Complete Monograph

2024 GROUP A PROPOSED CHANGES TO THE I-CODES

April 7 – 16, 2024
Doubletree by Hilton
Universal Orlando - Orlando, FL

ICC
INTERNATIONAL CODE COUNCIL®

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INTRODUCTION

As utilized during the previous Cycles, code change modifications will be submitted and presented for committee and public viewing at the Committee Action Hearing through the cdpACCESS system. Detailed instructions for modifications will be available at the cdpACCESS website. In addition, printed instructions will be supplied at the CAH hearings. See page vi for details on the modification submittal process.

The proposed changes published herein have been submitted in accordance with established procedures [Council Policy 28 Code Development (CP 28)] (see page xv) and are posted for review. The publication of these changes constitutes neither endorsement nor question of them but is in accordance with established procedures so that any interested individuals may make their views known to the relevant code committee and others similarly interested. In furtherance of this purpose, the committee will hold an open public hearing at the date and place shown below for the purpose of receiving comments and arguments for or against such proposed changes. Those who are interested in testifying on any of the published changes are expected to be represented at these hearings.

This compilation of code change proposals is available in electronic form only. ICC no longer prints and distributes this document. The compilation of code change proposals is posted on two locations on the ICC website: the customary posting which is the linked from the Code Development webpage and from the cdpACCESS webpage.

2024 GROUP A CODE GROUPINGS

Codes to be considered in Group A Cycle:

- IBC – Egress
- IBC – Fire Safety
- IFC
- IFGC
- IMC
- IPC
- IPSDC
- IRC – Mechanical
- IRC – Plumbing
- ISPSC
- IWUIC

See page viii for the 2024 – 2026 ICC Code Development Schedule

2024 ICC COMMITTEE ACTION HEARINGS

These proposed changes will be discussed in public hearings to be held on April 7-16, 2024, at the DoubleTree by Hilton at the entrance to Universal Orlando, Orlando, FL. The code committees will conduct their public hearings in accordance with the schedule shown on page lxxv.

MEMBERSHIP COUNCILS
PRIOR TO THE HEARINGS

Prior to the hearings, some of the Membership Councils will be holding meetings from 8-10am, Sunday, April 7th. This has been identified on the hearing schedule that was posted February14th. There will also be a panel discussion with lunch from Noon-2pm on Sunday, April 7th, during which industry and Code Council leaders will share their advice and experiences.

ADVANCED REGISTRATION AND VOTING

ICC members in attendance will be allowed to vote on procedural "points of order" in accordance with Section 6.4.8. of CP 28 (see page xxviii) **For identification purposes, all hearing participants must register. There is no cost to register or participate in the hearings.**

You are encouraged to advance register. Click here to register online.

The registration desk will be open in the lobby of the convention center according to the following schedule:

Saturday, April 6th	2:00 pm to 5:00 pm
Sunday, April 7th	8:00 am to 5:00 pm
Monday, April 8th through Saturday, April 13th	7:30 am to 5:00 pm
Sunday, April 14th	9:30 am to 5:00 pm
Monday, April 15th through Tuesday, April 16th	7:30 am to 5:00 pm

In order to be eligible to vote at the 2024 Annual Conference, Public Comment Hearings and the Online Governmental Consensus Vote, CP 28 requires that applications for new and reinstating Governmental Memberships must be received by the ICC at least 30 days prior to the Committee Action Hearing. This deadline is March 8, 2024. Recent revisions to CP 28 require voter validation only once during each code development cycle. (See Section 12.1 bold below). Applicable CP 28 sections noted below:

> 12**.1 Eligible Final Action Voters:** Eligible Final Action voters include ICC Page 30 of 34 CP#28-05 Governmental Member Voting Representatives and Honorary Members in good standing who have been confirmed by ICC in accordance with the Electronic Voter Validation System. **Such confirmations are required to be revalidated once each code development cycle. After initial validation, changes to the list of GMVRs for the remainder of the code development cycle shall be made in accordance with Section 12.2.** Eligible Final Action voters in attendance at the Public Comment Hearing and those participating in the Online Governmental Consensus Vote shall have one vote per eligible voter on all Codes. Individuals who represent more than one Governmental Member shall be limited to a single vote.
>
> **12.2 Applications:** Applications for Governmental Membership must be received by the ICC at least 30 days prior to the Group A First Committee Action Hearing (CAH #1) in order for its designated representatives to be eligible to vote at the Code Group A and B Public Comment Hearing or Online Governmental Consensus Vote. Applications, whether new or updated, for Governmental Member Voting Representative status must be received by the Code Council 30 days prior to the commencement of the first day of the Code Group A and B Public Comment Hearing in order for any designated representative to be eligible to vote. An individual designated as a Governmental Member Voting Representative shall provide sufficient information to establish eligibility as defined in the ICC Bylaws. The Executive Committee of the ICC Board, in its discretion, shall have the authority to address questions related to eligibility.

As such, new and reinstating Governmental Member membership applications must be received by ICC's Member Services Department by March 8, 2024. For information on application for new membership and membership renewal, click here or call ICC Member Services at 1-888-ICC SAFE (422-7233)

2025 GROUP B CODE DEVELOPMENT COMMITTEE RESPONSIBILITIES

Some sections of the International Codes have a letter designation in brackets in front of them. Code change proposals submitted for such code sections that have a bracketed letter designation in front of them will be heard by the respective committee responsible for such code sections. Because different committees will meet in different years, some proposals for a given code will be heard by a committee in a different year than the year in which the primary committee for this code meets.

For instance, Section 1505.8 of the IBC has a [BF] in front of it, meaning that this section is the responsibility of the IBC – Fire Safety Code Development Committee. However, the technical content of Chapter 15 is generally structural and as such, code change proposals are designated with the structural designation: IBC – S. Be sure to consult the Cross Index of Proposed Code Changes on page Iii and the respective Tentative Order of Discussion for the individual committees.

A complete summary of the 2024 – 2026 Group A and Group B Code Development Committees' responsibilities can be viewed at the ICC Website.

ANALYSIS STATEMENTS

Various proposed changes published herein contain an "analysis" that appears after the proponent's reason. These comments do not advocate action by the code committees or the voting membership for or against a proposal. The purpose of such comments is to identify pertinent information that is relevant to the consideration of the proposed change by all interested parties, including those testifying, the code committees and the voting membership. Staff analyses customarily identify such things as: conflicts and duplication within a proposed change and with other proposed changes and/or current code text; deficiencies in proposed text and/or substantiation; text problems such as wording defects and vagueness; background information on the development of current text; and staff's review of proposed reference standards for compliance with the Procedures. Lack of an analysis indicates neither support for, nor opposition to a proposal.

NEW REFERENCE STANDARDS

Proposed changes that include the addition of a reference to a new standard (a standard that is not currently referenced in the current edition of the I-Codes) will include in the proposal the number, title and edition of the proposed standard. This identifies to all interested parties the precise document that is being proposed and which would be included in the referenced standards chapter of the code if the proposed change is approved. Section 4.6.3.1.1 of CP 28 requires that a code change proposal will not be processed unless a consensus draft of the standard has been provided. Proponents of code changes which propose a new standard have been requested to provide copies of the standard to the code development committee. An analysis statement will be posted on the ICC website providing information regarding standard content, such as enforceable language, references to proprietary products or services, and references to consensus procedure. The analysis statements for referenced standards will be posted on or before March 18, 2022. This information will also be published and made available at the hearings.

Proposed new reference standards must be completed and readily available prior to the 2026 Public Comment Hearing in accordance with Section 4.6.3.1.1 of CP28.

REFERENCED STANDARDS UPDATES

Updates to currently referenced standards in any of the 2024 Codes will be considered by the Administrative Code Development Committee in the 2025 Group B Cycle.

Note that based on recent changes to Section 4.6.3.1 of CP28, updates to existing referenced standards that are part of a code change proposal that includes technical revisions to code text to coordinate with such proposed standard(s) update are to be processed as proposed new standards in accordance with Sections 4.4 and 4.6.3.1.2 of CP28. Accordingly, drafts of the revisions would have needed to be supplied at the time of the code change submittal and the standard update will be required to be completed and published on or before the Public Comment Hearing for this 2026 Cycle, April 19, 2026.

It should be noted that, in accordance with Section 5.6 and 5.6.1 of CP 28, standards promulgators will have until December 1, 2026 to finalize and publish any updates to standards in the administrative update. If the standard update is not finalized and published by December 1, 2026, the respective I-Codes will be revised to reference the previously listed year edition of the standard. (See Section 5.6.1 below)

> **5.6.1 Updating ICC Standards Referenced in the Codes.** All standards developed by ICC and referenced by the Codes which are undergoing an update shall be announced by ICC to allow stakeholders to participate in the update process. Where the updated standard is completed and available by December 1 of the third year of the code cycle,

the published version of the new edition of the Code which references the standard shall refer to the updated edition of the standard. If the standard is not available by the December 1st deadline, the edition of the standard as referenced by the newly published Code shall revert back to the reference contained in the previous edition and an errata to the Code issued.

ICC WEBSITE

This document is posted on the ICC Website. While great care has been exercised in the publication of this document, errata to proposed changes may occur. Errata, if any, will be identified in updates posted prior to the Committee Action Hearing. Users are encouraged to periodically review the ICC Website. Additionally, analysis statements for code changes which propose a new referenced standard will be updated and posted to reflect the staff review of the standard for compliance with select portions of Section 4.6 of the Procedures.

PROPONENT CONTACT INFORMATION

In accordance with procedures, proponents are under no obligation to provide an email address for their posted proposal. For most of the code change proposals, an email address for the proponent has been provided. In an effort to continue to provide for proponent’s privacy and at the same time allow an initial contact between an interested party and the proponent, we will be utilizing cdpACCESS to allow an interested party to initiate contact with the proponent without identifying the proponent’s email address. The process is follows:

- Interested party logs into cdpACCESS and searches for the subject code change.
- Interested party locates the button “Contact the Proponent” to request that cdpACCESS contact the proponent, providing the interested party’s name and email address.
- cdpACCESS uses the proponent email address on file and sends a notification to the proponent indicating the name of the interested party and their email address and that the interested party would like to discuss the code change.
- The interested party receives an email noting that the cdpACCESS system has sent the request to the proponent.
- It is up to the proponent to determine if they would like to respond and contact the interested party.
- The proponent is under no obligation to respond to the cdpACCESS request for contact or to contact the interested party. The proponent’s contact information is not revealed to the interested party as part of this initial contact.

HEARING ORDER CHANGES AND TABLING OF PROPOSALS

The Code Change Agenda that places the code change proposals in a logical order for each hearing committee is shown at the beginning of the respective committee’s group of code change proposals. In accordance with Section 6.4.4 of CP28, any attendee at the hearing is allowed make a motion to revise the hearing order at any time during the hearings except while a code change is being discussed, but usually as the first order of business at the hearing. Preference is given to grouping like subjects together, and moving items back to a later position on the agenda.

This motion is considered in order unless the proponent(s) of the moved code change proposals are in attendance and object to the move. If there is objection to the move, the motion is ruled out of order by the Moderator. This ruling is final and not debatable. If the motion is not ruled out of order, the motion is subject to a 2/3 vote of those present.

A motion to table a code change proposal is allowed in accordance with Section 6.4.5 of CP28. Just as with a motion to move a code change proposal in the hearing order, this motion is in order only if there is no objection from the proponent(s) in attendance at the hearing. When the proponent(s) object, the motion to table is ruled out of order by the Moderator. The ruling is final and not subject to debate.
The motion to table must identify the location to where the code change proposal consideration will be resumed by either identifying a specific date and time within the timeframe of the Code Change Agenda for the group of code change proposals under consideration or by designating a specific location in the Code Change Agenda. If the motion to table is not ruled out of order, the motion is subject to a $^2/_3$ vote of those present.

FLOOR MODIFICATIONS

With the implementation of the cdpACCESS online system, CP 28 was revised to reflect that floor modifications would be submitted electronically at the Committee Action Hearing (CAH).

The only aspect of the modification process that has changed is the way the modification is submitted and viewed. It is required to be submitted electronically via cdpACCESS. All other aspects of the modification process are unchanged. As in the past, the proponent of the modification must be in attendance at the CAH to present the modification as part of his/her testimony.

Those who are submitting a modification for consideration by the respective Code Development Committee are required to sign a Copyright Release in order to have their modification(s) considered (Section 4.3.5.5 of CP 28). This feature is built into cdpACCESS similar to the way the release is executed for code change and public comment submittals.

The Chair rules the modification in or out of order. Note that this is a procedural ruling to determine if the modification is to be permitted to be considered at the hearing. It is not a technical ruling. The ruling is final, with no challenge allowed.

The modification proponent is required to identify the specific text of the code change proposal that is being revised and the revision itself. In this way, it is very similar to the public comment process and that is the way cdpACCESS was developed to process modifications.

Example:
Original code change proposal.
The original code change proposal requested the following change to Section 1506.2 of the IBC: (Note that the example is fictional.)

FS15-24
803.1.1

Proponent: John West representing self

Revise as follows:

803.1.1 Interior wall and ceiling finish materials tested in accordance with NFPA 286. Interior wall and ceiling finish materials shall be classified in accordance with NFPA 286 and comply with Section 803.1.1.1. Materials complying with Section 803.1.1.1 shall be considered to also comply with the requirements of Class A.

> **Exception:** Interior wall and ceiling finish materials qualified in accordance with Section 104.2.3 and approved by the code official.

Proposed modification:

A modification to the code change proposal is proposed:

1. To change “Interior wall and ceiling finish materials” to “Interior wall and ceiling finish systems.”
2. To change “conform to” to “comply with.”
3. To remove “and approved by the code official” from the exception.

The cdpACCESS system will provide the text of the original code change proposal with the proposed change incorporated into the text. Using the cdpACCESS system, the proponent of the modification locates the original change in the system.

The proponent of the modification will need to manually install strikethrough (ex:” ~~delete~~) and underline (ex: add) formatting showing the additional revisions to the original proposal.

cdpACCESS will show the modification as follows:

FS15-24
803.1.1

Proponent: John West representing self

Revise as follows:

803.1.1 Interior wall and ceiling finish materials tested in accordance with NFPA 286. Interior wall and ceiling finish materials shall be classified in accordance with NFPA 286 and comply with Section 803.1.1.1. Materials complying with Section 803.1.1.1 shall be considered to also comply with the requirements of Class A.

> **Exception:** Interior wall and ceiling finish ~~materials~~ systems qualified in accordance with Section 104..2.3 ~~and approved by the code official~~.

Among the benefits of using cdpACCESS to submit modifications are:

- Modification proponents will be able to access the system in advance of the hearings to develop their modification (see "Detailed Steps of the Modification Submission Process via cdpACCESS" on the following pages).
- 20 hard copies of the modification for distribution to the committee are no longer required.
- You can preview your modification at any time by downloading a pdf via cdpACCESS.

OVERVIEW OF THE MODIFICATION PROCESS (see CP28 Section 6.5.2 on page xxviii)

1. Modification submitted electronically via cdpACCESS. As in the past, this submittal is required well in advance of the code change proposal being brought to the floor.

2. The code change proposal is brought to the floor by the Moderator.

> **IMPORTANT NOTE: ONCE A CODE CHANGE PROPOSAL IS BROUGHT TO THE FLOOR, ALL MODIFICATIONS MUST BE IN THE cdpACCESS SYSTEM. SEE NOTE 1.**

3. Modification proponent suggests the modification from the floor at the hearing.

4. Modification posted to cdpACCESS for public viewing (including the hearing room via WiFi) and committee viewing.

5. Modification displayed on the screen in the hearing room.

6. Chair rules the modification in or out of order.

7. If ruled in order, testimony on the modification is initiated.

EDITORIAL CODE CHANGES - CODE CORRELATION COMMITTEE

In a typical code change cycle, there are code change proposals that are considered strictly editorial. Section 5.4 of CP 28 (see below) establishes a process by which the Code Correlation Committee (CCC) considers such proposals.

> **5.4 Editorial Code Change Proposals.** When a code change proposal is submitted that proposes an editorial or format change that, in the opinion of the Secretariat, does not affect the scope or application of the code, the proposal shall be submitted to the Code Correlation Committee who shall deem the code change proposal as editorial or send the proposal back to the Secretariat to be considered by the appropriate Committee. To be deemed editorial, such proposal shall require a majority vote of the Code Correlation Committee. Editorial proposals shall be published in the Code Change Agenda. Such proposals shall be added to the hearing agenda for consideration by the appropriate Committee upon written request to ICC by any individual. The deadline to submit such requests shall be 14 days prior to the first day of the First Committee Action Hearing (CAH #1). Code Correlation Committee proposals that are not added to a Committee hearing agenda shall be published in the next edition of the code with no further consideration.

There are 7 such proposals in the current 2024 Cycle. The proposals are located after the last code change in the CAH Agenda and are identified by a code change prefix of CCC.

As noted in Section 5.4, anyone may request that either of these proposals be added to the hearing agenda. The deadline to make such a request is 11: 59 pm Pacific on Sunday, March 24, 2024 via email. Be sure to identify the code change number noted above. Such requests must be sent to:

Ed Wirtschoreck
Director, Codes
ewirtschoreck@iccsafe.org

CODE DEVELOPMENT PROCESS STARTING IN 2024

The ICC board approved a standing motion from the Board Committee on the Long-Term Code Development Process to revise the code development cycle to incorporate two committee action hearings for each code group. This change expands the current process from two independent one-year cycles to a single continuous three-year cycle. This revised process is reflected in the following 2024/2025/2026 ICC Code Development Schedule. Go to https://www.iccsafe.org/products-and-services/i-codes/code-development-changes/ for more information.

2024/2025/2026 ICC CODE DEVELOPMENT SCHEDULE

3/17/23

STEP IN CODE DEVELOPMENT CYCLE	DATE		
	2024 – Group A Codes **IBC – E, IBC – FS, IFC, IFGC, IMC, IPC, IPSDC, IRC – M, IRC – P, ISPSC, IWUIC**	**2025 – Group B Codes** **Admin, IBC – G, IBC – S, IEBC, IgCC (Ch. 1 & App M), IPMC, IRC – B, IZC**	**2026 - Group A & B Codes** **Public Comments Posting, Public Comment Hearing, Online Governmental Consensus Vote**
DEADLINE FOR RECEIPT OF ONLINE APPLICATIONS FOR ALL CODE DEVELOPMENT COMMITTEES	June 1, 2023 (See Schedule Notes)		
cdpACCESS OPEN FOR CODE CHANGE SUBMITTALS	October 16, 2023 (Tentative)	October 15, 2024	
DEADLINE FOR cdpACCESS ONLINE RECEIPT OF CODE CHANGE PROPOSALS	January 8, 2024	January 10, 2025	
WEB POSTING OF "PROPOSED CHANGES TO THE I-CODES"	February 26, 2024	March 13, 2025	
COMMITTEE ACTION HEARING #1 (CAH #1)	April 7 – 16, 2024	April 27 – May 6, 2025	
cdpACCESS OPEN FOR COMMENT SUBMITTALS TO CAH #1 ACTION	May 16, 2024	May 27, 2025	
WEB POSTING OF "REPORT OF THE COMMITTEE ACTION HEARING #1"	May 16, 2024	June 3, 2025	
DEADLINE FOR cdpACCESS ONLINE RECEIPT OF COMMENTS ON CAH #1 ACTIONS	July 8, 2024	July 8, 2025	
WEB POSTING OF "COMMENTS TO CAH #1"	September 5, 2024	August 27, 2025	
COMMITTEE ACTION HEARING #2 (CAH #2)	October 23 – 31, 2024	October 8 – 16, 2025	
WEB POSTING OF "REPORT OF THE COMMITTEE ACTION HEARING #2"	December 2, 2024	November 13, 2025	

STEP IN CODE DEVELOPMENT CYCLE	DATE		
	2024 – Group A Codes **IBC – E, IBC – FS, IFC, IFGC, IMC, IPC, IPSDC, IRC – M, IRC – P, ISPSC, IWUIC**	**2025 – Group B Codes** **Admin, IBC – G, IBC – S, IEBC, IgCC (Ch. 1 & App M), IPMC, IRC – B, IZC**	**2026 - Group A & B Codes** **Public Comments Posting, Public Comment Hearing, Online Governmental Consensus Vote**
cdpACCESS OPEN FOR PUBLIC COMMENT SUBMITTALS FOR 2026 PCH	January 20, 2025 (Tentative)	November 13, 2025 (Tentative)	
DEADLINE FOR cdpACCESS ONLINE RECEIPT OF PUBLIC COMMENTS FOR 2026 PCH	March 14, 2025	January 5, 2026	
WEB POSTING OF "GROUP A & B PUBLIC COMMENT AGENDA"	See 2026	See 2026	March 4, 2026
COMBINED GROUP A & B PUBLIC COMMENT HEARING (PCH)	Combined Group A & B PCH in 2026	Combined Group A & B PCH in 2026	April 19 - 28, 2026
COMBINED GROUP A & B ONLINE GOVERNMENTAL CONSENSUS VOTING (OGCV) PERIOD	Combined Group A & B OGCV in 2026	Combined Group A & B OGCV in 2026	Starts approx. two - three weeks after the last day of PCH.
WEB POSTING OF GROUP A & B FINAL ACTION	See 2026	See 2026	Following Validation Committee certification and ICC Board confirmation.

Schedule Notes:

- This schedule introduces the restructured process starting in 2024 with two Committee Action Hearings (CAH #1 and CAH #2) for each Code Group in 2024 and 2025, followed by a combined Group A and B PCH and OGCV in 2026. Click here for more information.
- Code Development Committee applications: As noted above, the restructured process will include two CAH's for which the same committee members who presided at CAH#1 will also preside at CAH#2. Previous cycles required Code Development Committee members to preside at only a single CAH in the Spring of the given year. Please be sure to consider this when applying for a Code Development Committee position.
- The "cdpACCESS OPEN" steps noted as "(tentative)" reflect availability of the applicable codes in the cdpACCESS system.
- Web posting of the "Proposed Changes to the I-Codes", "Comments to CAH #1" and "Group A & B Public Comment Agenda" will be posted no later than scheduled. ICC will make every effort to post these documents earlier, subject to code change/comment/public comment volume and processing time.
- "Comment" vs "Public Comment": CP28 uses the term "comment" to indicate a submittal in response to CAH #1 action and "public comment" in response to a CAH #2 action to be considered at the PCH. See Sections 7.0 and 9.0 in CP28.

2024 Group A Codes/Code Development Committees:

- IBC-E: IBC Egress provisions. Chapters 10 and 11.
- IBC-FS: IBC Fire Safety provisions. Chapters 7, 8, 9 (partial), 14 and 26. Majority of IBC Chapter 9 is maintained by the IFC. See Code Group Notes.
- IFC: The majority of IFC Chapter 10 is maintained by IBC-E. See Code Group Notes.
- IFGC
- IMC
- IPC
- IPSDC: Code changes heard by the IPC committee (combined IPC & IPSDC committee)
- IRC-M: IRC Mechanical provisions. Chapters 12 – 23 (code changes heard by the IRC - MP committee)
- IRC-P: IRC Plumbing provisions. Chapters 25 – 33 (code changes heard by the IRC – MP committee)
- ISPSC
- IWUIC: Code changes heard by the IFC committee (combined IFC & IWUIC committee)

2025 Group B Codes/Code Development Committees:

- Admin: Chapter 1 of all the I-Codes except the IgCC and IRC. Also includes the update of currently referenced standards in all of the 2021 Codes, except the IgCC. See Code Group Notes below for the IECC and the ICC PC.
- IBC-G: IBC General provisions. Chapters 3 – 6, 12, 13, 27 – 33.
- IBC-S: IBC Structural provisions. IBC Chapters 15 – 25 and IEBC structural provisions. See Code Group Notes.
- IEBC: IEBC Non-structural provisions. See Code Group Notes.
- IgCC: The administration provisions of Chapter 1 of the IgCC in order to provide for coordination with the other administrative provisions in the I-Codes. Additionally, Appendix M included as it is not included in ASHRAE Standard 189.1. Remainder of the code is based on the provisions of ASHRAE Standard 189.1 *Standard for the Design of High-Performance Green Buildings, Except Low-Rise Residential Buildings*.
- IPMC: Code changes heard by the IPM/ZC (combined IPMC & IZC code committee)
- IRC-B: IRC Building provisions. Chapters 1 – 10
- IZC: Code changes heard by the IPM/ZC (combined IPMC & IZC code committee)

Code Group Notes:

- Be sure to review the document entitled “2024/2025/2026 Group A and B Code Development Committee Responsibilities Matrix” (matrix) which will be posted. This identifies responsibilities which are different than Group A and B codes and committees which may impact the applicable code change cycle and resulting code change deadline. As an example, throughout Chapter 4 of the IBC (IBC- General), there are numerous sections which include the designation “[F]” which indicates that the provisions of the section are maintained by the IFC committee. Similarly, there are numerous sections in the IEBC which include the designation “[BS]”. These are structural provisions which will be heard by the IBC – Structural committee. The designations in the code are identified in the matrix.
- I-Code Chapter 1: Proposed changes to the provisions in Chapter 1 of the majority of the I-Codes are heard in Group B (see Admin above for exceptions). Be sure to review the brackets ([ ]) of the applicable code.
- Definitions. Be sure to review the brackets ([ ]) in Chapter 2 of the applicable code and the matrix to determine which committee will consider proposed changes to the definitions.
- ICC Performance Code (ICC PC): The 2027 edition of the ICC PC will be updated utilizing the ICC standards process. Click link for more information.

- International Energy Conservation Code (IECC) and Chapter 11 of the International Residential Code (IRC): The 2027 edition of the IECC and Chapter 11 of the IRC will be updated utilizing the ICC standards process. Click link for more information.

2024/2025/2026 STAFF SECRETARIES

GROUP A (2024)

IBC – Egress Chapters 10, 11	IBC – Fire Safety Chapters 7, 8, 9, 14, 26	IFC	IFGC	IMC
Kim Paarlberg Indianapolis, IN Ext 4306 kpaarlberg@iccsafe.org	Samhar Hoz Chicago Regional Office Ext 4284 shoz@iccsafe.org	Beth Tubbs Northbridge, MA Ext 7708 btubbs@iccsafe.org Keith Enstrom Chicago Regional Office Ext 4342 kenstrom@iccsafe.org	LaToya Carraway Chicago Regional Office Ext 4347 lcarraway@iccsafe.org	LaToya Carraway Chicago Regional Office Ext 4347 lcarraway@iccsafe.org
IPC/IPSDC	**IRC Mechanical**	**IRC Plumbing**	**ISPSC**	**IWUIC**
Fred Grable Chicago Regional Office Ext 4359 fgrable@iccsafe.org	LaToya Carraway Chicago Regional Office Ext 4347 lcarraway@iccsafe.org	Fred Grable Chicago Regional Office Ext 4359 fgrable@iccsafe.org	Fred Grable Chicago Regional Office Ext 4359 fgrable@iccsafe.org	Keith Enstrom Chicago Regional Office Ext 4342 kenstrom@iccsafe.org Beth Tubbs Northbridge, MA Ext 7708 btubbs@iccsafe.org

GROUP B (2025)

ADMINISTRATIVE Chapter 1 All Codes except the IECC, IgCC, and IRC	IBC – General Chapters -6, 12, 13, 27-34	IBC- Structural Chapters 15-25 IEBC Structural	IEBC	ICC Performance
Keith Enstrom Chicago Regional Office Ext 4342 kenstrom@iccsafe.org	Quinton Owens Sugar City, ID Ext 4319 qowens@iccsafe.org Kim Paarlberg Indianapolis, IN Ext 4306 kpaarlberg@iccsafe.org	Samhar Hoz Chicago Regional Office Ext 4284 shoz@iccsafe.org	Beth Tubbs Northbridge, MA Ext 7708 btubbs@iccsafe.org Keith Enstrom Chicago Regional Office Ext 4342 kenstrom@iccsafe.org	Beth Tubbs Northbridge, MA Ext 7708 btubbs@iccsafe.org
IPMC	**IRC-Building**	**IZC**		
Ed Wirtschoreck Chicago Regional Office Ext 4317 ewirtschoreck@iccsafe.org	Kim Paarlberg Indianapolis, IN Ext 4306 kpearlberg@iccsafe.org Samhar Hoz Chicago Regional Office Ext 4284 shoz@iccsafe.org	Ed Wirtschoreck Chicago Regional Office Ext 4317 ewirtschoreck@iccsafe.org		

IgCC proposals to Chapter 1 to be heard by the Administrative Committee.

CP#28-05 – Code Development

Approved: 09/24/05 | **Revised:** 12/08/23

1.0 Introduction

1.1 **Purpose of Council Policy:** The purpose of this Council Policy is to prescribe the Rules of Procedure utilized in the continued development and maintenance of the International Codes (Codes).

1.2 **Objectives:** The ICC Code Development Process has the following objectives:

1.2.1 The timely evaluation and recognition of technological developments pertaining to construction regulations.
1.2.2 The open discussion of code change proposals by all parties desiring to participate.
1.2.3 The final determination of Code text by public officials actively engaged in the administration, formulation, implementation or enforcement of laws, ordinances, rules, or regulations relating to the public health, safety, and welfare and by honorary members.
1.2.4 The increased participation of all parties desiring to participate through an online submittal and voting process that includes opportunities for online collaboration.

1.3 **Code Publication:** The ICC Board of Directors (ICC Board) shall determine the title and the general purpose and scope of each Code published by the ICC.

1.3.1 **Code Correlation:** The provisions of all Codes shall be consistent with one another so that conflicts between the Codes do not occur. A Group A and Group B Code Development Committee Responsibilities Matrix identifies which Code shall be the primary document, and therefore which Code Development Committee shall be responsible for maintenance of the Code text where a given subject matter or Code text could appear in more than one Code. The Matrix shall be administered by the Code Correlation Committee as approved by the ICC Board and posted prior to the code change proposal deadline. Duplication of content or text between Codes shall be limited to the minimum extent necessary for practical usability of the Codes, as determined in accordance with Section 5.5.

1.4 **Process Maintenance:** The review and maintenance of the Code Development Process and these Rules of Procedure shall be by the ICC Board. The manner in which Codes are developed embodies core principles of the organization. One of those principles is that the final content of the Codes is determined by a vote of the governmental and honorary members in accordance with Sections 10.6 and 11. It is the policy of the ICC Board that there shall be no change to this principle without the affirmation of two-thirds of the governmental and honorary members responding.

1.5 **Secretariat:** The Chief Executive Officer shall assign a Secretariat for each of the

Codes. All correspondence relating to code change proposals, comments to Committee action and public comments shall be addressed to the Secretariat. The Secretariat shall have the authority to facilitate unforeseen situations which arise in the implementation of this council policy. Staff shall maintain a record of such actions.

1.6 **Code Development Committee:** The members of the respective Code Development Committee presiding over the hearings are appointed by the ICC Board in accordance with Section 6.2. The term "Committee" is used throughout this Council Policy to refer to Code Development Committee members.

1.7 **Recording:** Individuals requesting permission to record any meeting or hearing, or portion thereof, shall be required to provide the ICC with a release of responsibility disclaimer and shall acknowledge that ICC shall retain sole ownership of the recording, and that they have insurance coverage for liability and misuse of recording materials. Equipment and the process used to record shall, in the judgment of the ICC Secretariat, be conducted in a manner that is not disruptive to the meeting. The ICC shall not be responsible for equipment, personnel or any other provision necessary to accomplish the recording. An unedited copy of the recording shall be forwarded to ICC within 30 days of the meeting. Recordings shall not otherwise be copied, reproduced or distributed in any manner. Recordings shall be returned to ICC or destroyed upon the request of ICC.

1.8 **Code of Ethics:** Each individual participating in the ICC Code Development Process shall comply with the posted *ICC Code of Ethics*.

2.0 Code Development Cycle

2.1 **Intent:** The code development cycle shall consist of the complete consideration of code change proposals in accordance with the procedures herein specified, commencing with the deadline for submission of code change proposals (see Section 4.5) and ending with publication of the Final Action on the code change proposals (see Section 13.4).

2.2 **New Editions:** The ICC Board shall determine the schedule for publishing new editions of the Codes. Each new edition shall incorporate the results of the code development activity since the previous edition.

2.3 **Interim Code Amendments:** All revisions to the International Codes shall be processed in accordance with other sections of this Council Policy except for Emergency Actions by the ICC Board complying with Section 2.3.1 and Interim Critical Amendments (ICA) complying with Section 2.3.2.

2.3.1 **Emergency Actions by the ICC Board:** Emergency actions by the ICC Board are limited to those issues representing an immediate threat to health and safety that warrant a more timely response than allowed by the Code Development Process schedule.

2.3.1.1 **Initial Request:** A request for an emergency action shall be based upon perceived immediate threats to health and safety and shall be reviewed by the Codes and Standards Council for referral to the ICC Board for action with their analysis and recommendation.

2.3.1.2 **Board and Member Action:** In the event that the ICC Board determines that an emergency amendment to any Code or supplement thereto is warranted, the same may be adopted by the

ICC Board. Such action shall require an affirmative vote of at least two-thirds of the ICC Board.

The ICC membership shall be notified within ten days after the ICC Boards' official action of any emergency amendment. At the next Annual Business Meeting, any emergency amendment shall be presented to the members for ratification by a majority of the Governmental Member Voting Representatives and Honorary Members present and voting.

All code revisions pursuant to these emergency procedures and the reasons for such corrective action shall be published as soon as practicable after ICC Board action. Such revisions shall be identified as an emergency amendment.

Emergency amendments to any Code shall not be considered as a retro-active requirement to the Code. Incorporation of the emergency amendment into the adopted Code shall be subjected to the process established by the adopting authority.

2.3.2 Interim Critical Amendments (ICA)

2.3.2.1 Submittal. Anyone may propose an ICA by providing the following information:

a) Name of submitter
b) Contact information
c) Submitters representation
d) Date
e) Relevant section(s) and code edition(s) under consideration
f) Proposed modifications with text changes identified using underlines for new text and strikethroughs for deleted text
g) A statement that substantiates the need for proposed changes and why the proposed submission is of such a critical nature in accordance with Section 2.3.2.3 that it cannot be left to be addressed during the next code development cycle.
h) Written endorsement of the proposed ICA by not less than two members of the Committee(s) responsible for maintaining the affected code section(s)

2.3.2.2 Preliminary Review. An ICA will only be processed if the Codes and Standards Council determines that the proposed ICA appears to be of a critical nature requiring prompt action based on the criteria specified in Section 2.3.2.3. If processed, the question of critical nature shall be further considered by the responsible Committee(s) and the Codes and Standards Council. The text of a proposed ICA shall be processed as submitted or shall be changed with the approval of the submitter. The Codes and Standards Council shall process their preliminary "critical nature" determination within 45 days of the ICA submission.

2.3.2.3 Determination of Critical Nature. Qualification for critical nature shall be based on one or more of the following factors:

a) The proposed ICA corrects an error or an omission that was overlooked during a regular code development process.
b) The proposed ICA resolves a conflict within an individual code or a conflict involving two or more ICC codes.
c) The proposed ICA mitigates a previously unknown hazard.

2.3.2.4 Committee. A proposed ICA that meets the provisions in Sections 2.3.2.2 and 2.3.2.3 shall be submitted to the Committee(s) responsible for the affected section(s) for a ballot and comment period of 30 calendar days. The Committee(s) shall be separately balloted on both the technical merit of the ICA and whether the ICA satisfies the critical nature criteria. Negative votes in the initial ballot, if any, shall require a reason statement and shall be circulated to the full Committee(s) to allow initial ballot votes to be changed.

A Committee recommendation for approval shall require an affirmative vote of at least three-fourths of members who voted, on both technical merit and critical nature. The following shall be omitted from the three-fourths vote calculation:

a) Committee members who have abstained.
b) Committee members whose negative ballots do not include a statement conveying the reason for casting a negative vote.
c) Committee members who do not return their ballots prior to the announced ballot return deadline.

In addition to the three-fourths majority described above, the number of affirmative votes shall be not less than 50% of all Committee members who are eligible to vote. Committee members eligible to vote shall be the total number of individuals who are members of the Committee on the date of ballot distribution and shall not be adjusted based on abstentions or ballots that were not returned.

ICAs that achieve the required number of affirmative votes on both technical merit and critical nature are approved for further processing in accordance with Sections 2.3.2.5 through 2.3.2.9. ICAs that do not achieve the required number of affirmative votes on both technical merit and critical nature are rejected.

2.3.2.5 Publication of Proposed ICA for Comment. An ICA that is approved in accordance with Section 2.3.2.3 shall be published by ICC in appropriate media with a notice inviting the public to comment on the proposed ICA. The comment period shall be open for at least 30 calendar days from the date of posting of the notice. When a proposed ICA revises text that was changed in the most recent code development cycle, the ICA comment notice shall also be directly provided to submitters of proposals, comments to Committee action and public comments to the affected section in the most recent code development cycle.

2.3.2.6 Additional Committee Review. All comments shall be circulated to the responsible Committee(s) for a 30-calendar day ballot and comment period allowing an opportunity for Committee members to change votes taken prior to the comment period. If any votes are changed to negative, negative votes shall be circulated to the full Committee, followed by a final ballot following the voting procedures Section 2.3.2.4.

Approved ICAs shall be forwarded to the Codes and Standards Council with a staff report that includes all comments, ballots, Committee member comments on ballots and concurrence by staff on which code editions should be affected by the ICA.

2.3.2.7 **Action of the Codes and Standards Council.** The Codes and Standards Council shall review the material submitted in accordance with Section 2.3.2.6 at the next Codes and Standards Council meeting. Approval of an ICA shall require an affirmative vote of at least two-thirds of the Codes and Standards Council members who cast a vote at the meeting.

2.3.2.8 **Effective Date and Publication**. ICAs that are approved by the Codes and Standards Council shall become effective 30 calendar days after approval, or in the case of an appeal in accordance with Section 2.3.2.9, 30 calendar days after a decision by the ICC Board upholding a Codes and Standards Council decision to issue an ICA.

An ICA shall apply to code editions specified by the ICC Codes and Standards Council, and ICC staff shall, by an appropriate method, publish approved ICAs and ensure that approved ICAs are distributed with future sales of affected codes. ICAs shall be distributed as a separate document and shall not be incorporated into the text of a published code until such time that the ICA has been approved by the full code development process, following submittal as a proposal in accordance with Section 2.3.2.11.

2.3.2.9 **Appeals.** A decision of the Codes and Standards Council to approve an ICA shall be appealable to the ICC Board in accordance with Council Policy 1.

2.3.2.10 **Applicability.** ICAs shall not be considered retroactive requirements.

2.3.2.11 **Subsequent Processing.** An approved ICA shall automatically become a code change proposal from the Codes and Standards Council in the following code cycle.

2.4 **Code Development Record.** The code development record shall include the official documents and records developed in support of the given code development cycle. This includes the following:

1. Code Change Agenda (Section 5.8)
2. Audio and video recording of both Committee Action Hearings for each code group (Sections 6.1 and 8.1)
3. Report of both Committee Action Hearings for each code group (Sections 6.7 and 8.5)
4. Public Comment Agenda (Section 9.6)

5. Public Comment Hearing results (Section 10.5.9.10)
6. Audio and video recording of the Public Comment Hearing (Section 10.0)
7. The Online Governmental Consensus Ballot (Section 11.3)
8. Final Action results (Section 13.4)
9. Errata to the documents noted above

The information resulting from online collaboration between interested parties shall not be part of the code development record.

3.0 Restructured Process Starting in 2024 (NEW)

3.1 **Process:** The 2027 I-Codes, and future editions, shall be developed utilizing a restructured code development process starting in 2024. The process includes the following key process steps:

YEAR ONE

- Code Group A code change proposals due (see Section 4.0)
- Code Group A First Committee Action Hearing (CAH #1) (see Section 6.0)
- Code Group A comments due on the action taken at CAH #1 (see Section 7.0)
- Code Group A Second Committee Action Hearing (CAH #2) (see Section 8.0)

YEAR TWO

- Code Group B code change proposals due (see Section 4.0)
- Code Group A public comments due (see Section 9.0)
- Code Group B First Committee Action Hearing (CAH #1) (see Section 6.0)
- Code Group B comments due on the action taken at CAH #1 (see Section 7.0)
- Code Group B Second Committee Action Hearing (CAH # 2) (see Section 8.0)

YEAR THREE

- Code Group B public comments due (see Section 9.0)
- Combined Code Group A & B Public Comment Hearing (see Section 10.0)
- Combined Code Group A & B Online Governmental Consensus Vote (see Section 11.0)

3.2 **Schedule:** A schedule of Code Groups, dates, locations and process steps with deadlines shall be posted a minimum of 120 days prior to the code change submittal deadline for Code Group A codes.

4.0 Submittal of Code Change Proposals

4.1 **Intent:** Any interested person, persons or group may submit a code change proposal which will be duly considered when in conformance to these Rules of Procedure.

4.2 **Withdrawal of Proposal:** A code change proposal may be withdrawn by the proponent (WP) at any time prior to membership action on the consent agenda at the Public Comment Hearing or prior to testimony on the code change proposal on the individual consideration agenda at the Public Comment Hearing. All actions on the code change proposal shall cease immediately upon the withdrawal of the code change proposal.

4.3 **Form and Content of Code Change Submittals:** Each code change proposal shall be submitted separately and shall be complete in-itself. Each submittal shall contain the following information:

4.3.1 **Proponent:** Each code change proposal shall include the name, title and email address of the proponent. Email addresses shall be published with the code change proposals unless the proponent otherwise requests on the submittal form.

4.3.1.1 If a group, organization or Committee submits a code change proposal, an individual with prime responsibility shall be indicated.

4.3.1.2 If a proponent submits a code change proposal on behalf of a client, group, organization or Committee, the name and email address of the client, group, organization, or Committee shall be indicated.

4.3.2 **Code Reference:** Each code change proposal shall relate to the applicable code sections(s) in the latest edition of the Code.

4.3.2.1 If more than one section in the Code is affected by a code change proposal, appropriate proposals shall be included for all such affected sections.

4.3.2.2 If more than one Code is affected by a code change proposal, appropriate proposals shall be included for all such affected Codes and appropriate cross referencing shall be included in the supporting information.

4.3.3 **Multiple Code Change Proposals to a Code Section.** A proponent shall not submit multiple code change proposals to the same code section. Where a proponent submits multiple code change proposals to the same section, the proposals shall be considered as incomplete proposals and processed in accordance with Section 5.3. This restriction shall not apply to code change proposals that attempt to address differing subject matter within a code section.

4.3.4 **Text Presentation:** The text of the code change proposal shall be presented in the specific wording desired with deletions shown struck out with a single line and additions shown underlined with a single line.

4.3.4.1 A charging statement shall indicate the referenced code section(s) and whether the code change proposal is intended to be an addition, deletion, or a revision to existing Code text.

4.3.4.2 Whenever practical, the existing wording of the text shall be preserved with only such deletions and additions as necessary to accomplish the desired change.

4.3.4.3 Each code change proposal shall be in proper code format and terminology.

4.3.4.4 Each code change proposal shall be complete and specific in the text to eliminate unnecessary confusion or misinterpretation.

4.3.4.5 The proposed text shall be in mandatory terms.

4.3.5 **Supporting Information:** Each code change proposal shall include sufficient supporting information to indicate how the code change proposal is intended to affect the intent and application of the Code.

4.3.5.1 **Purpose:** The proponent shall clearly state the purpose of the code change proposal (e.g., clarify the Code; revise outdated material; substitute new or revised material for current provisions of the Code; add new requirements to the Code; delete current requirements, etc.).

4.3.5.2 **Reasons:** The proponent shall justify changing the current Code provisions, stating why the code change proposal is superior to the current provisions of the Code. Code change proposals which add or delete requirements shall be supported by a logical explanation which clearly shows why the current Code provisions are inadequate or overly restrictive, specifies the shortcomings of the current Code provisions and explains how such code change proposals will improve the Code.

4.3.5.3 **Substantiation:** The proponent shall substantiate the code change proposal based on technical information and substantiation. Substantiation provided which is reviewed in accordance with Section 5.2 and determined as not germane to the technical issues addressed in the code change proposal may be identified as such. The proponent shall be notified that the code change proposal is considered an incomplete proposal in accordance with Section 5.3 and the proposal shall be held until the deficiencies are corrected. The proponent shall have the right to appeal this action in accordance withCP-01 - Appeals. The burden of providing substantiating material lies with the proponent of the code change proposal. Supporting documentation may be provided via a link to a website provided by the proponent and included in the reason statement. The reason statement shall include the date the link was created. All substantiating material published by ICC is material that has been provided by the proponent and in so publishing ICC makes no representations or warranties about its quality or accuracy.

4.3.5.4 **Bibliography:** The proponent shall submit a bibliography of any substantiating material submitted with the code change proposal. The bibliography shall be published with the code change proposal and the proponent shall make the substantiating materials available for review at the appropriate ICC office and during the public hearing. Supporting documentation may be provided via a link to a website provided by the proponent and included in the bibliography. The reason statement shall include the date the link was created.

4.3.5.5 **Copyright Release:** The proponent of code change proposals, floor modifications, comments to Committee action and public comments shall sign a copyright release developed and posted by ICC.

4.3.5.6 **Cost Impact:** The proponent of the code change proposal, floor modification, and comments shall provide a cost impact statement in accordance with Section 17.0.

4.4 **Online Submittal:** Each code change proposal and all substantiating information shall be submitted online via cdpACCESS. One copy of each proposed new referenced standard in electronic form shall be submitted to staff. Additional electronic copies may be requested when determined necessary by the Secretariat to allow such information to be distributed to the Committee. Where such additional copies are requested, it shall be the responsibility of the proponent to secure permission to post the proposed new reference standard on a secure ICC website for Committee viewing. In lieu of electronic copies, hard copies are acceptable.

4.5 **Submittal Deadline:** ICC shall establish and post the submittal deadline for each cycle in accordance with Section 3.2. The posting of the deadline shall occur no later than 120 days prior to the code change deadline. Each code change proposal shall be submitted online via cdpACCESS by the posted deadline. The submitter of a code change proposal is responsible for the proper and timely receipt of all pertinent materials by the Secretariat.

4.6 **Referenced Standards:** In order for a standard to be considered for reference or to continue to be referenced by the Codes, a standard shall meet the following criteria:

4.6.1 Code References:

4.6.1.1 The standard, including title and date, and the manner in which it is to be utilized shall be specifically referenced in the Code text.

4.6.1.2 The need for the standard to be referenced shall be established.

4.6.2 Standard Content:

4.6.2.1 A standard or portions of a standard intended to be enforced shall be written in mandatory language.

4.6.2.2 The standard shall be appropriate for the subject covered.

4.6.2.3 All terms shall be defined when they deviate from an ordinarily accepted meaning or a dictionary definition.

4.6.2.4 The scope or application of a standard shall be clearly described.

4.6.2.5 The standard shall not have the effect of requiring proprietary materials.

4.6.2.6 The standard shall not prescribe a proprietary agency for quality control or testing.

4.6.2.7 The test standard shall describe, in detail, preparation of the test sample, sample selection or both.

4.6.2.8 The test standard shall prescribe the reporting format for the test results. The format shall identify the key performance criteria for the element(s) tested.

4.6.2.9 The measure of performance for which the test is conducted shall be clearly defined in either the test standard or in Code text.

4.6.2.10 The standard shall not state that its provisions shall govern whenever the referenced standard is in conflict with the requirements of the referencing Code.

4.6.2.11 The preface to the standard shall announce that the standard is promulgated according to a consensus procedure.

4.6.3 New and Updated Standards with Text Revisions:

4.6.3.1 Code change proposals with corresponding changes to the Code text which include a reference to a proposed new standard, or a proposed update of an existing referenced standard shall comply with this section.

4.6.3.1.1 **Proposed New Standards.** In order for a new standard to be considered for reference by the Code, such standard shall be submitted in at least a consensus draft form in accordance with Section 4.4. If the proposed new standard is not submitted in at least consensus draft form, the code change proposal shall be considered incomplete and shall not be processed. The code change proposal shall be considered at the First Committee Action Hearing (CAH #1) by the applicable Committee responsible for the corresponding proposed changes to the code text.

If the Committee action at the Second Committee Action Hearing (CAH #2) is either As Submitted or As Modified and the standard is not completed, the code change proposal shall automatically be placed on the Public Comment Agenda with the recommendation stating that in order for the public comment to be considered, the new standard shall be completed and readily available prior to the Public Comment Hearing. If the Committee action at the Second Committee Action Hearing (CAH #2) is Disapproval, further consideration on the Public Comment Agenda shall state that in order for the public comment to be considered, the new standard shall be completed and readily available prior to the Public Comment Hearing. See Section 10.5.6.1 for availability of new standards at the Public Comment Hearing.

4.6.3.1.2 **Update of Existing Standards.** Code change proposals which include technical revisions to the Code text to coordinate with a proposed update of an existing referenced standard shall include the submission of the proposed update to the standard in at least a consensus draft form in accordance with Section 4.4. If the proposed update of the existing standard is not submitted in at least consensus draft form, the code change proposal shall be considered incomplete and shall not be processed. The code change proposal, including the update of the existing referenced standard, shall be considered at the First Committee Action Hearing (CAH #1) by the applicable Committee responsible for the corresponding changes to the code text.

If the Committee action at the Second Committee Action Hearing (CAH #2) is either As Submitted or As Modified and the updated standard is not completed, the code change proposal shall automatically be placed on the Public Comment Agenda with the recommendation stating that in order for the public comment to be considered, the updated standard shall be completed and readily available prior to the Public Comment Hearing. If the Committee action at the Second Committee Action Hearing (CAH #2) is Disapproval, further consideration on the Public Comment Agenda shall state that in order for the public comment to be considered, the updated standard shall be completed and readily available prior to the Public Comment Hearing. See Section 10.5.6.1 for availability of updated standards at the Public Comment Hearing.

Updating of standards without corresponding code text changes shall be accomplished administratively in accordance with Section 5.6.

4.6.4 **Standard Promulgation:** The standard shall be developed and maintained through a consensus process such as ASTM or ANSI.

5.0 Processing of Code Change Proposals

5.1 **Intent:** The processing of code change proposals is intended to ensure that each proposal complies with these Rules of Procedure and that the resulting published code change proposal accurately reflects that proponent's intent.

5.2 **Review:** Upon receipt in the Secretariat's office, the code change proposals will be checked for compliance with these Rules of Procedure as to division, separation, form, language, terminology, supporting statements and substantiating data. Where a code change proposal consists of multiple parts which fall under the maintenance responsibilities of different Committees, the Secretariat shall determine the Committee responsible for determining the Committee action in accordance with Section 6.6 and the Group A and Group B Code Development Committee Responsibilities Matrix (see Section 1.3.1).

5.3 **Incomplete Code Change Proposals:** When a code change proposal is submitted with incorrect format, without the required information or judged as not in compliance with these Rules of Procedure, the Secretariat shall notify the proponent of the specific deficiencies and the proposal shall be held until the deficiencies are corrected, with a final date set for receipt of a corrected submittal. If the Secretariat receives the corrected code change proposal after the final date, the proposal shall be held over until the next code development cycle. Where there are otherwise no deficiencies addressed by this section, a code change proposal that incorporates a new referenced standard shall be processed with an analysis of the referenced standard's compliance with the criteria set forth in Section 4.6.

5.4 **Editorial Code Change Proposals.** When a code change proposal is submitted that proposes an editorial or format change that, in the opinion of the Secretariat, does not affect the scope or application of the code, the proposal shall be submitted to the Code Correlation Committee who shall deem the code change proposal as editorial or send the proposal back to the Secretariat to be considered by the appropriate Committee. To be deemed editorial, such proposal shall require a majority vote of the Code Correlation Committee. Editorial proposals shall be published in the Code Change Agenda. Such proposals shall be added to the hearing agenda for consideration by the appropriate Committee upon written request to ICC by any individual. The deadline to submit such requests shall be 14 days prior to the first day of the First Committee Action Hearing (CAH #1). Code Correlation Committee proposals that are not added to a Committee hearing agenda shall be published in the next edition of the code with no further consideration.

5.5 **Copy Editing Code Text:** The Chief Executive Officer shall have the authority at all times to make editorial style and format changes to the Code text, or any approved changes, consistent with the intent, provisions and style of the Code.

Such editorial style or format changes shall not affect the scope or application of the Code requirements.

5.6 **Updating Standards Referenced in the Codes:** Standards referenced by the Codes that do not require coordination with a code change proposal to the Code text shall be identified administratively by staff and considered by the Administrative Committee in accordance with these full procedures except that the deadline for availability of the updated standard and receipt by the Secretariat shall be December 1 of the third year of each code cycle. The published version of the new edition of the Code which references the standard will refer to the updated edition of the standard. If the standard is not available by the December 1st deadline, the edition of the standard as referenced by the newly published Code shall revert back to the reference contained in the previous edition and an errata to the Code issued. Multiple standards to be updated may be included in a single proposal.

5.6.1 **Updating ICC Standards Referenced in the Codes.** All standards developed by ICC and referenced by the Codes which are undergoing an update shall be announced by ICC to allow stakeholders to participate in the update process.

Where the updated standard is completed and available by December 1 of the third year of the code cycle, the published version of the new edition of the Code which references the standard shall refer to the updated edition of the standard. If the standard is not available by the December 1st deadline, the edition of the standard as referenced by the newly published Code shall revert back to the reference contained in the previous edition and an errata to the Code issued.

5.7 **Preparation:** All code change proposals in compliance with these procedures shall be prepared in a standard manner by the Secretariat and be assigned separate, distinct, and consecutive numbers. The Secretariat shall coordinate related proposals submitted in accordance with Section 4.3.2 to facilitate the hearing process.

5.8 **Code Change Agenda:** All code change proposals shall be posted on the ICC website at least 30 days prior to the First Committee Action Hearing (CAH #1) on those proposals and shall constitute the agenda for the hearing. Any errata to the Code Change Agenda shall be posted on the ICC website as soon as possible. Code change proposals which have not been published in the original posting or subsequent errata shall not be considered.

6.0 First Committee Action Hearing (CAH #1)

6.1 **Intent:** The intent of the First Committee Action Hearing (CAH #1) is to permit interested parties to present their views including the cost and benefits on the code change proposals on the published agenda. The Committee will consider such comments as may be presented in the development of their action on the disposition of such code change proposals.

6.2 **Code Development Committee:** The Codes and Standards Council shall review all applications and make Committee appointment recommendations to the ICC Board. The Committees shall be appointed by the ICC Board. (See Section 1.6 for terminology).

6.2.1 **Chairperson/Moderator:** The Chairperson and Vice-Chairperson shall be selected by the Codes and Standards Council from the appointed members of the Committee. The ICC President shall appoint one or more Moderators who shall act as presiding officer for the Committee Action Hearing.

6.2.2 **Conflict of Interest:** A Committee member shall withdraw from and take no part in those matters with which the Committee member has an undisclosed financial, business or property interest. The Committee member shall not participate in any Committee discussion, or any Committee vote on the matter in which they have an undisclosed interest. A Committee member who is a proponent of a code change proposal shall not participate in any Committee discussion on the matter or any Committee vote. Such Committee member shall be permitted to participate in the floor discussion in accordance with Section 6.5 and Section 8.4.1 by stepping down from the dais.

6.2.3 **Representation of Interest:** Committee members shall not represent themselves as official or unofficial representatives of the ICC except at regularly convened meetings of the Committee.

6.2.4 **Committee Composition:** The Committee may consist of representation from multiple interests. A minimum of thirty-three and one-third percent (33.3%) of the Committee members shall be Regulators (General Interest category in accordance with Council Policy#7 *Committees and Members*).

6.3 **Date and Location:** The date and location of the Committee Action Hearing shall be announced not less than 60 days prior to the date of the hearing.

6.4 **General Procedures:** *The Robert's Rules of Order* shall be the formal procedure for the conduct of the Committee Action Hearing except as a specific provision of these Rules of Procedure may otherwise dictate. A quorum shall consist of a majority of the voting members of the Committee.

6.4.1 **Chair Voting:** The Chairperson of the Committee shall vote only when the vote cast will break a tie vote of the Committee.

6.4.2 **Open Hearing:** The Committee Action Hearing is an open hearing. Any interested person may attend and participate in the floor discussion. Only Committee members may participate in the Committee action portion of the hearings (see Section 6.6). Participants shall not advocate a position on specific code change proposals with Committee members other than through the methods provided in this policy.

6.4.3 **Presentation of Material at the Committee Action Hearing:** Information to be provided at the hearing shall be limited to verbal presentations and modifications submitted in accordance with Section 6.5.2. Each individual presenting information at the hearing shall state their name and affiliation, and shall identify any entities or individuals they are representing in connection with their testimony. Audio-visual presentations are not permitted. Substantiating material submitted in accordance with Section 4.3.5.3 and other material submitted in response to a code change proposal shall be located in a designated area in the hearing room and shall not be distributed to the Committee at the public hearing.

6.4.4 **Agenda Order:** The Secretariat shall publish a Code Change Agenda for the Committee Action Hearing, placing individual code change proposals in a logical order to facilitate the hearing. Any public hearing attendee may move to revise the agenda order as the first order of business at the hearing, or at any time during the hearing except while another code change proposal is being discussed. Preference shall be given to grouping like subjects together, and for moving items back to a later position on the agenda as opposed to moving items forward to an earlier position.

6.4.4.1 **Proponent Approval:** A motion to revise the agenda order is considered in order unless the proponent(s) of the moved code change proposals are in attendance in the hearing room and object to the move. Where such objections are raised, the motion to revise the hearing order shall be ruled out of order by the Moderator. The ruling of the Moderator shall be final and not subject to a point of order in accordance with Section 6.4.8. The motion to change the hearing order is not debatable.

6.4.4.2 **Revised Agenda Order Approved:** A motion to revise the agenda order is subject to a 2/3 vote of those present.

6.4.5 **Tabling:** Tabling of code change proposals shall be permitted. The motion to table is considered in order unless the proponent(s) of the tabled code change proposals are in attendance at the hearing and object to the tabling. Where such objections are raised, the motion to table shall be ruled out of order by the Moderator. The ruling of the Moderator shall be final and not subject to a point of order in accordance with Section 6.4.8. The motion to table is not debatable.

The motion to table must identify one of the following as to the location in the agenda when or where the code change proposal(s) will be considered:

1. To a specific date and time within the timeframe of the Code Change Agenda for the code change proposals under consideration, or

2. To a specific location in the Code Change Agenda for the code change proposals under consideration.

6.4.5.1 **Tabling approved:** A motion to table is subject to a 2/3 vote of those present.

6.4.5.2 **Tabled code change proposals back to the floor:** The Moderator shall bring the tabled code change proposal(s) back to the floor at the applicable time/agenda location in accordance with Section 6.4.5 Items 1 or 2. The testimony on the code change proposal shall resume at the point in the process where the tabling occurred.

6.4.6 **Reconsideration:** There shall be no reconsideration of a code change proposal after it has been voted on by the Committee in accordance with Section 6.6.

6.4.7 **Time Limits:** Time limits shall be established as part of the agenda for testimony on all code change proposals at the beginning of each hearing session. Each person testifying on a code change proposal shall be given equal time. In the interest of time and fairness to all hearing participants, the Moderator shall identify the time limits on debate at the beginning of the hearing. The Moderator shall have the authority to adjust time limits as necessary in order to complete the hearing agenda.

6.4.7.1 **Time Keeping:** Keeping of time for testimony by an individual shall be by an automatic timing device. Remaining time shall be evident to the person testifying. Interruptions during testimony shall not be tolerated. The Moderator shall maintain appropriate decorum during all testimony.

6.4.7.2 **Proponent Testimony:** The Proponent is permitted to waive an initial statement. The Proponent shall be permitted to have the amount of time that would have been allocated during the initial testimony period plus the amount of time that would be allocated for rebuttal. Where the code change proposal is submitted by multiple proponents, this provision shall permit only one proponent of the joint submittal to be allotted additional time for rebuttal.

6.4.8 **Points of Order:** Any person participating in the hearing may challenge a procedural ruling of the Moderator or the Chairperson. A majority vote of ICC Members in attendance shall determine the decision.

6.5 **Floor Discussion:** The Moderator shall place each code change proposal before the hearing for discussion by identifying the proposal and by regulating discussion as follows:

6.5.1 Discussion Order:

1. Support. The Moderator shall begin by asking the proponent and then others in support of the code change proposal for their comments.
2. Opposition. After discussion by those in support of a code change proposal,

those opposed hereto, if any, shall have the opportunity to present their views.

3. Rebuttal in support. Those in support shall then have the opportunity to rebut points raised by those in opposition.
4. Rebuttal in opposition. Those in opposition shall then have the opportunity to respond to the rebuttal in support.

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6.5.2 **Modifications:** Modifications to code change proposals may be suggested from the floor by any person participating in the hearing. The person proposing the modification, or his/her designee, is deemed to be the proponent of the modification.

6.5.2.1 **Submission.** All modifications shall be submitted electronically to the ICC Secretariat in a format determined by ICC unless determined by the Chairperson to be either editorial or minor in nature. The modification will be forwarded electronically to the members of the Committee during the hearing and will be projected on the screen in the hearing room.

6.5.2.2 **Criteria.** The Chairperson shall rule proposed modifications in or out of order before they are discussed on the floor. A proposed modification shall be ruled out of order if it:

1. changes the scope of the original code change proposal; oris not readily understood to allow a proper assessment of its impact on the original code change proposal or the Code.

The ruling of the Chairperson on whether or not the modification is in or out of order shall be final and is not subject to a point of order in accordance with Section 6.4.8.

6.5.2.3 **Testimony.** When a modification is offered from the floor and ruled in order by the Chairperson, a specific floor discussion on that modification is to commence in accordance with the procedures listed in Section 6.5.1.

6.5.2.3.1 **Time Limits:** Time limits on testimony on a modification shall be in accordance with the following:

1. Support: 1 minute
2. Opposition: 1 minute
3. Rebuttal in support: 30 seconds
4. Rebuttal in opposition: 30 seconds

6.6 **Committee Action:** Following the floor discussion of each code change proposal, one of the following motions shall be made and seconded by members of the Committee:

1. Approve the code change proposal As Submitted (AS) or
2. Approve the code change proposal As Modified with specific modifications (AM), or
3. Disapprove the code change proposal (D)

Discussion on this motion shall be limited to Committee members. If a Committee member proposes a modification which had not been proposed during floor discussion, the Chairperson shall rule on the modification in accordance with

Section 6.5.2.2. If a Committee member raises a matter of issue, including a proposed modification, which has not been proposed or discussed during the floor discussion, the Moderator shall suspend the Committee discussion and shall reopen the floor discussion for comments on the specific matter or issue. Upon receipt of all comments from the floor, the Moderator shall resume Committee discussion.

The Committee shall vote on each motion with the majority dictating the Committee's action. Committee action on each code change proposal shall be completed when one of the motions noted above has been approved. Each Committee vote shall be supported by a reason.

The ICC shall maintain a record of the hearing proceedings including the action on each code change proposal.

7.0 Report of the First Committee Action Hearing (CAH #1): The results of the First Committee Action Hearing (CAH #1), including Committee action and reason, shall be posted on the ICC website not less than 60 days prior to the Second Committee Action Hearing (CAH #2) , except as approved by the ICC Board.Submittal of Comments to the First Committee Action Hearing (CAH #1) (NEW)

7.1 Intent: Any interested person, persons or group may submit a comment noting disagreement with the action taken at the First Committee Action Hearing (CAH #1). The comment process gives attendees at the Second Committee Action Hearing (CAH #2) an opportunity to consider specific objections to the results of the First Committee Action Hearing (CAH #1) and more thoughtfully prepare for the discussion and comment consideration at the Second Committee Action Hearing (CAH #2).

7.1.1 Public Comment Hearing consideration: In order for a code change proposal to be considered for a further modification at the Public Comment Hearing, such proposal must have received a comment and been considered and acted upon at the Second Committee Action Hearing (CAH #2).

7.1.2 Proposed New Reference Standards and Standards Updates: Proposed new referenced standards and proposed updates of existing standards with coordinating text are limited to original code change submittals in accordance with Section 4.6.3. Comments proposing a new reference standard or a new proposed update of an existing standard with coordinating text shall not be permitted.

7.2 Deadline: The deadline for receipt of a comment to the results of the First Committee Action Hearing (CAH #1) shall be announced at the first hearing but shall not be less than 30 days subsequent to the availability of the Report of the First Committee Action Hearing (CAH #1) (see Section 6.7).

7.3 Withdrawal of Comment: A comment may be withdrawn by the commenter at any time prior to comment consideration of that comment at the Second Committee Action Hearing (CAH #2). A withdrawn comment shall not be subject to consideration at the second hearing. If the only comment to a code change proposal is withdrawn by the commenter prior to consideration at the Second Committee Action Hearing (CAH #2), such proposal will be considered as not acted upon at the second hearing and the proposal is not eligible for further modification consideration at the Public Comment Hearing in accordance with Section 7.1.1.

7.4 Form and Content of Comments: Any interested person, persons, or group may submit a public comment to the results of the First Committee Action Hearing (CAH #1) which will be considered when in conformance to these requirements. Each comment to a code change proposal shall be submitted separately and shall be complete in itself. Each comment shall contain the following information:

7.4.1 **Comment:** Each comment shall include the name, title, and email address of the commenter. Email addresses shall be published with the comments unless the commenter otherwise requests on the submittal form.

If a group, organization, or committee submits a comment, an individual with prime responsibility shall be indicated. If a comment is submitted on behalf a client, group, organization or committee, the name and email address of the client, group, organization or committee shall be indicated. The scope of the comment shall be consistent with the scope of the original code change proposal or the Committee action. Comments which are determined as not within the scope of the code change proposal or Committee action shall be identified as such. The commenter shall be notified that the comment is considered an incomplete comment in accordance with Section 7.5.1 and the comment shall be held until the deficiencies are corrected. A copyright release in accordance with Section 4.3.5.5 shall be provided with the comment.

7.4.2 **Code Reference:** Each comment shall include the code change proposal number.

7.4.3 **Multiple comments to a code change proposal.** A commentor shall not submit multiple comments to the same code change proposal. When a commentor submits multiple comments to the same code change proposal, the comments shall be considered as incomplete comments and processed in accordance with Section 7.5.1. This restriction shall not apply to comments that attempt to address differing subject matter within a Code section.

7.4.4 **Desired Action at the Second Committee Action Hearing (CAH #2):** In order for a comment to be considered, the comment shall indicate the desired action at the Second Committee Action Hearing (CAH #2) as one of the following:

1. Approve the code change proposal As Submitted (AS), or
2. Approve the code change proposal As Modified by the Committee modification published in the Report of the First Committee Action Hearing (AMC #1) or a comment published in the Second Committee Action Hearing Agenda (AMC #2), or
3. Disapprove the code change proposal (D)

7.4.5 **Supporting Information:** The comment shall include a statement containing a reason and justification for the desired action on the code change proposal. Reasons and justification which are reviewed in accordance with Section 7.5 and determined as not germane to the technical issues addressed in the code change proposal or first Committee action may be identified as such. The commenter shall be notified that the comment is considered an incomplete comment in accordance with Section 7.5.1 and the comment shall be held until the deficiencies are corrected. The commenter shall have the right to appeal this action in accordance with CP-01 – Appeals. A bibliography of any substantiating material submitted with a comment shall be published with the comment and the substantiating material shall be made available at the Second Committee Action Hearing (CAH #2). Supporting documentation may be provided via a link to a website provided by the commenter and included in the reason statement and bibliography. The reason statement shall include the date the link was created. All substantiating material published by ICC is material that has been provided by the proponent and in so publishing ICC makes no representations or warranties about its quality or accuracy.

7.4.6 **Cost Impact:** The comment shall include a cost impact statement in accordance with Section 17.0.

7.4.7 **Online submittal:** Each comment and substantiating information shall be submitted online via cdpACCESS. Additional electronic copies may be requested when determined necessary by the Secretariat.

7.4.8 Submittal Deadline: ICC shall establish and post the submittal deadline for each cycle in accordance with Section 3.2. The posting of the deadline shall occur no later than 120 days prior to the comment deadline. Each comment shall be submitted online via cdpACCESS by the posted deadline. The submitter of a public comment is responsible for the proper and timely receipt of all pertinent materials by the Secretariat.

7.5 Review: The Secretariat shall be responsible for reviewing all submitted comments from an editorial and technical viewpoint similar to the review of code change proposals (see Section 5.2).

7.5.1 Incomplete Comment: When a comment is submitted with incorrect format, without the required information or judged as not in compliance with these Rules of Procedure, the comment shall not be processed. The Secretariat shall notify the commenter of the specific deficiencies and the comment shall be held until the deficiencies are corrected, or the comment shall be returned to the commenter with instructions to correct the deficiencies with a final date set for receipt of the corrected comment.

7.5.2 Duplications: On receipt of duplicate or parallel comments, the Secretariat may consolidate such comments for Second Committee Action Hearing (CAH #2) comment consideration. Each commenter shall be notified of this action when it occurs.

7.5.3 Comments Received after Deadline: Comments received by the Secretariat after the deadline set for receipt shall not be published and shall not be considered as part of the Second Committee Action Hearing (CAH #2) consideration. This deadline shall not apply to comments submitted by the Code Correlation Committee. In order to correlate submitted comments with action taken at the First Committee Action Hearing (CAH #1) on code change proposals that did receive a comment, the Code Correlation Committee, in conjunction with staff processing of comments, shall review the submitted comments and submit the necessary comments in order to facilitate the coordination of code change proposals. Such review and submittal shall not delay the posting of the Second Committee Action Hearing (CAH #2) Agenda as required in Section 7.6.

7.6 Second Committee Action Hearing Agenda: The comments received to the First Committee Action Hearing (CAH #1) results on code change proposals shall constitute the Second Committee Action Hearing Agenda. The agenda shall be posted on the ICC website at least 30 days prior to the hearing. Any errata to the agenda shall be posted on the ICC website as soon as possible. Code change proposals and comments which have not been published in the original posting or subsequent errata shall not be considered.

8.0 Second Committee Action Hearing (CAH #2) (NEW)

8.1 Intent: The intent of the Second Committee Action Hearing (CAH #2) is to permit interested parties to present their views including cost and benefits on comments received to the action taken by the Committee at the First Committee Action Hearing (CAH #1). The Committee will consider such comments as may be presented in the development of their action on the disposition of such code change proposals prior to the public comment portion of the code development process in accordance with Section 9.0.

8.1.1 **Code changes not receiving a comment:** The Committee action on code changes that do not receive a comment shall be the action taken at the First Committee Action Hearing (CAH #1) and shall not be on the agenda for the Second Committee Action Hearing (CAH #2). Such code changes will not be eligible for further modification as part of public comment consideration (see Section 7.1.1)

8.2 **Committee:** The Committee shall be the same Committee that presided over the First Committee Action Hearing (CAH #1).

8.3 **Date and Location:** The date and location of the Second Committee Action Hearing (CAH #2) shall be announced not less than 60 days prior to the date of the hearing.

8.4 **Hearing conduct:** The Second Committee Action Hearing (CAH #2) shall be conducted in the same fashion as the First Committee Action Hearing (CAH #1) in accordance with Sections 6.2 through 6.4 and 6.6 and Section 8.4.1.

8.4.1 **Floor discussion.** Discussion on code change proposals being individually considered shall be in accordance with Sections 8.4.1.1 through 8.4.1.4:

8.4.1.1 **Initial Motion:** The Committee action from the First Committee Action Hearing (CAH #1) shall be the initial motion considered.

8.4.1.2 **Motions for Comments:** At any point during the floor discussion of the initial motion, a subsequent motion and second for a comment published in the CAH#2 Agenda may be made. Each subsequent motion for comment, if any, shall be individually discussed before returning to the main motion. Comments in the CAH#2 agenda must be called to the floor for consideration.

8.4.1.3 **Proponent testimony:** The Proponent of a comment is permitted to waive an initial statement. The Proponent of the comment shall be permitted to have the amount of time that would have been allocated during the initial testimony period plus the amount of time that would be allocated for rebuttal. Where a comment is submitted by multiple proponents, this provision shall permit only one proponent of the joint submittal to waive an initial statement.

8.4.1.4 **Modifications:** Modifications to individual comments may be suggested from the floor by any person participating in the hearing, at any time during the floor discussion of the respective comment. The person proposing the modification, or his/her designee, is deemed to be the proponent of the modification. Modifications submission, criteria, testimony, and time limits shall comply with Sections 6.5.2.1 through 6.5.2.3.1

8.5 **Report of the Second Committee Action Hearing (CAH #2):** The results of the Second Committee Action Hearing (CAH #2), including Committee action and reason, shall be posted on the ICC website not less than 60 days prior to the Public Comment Hearing, except as approved by the ICC Board.

9.0 Submittal of Public Comments to the Second Committee Action Hearing (CAH #2)

9.1 **Intent:** The public comment process gives attendees at the Public Comment Hearing an opportunity to consider specific objections to the results of the Second Committee Action Hearing (CAH #2) for each code group and more thoughtfully prepare for the discussion for public comment consideration. The public comment process expedites the Public Comment Hearing by limiting the items discussed to consideration of items for which a public comment has been submitted. The Public Comment Hearing will be a combined hearing of both Code Group A and Code Group B code change proposals and public comments in accordance with Sections 3.0 and 10.0.

9.2 **Deadline:** The deadline for receipt of a public comment to the results of the Second Committee Action Hearing (CAH #2) shall be announced at the hearing but shall not be less than 30 days subsequent to the availability of the Report of the Second Committee Action Hearing (CAH #2) for the respective code group (see Section 8.5). The public comment deadline for Code Group A codes shall be early in the second year of the cycle and the public comment deadline for Code Group B codes shall be early in the third year of the cycle with specific dates posted in accordance with Section 3.2.

9.3 **Withdrawal of Public Comment:** A public comment may be withdrawn by the public commenter at any time prior to public comment consideration of that comment. A withdrawn public comment shall not be subject to public comment consideration. If the only public comment to a code change proposal is withdrawn by the public commenter prior to the vote on the consent agenda in accordance with Section 10.5.5, the proposal shall be considered as part of the consent agenda. If the only public comment to a code change proposal is withdrawn by the public commenter after the vote on the consent agenda in accordance with Section 10.5.5, the proposal shall continue as part of the individual consideration agenda in accordance with Section 10.5.6, however the public comment shall not be subject to public comment consideration.

9.4 Form and Content of Public Comments: Any interested person, persons, or group may submit a public comment to the results of the Second Committee Action Hearing (CAH #2) which will be considered when in conformance to these requirements. Each public comment to a code change proposal shall be submitted separately and shall be complete in itself. Each public comment shall contain the following information:

9.4.1 Public comment: Each public comment shall include the name, title, and email address of the public commenter. Email addresses shall be published with the public comments unless the commenter otherwise requests on the submittal form.

If a group, organization, or Committee submits a public comment, an individual with prime responsibility shall be indicated. If a public comment is submitted on behalf a client, group, organization or Committee, the name and email address of the client, group, organization or Committee shall be indicated. The scope of the public comment shall be consistent with the scope of the original code change proposal or Committee action from the Second Committee Action Hearing (CAH #2). Public comments which are determined as not within the scope of the code change proposal or Committee action shall be identified as such. The public commenter shall be notified that the public comment is considered an incomplete public

comment in accordance with Section 9.5.1 and the public comment shall be held until the deficiencies are corrected. A copyright release in accordance with Section 4.3.5.5 shall be provided with the public comment.

9.4.2 Code Reference: Each public comment shall include the code change proposal number.

9.4.3 Multiple public comments to a code change proposal. A proponent shall not submit multiple public comments to the same code change proposal. When a proponent submits multiple public comments to the same code change proposal, the public comments shall be considered as incomplete public comments and processed in accordance with Section 9.5.1. This restriction shall not apply to public comments that attempt to address differing subject matter within a code section.

9.4.4 Desired Final Action: In order for a public comment to be considered, the public comment shall indicate the desired Final Action as one of the following:

1. Approve the code change proposal As Submitted (AS), or

2. Approve the code change proposal As Modified by the Committee modification published in the Report of the First or Second Committee Action Hearing (AMC) or published in a public comment in the Public Comment Agenda (AMPC), or

3. Disapprove the code change proposal (D)

9.4.5 **Supporting Information:** The public comment shall include a statement containing a reason and justification for the desired Final Action on the code change proposal. Reasons and justification which are reviewed in accordance with Section 9.5 and determined as not germane to the technical issues addressed in the code change proposal or Committee action may be identified as such. The public commenter shall be notified that the public comment is considered an incomplete public comment in accordance with Section 9.5.1 and the public comment shall be held until the deficiencies are corrected. The public commenter shall have the right to appeal this action in accordance with CP-01 – Appeals. A bibliography of any substantiating material submitted with a public comment shall be published with the public comment and the substantiating material shall be made available at the Public Comment Hearing. Supporting documentation may be provided via a link to a website provided by the public commenter and included in the reason statement and bibliography. The reason statement shall include the date the link was created. All substantiating material published by ICC is material that has been provided by the proponent and in so publishing ICC makes no representations or warranties about its quality or accuracy.

9.4.6 **Cost Impact:** The public comment shall include a cost impact statement in accordance with section 17.0.

9.4.7 **Online submittal:** Each public comment and substantiating information shall be submitted online via cdpACCESS. Additional electronic copies may be requested when determined necessary by the Secretariat.

9.4.8 **Submittal Deadline:** ICC shall establish and post the submittal deadlinesfor Code Groups A and B in accordance with Section 3.2. The posting of the deadline shall occur no later than 120 days prior to the public comment deadlines. Each public comment shall be submitted online via cdpACCESS by the posted deadline. The submitter of a public comment is responsible for the proper and timely receipt of all pertinent materials by the Secretariat.

9.5 **Review:** The Secretariat shall be responsible for reviewing all submitted public comments from an editorial and technical viewpoint similar to the review of code change proposals (see Section 5.2).

9.5.1 Incomplete Public Comment: When a public comment is submitted with incorrect format, without the required information or judged as not in compliance with these Rules of Procedure, the public comment shall not be processed. The Secretariat shall notify the public commenter of the specific deficiencies and the public comment shall be held until the deficiencies are corrected, or the public comment shall be returned to the public commenter with instructions to correct the deficiencies with a final date set for receipt of the corrected public comment.

9.5.2 Duplications: On receipt of duplicate or parallel public comments, the Secretariat may consolidate such public comments for public comment consideration. Each public commenter shall be notified of this action when it occurs.

9.5.3 Public Comments Received after Deadline: Public comments received by the Secretariat after the deadline set for receipt shall not be published and shall not be considered as part of the public comment consideration. This deadline shall not apply to public comments submitted by the Code Correlation Committee. In order to correlate submitted public comments with action taken at the Second Committee Action Hearing (CAH #2) on code change proposals that did receive a public comment, the Code Correlation Committee, in conjunction with staff processing of public comments, shall review the submitted public comments and submit the necessary public comments in order to facilitate the coordination of code change proposals. Such review and submittal shall not delay the posting of the Public Comment Agenda as required in Section 9.6.

9.6 Public Comment Agenda: The First and Second Committee Action Hearing results on code change proposals that have not received a public comment and code change proposals from the Second Committee Action Hearing (CAH #2) which received public comments shall constitute the Public Comment Agenda. The Public Comment Agenda shall be posted on the ICC website at least 30 days prior the Public Comment Hearing. Any errata to the Public Comment Agenda shall be posted on the ICC website as soon as possible. Code change proposals and public comments which have not been published in the original posting or subsequent errata shall not be considered.

10.0 Public Comment Hearing

10.1 Intent: The Public Comment Hearing is the first of two steps to make a final determination on all code change proposals which have been considered in a code development cycle by a vote cast by eligible voters (see Section 12.0). The second step, which follows the Public Comment Hearing, is the Online Governmental Consensus Vote that is conducted in accordance with Section 11.0. Code change proposals from Code Groups A and B considered at the Second Committee Action Hearing (CAH #2) in accordance with Section 8.1 are eligible for public commentconsideration at the Public Comment Hearing and the

Online Governmental Consensus Vote.

10.2 **Date and Location:** The date and location of the Public Comment Hearing shall be announced not less than 60 days prior to the date of the hearing.

10.3 **Moderator:** The ICC President shall appoint one or more Moderators who shall act as presiding officer for the Public Comment Hearing.

10.4 **Public Comment Agenda:** The Public Comment Consent Agenda shall be comprised of code change proposals which have not received a public comment. The agenda for public testimony and individual consideration shall be comprised of proposals which have a public comment (see Section 9.1).

10.5 **Procedure:** *The Robert's Rules of Order* shall be the formal procedure for the conduct of the Public Comment Hearing except as these Rules of Procedure may otherwise dictate.

10.5.1 **Open Hearing:** The Public Comment Hearing is an open hearing. Any interested person may attend and participate in the floor discussion.

10.5.2 **Agenda Order:** The Secretariat shall publish a Public Comment Agenda for the Public Comment Hearing, placing individual code change proposals and public comments in a logical order to facilitate the hearing. The proponents or opponents of any code change proposal or public comment may move to revise the agenda order as the first order of business at the public hearing, or at any time during the hearing except while another proposal is being discussed. Preference shall be given to grouping like subjects together and for moving items back to a later position on the agenda as opposed to moving items forward to an earlier position.

10.5.2.1 **Proponent Approval**: A motion to revise the agenda order is considered in order unless the proponent(s) of the moved code change proposals are in attendance at the hearing and object to the move. Where such objections are raised, the motion to revise the hearing order shall be ruled out of order by the Moderator. The ruling of the Moderator shall be final and not subject to a point of order in accordance with Section 6.4.8. The motion to change the hearing order is not debatable.

10.5.2.2 **Revised Agenda Order Approved:** A motion to revise the agenda order is subject to a 2/3 vote of those present.

10.5.3 **Tabling:** Tabling of code change proposals shall be permitted. The motion to table is considered in order unless the proponent(s) of the tabled code change proposals are in attendance at the hearing and object to the tabling. Where such objections are raised, the motion to table shall be ruled out of order by the Moderator. The ruling of the Moderator shall be final and not subject to a point of order in accordance with Section 6.4.8. The motion to table is not debatable.

The motion to table must identify one of the following as to the location in the agenda when or where the code change proposal(s) will be considered:

1. To a specific date and time within the timeframe of the Public Comment Agenda for the code change proposals under consideration, orTo a specific location in the Public Comment Agenda for the code change proposals under consideration.

10.5.3.1 Tabling approved: A motion to table is subject to a 2/3 vote of those present.

10.5.3.2 Tabled code change proposals back to the floor: The Moderator shall bring the tabled code change proposal(s) back to the floor at the applicable time/agenda location in accordance with Section 10.5.3 Items 1 or 2. The testimony on the code change proposal shall resume at the point in the process where the tabling occurred.

10.5.4 Presentation of Material at the Public Comment Hearing: Information to be provided at the hearing shall be limited to verbal presentations. Each individual presenting information at the hearing shall state their name and affiliation and shall identify any entities or individuals they are representing in connection with their testimony. Audio-visual presentations are not permitted. Substantiating material submitted in accordance with Section
9.4.5 and other material submitted in response to a code change proposal or public comment shall be located in a designated area in the hearing room.

10.5.5 Public Comment Consent Agenda: The Public Comment Consent Agenda (see Section 10.4) shall be placed before the assembly with a single motion for Final Action in accordance with the results of the First and Second Committee Action Hearings. When the motion has been seconded, the vote shall be taken with no testimony being allowed. A simple majority (50% plus one) based on the number of votes cast by eligible voters shall decide the motion. This action shall not be subject to the Online Governmental Consensus Vote following the Public Comment Hearing (see Section 11.0).

10.5.6 Public Comment Individual Consideration Agenda: Upon completion of the Public Comment Consent Agenda vote, all code change proposals not on the Public Comment Consent Agenda shall constitute the Public Comment Individual Consideration Agenda and be placed before the assembly for individual consideration of each item (see Section 10.4).

10.5.6.1 New Proposed Standard or Updated Standard Not Available. It is the responsibility of the proponent of the code change proposal to identify whether a new standard or updated standard (where the proposal includes coordinating text revisions) is available. Where the proposed new standard or the updated standard is not available in accordance with Section 4.6.3, the code change will not be considered on the Individual Consideration Agenda and the Final Action shall be Disapproval.

10.5.7 **Reconsideration:** There shall be no reconsideration of a code change proposal after it has been voted on in accordance with Section 10.5.9.

10.5.8 **Time Limits:** Time limits shall be established as part of the agenda for testimony on all code change proposals at the beginning of each hearing session. Each person testifying on a code change proposal shall be given equal time. In the interest of time and fairness to all hearing participants, the Moderator shall identify the time limits on debate at the beginning of the Public Comment Hearing. The Moderator shall have the authority to adjust time limits as necessary in order to complete the hearing agenda.

10.5.8.1 **Time Keeping:** Keeping of time for testimony by an individual shall be by an automatic timing device. Remaining time shall be evident to the person testifying. Interruptions during testimony shall not be tolerated. The Moderator shall maintain appropriate decorum during all testimony.

10.5.9 **Discussion and Voting:** Discussion and voting on code change proposals being individually considered shall be in accordance with the following procedures and the voting majorities in Section 10.6:

10.5.9.1 **Proponent testimony:** The Proponent of a public comment is permitted to waive an initial statement. The Proponent of the public comment shall be permitted to have the amount of time that would have been allocated during the initial testimony period plus the amount of time that would be allocated for rebuttal. Where a public comment is submitted by multiple proponents, this provision shall permit only one proponent of the joint submittal to waive an initial statement.

10.5.9.2 **Points of Order:** Any person participating in hearing may challenge a procedural ruling of the Moderator. A majority vote of ICC Members in attendance shall determine the decision.

10.5.9.3 **Eligible voters:** Voting shall be limited to eligible voters in accordance with Section 12.0.

10.5.9.4 **Allowable Final Action Motions:** The only allowable motions for Final Action are Approval as Submitted (AS), Approval as Modified by the Committee from the First or Second Committee Action Hearing (AMC) or by one or more modifications published in the Public Comment Agenda (AMPC), and Disapproval (D).

10.5.9.5 **Initial Motion:** The Committee action from the Second Committee Action Hearing (CAH #2) shall be the initial motion considered.

10.5.9.6 **Motions for Modifications:** Whenever a motion under consideration is for Approval as Submitted or Approval as Modified, a subsequent motion and second for a modification published in the Public Comment Agenda may be made (see Section 9.4.4). Each subsequent motion for modification, if any, shall be individually discussed and voted before returning to the main motion. A two-thirds majority based on the number of votes cast by eligible voters shall be required for a successful motion on all modifications.

10.5.9.7 **Voting:** After dispensing with all motions for modifications, if any, and upon completion of discussion on the main motion, the Moderator shall then ask for the vote on the main motion. The vote on the main motion shall be taken electronically with the vote recorded and each vote assigned to the eligible voting member. In the event the electronic voting system is determined not to be used by ICC, a hand/standing count will be taken bythe Moderator. If the motion fails to receive the majority required in Section 10.6, the Moderator shall ask for a new motion.

10.5.9.8 **Subsequent Motion:** If the initial motion is unsuccessful, a motion for either Approval as Submitted or Approval as Modified by one or more published modifications is in order. A motion for Disapproval is not in order. The vote on the main motion shall be taken electronically with the vote recorded and each vote assigned to the eligible voting member. In the event the electronic voting system is determined not to be used by ICC, a hand/standing count will be taken by the Moderator. If a successful vote is not achieved, Section 10.5.9.9 shall apply.

10.5.9.9 **Failure to Achieve Majority Vote at the Public Comment Hearing.** In the event that a code change proposal does not receive any of the required majorities in Section 10.6, the results of the Public Comment Hearing for the code change proposal in question shall be Disapproval. The vote count that will be reported as the Public Comment Hearing result will be the vote count on the main motion in accordance with Section 10.5.9.7.

10.5.9.10 **Public Comment Hearing Results:** The result and vote count on each code change proposal considered at the Public Comment Hearing shall be announced at the hearing. In the event the electronic voting system is not utilized and a hand/standing count is taken in accordance with Sections 10.5.9.7 and 10.5.9.8, the vote count will not be announced if an individual standing vote count is not taken. The results shall be posted and included in the Online Governmental Consensus Vote ballot (see Section 11.3).

10.5.9.10.1 **Online Governmental Consensus Ballot Exceptions:** Where Disapproval is the action at all three hearings in the code group cycle (First Committee Action Hearing (CAH #1), Second Committee Action Hearing (CAH #2) and the Public Comment Hearing), the Final Action on the code change proposal shall be Disapproval and the proposal shall not be placed on the Online Governmental Consensus Vote ballot.

10.6 **Majorities for Public Comment Hearing Voting:** The required voting majority for code change proposals individually considered shall be based on the number of votes cast by eligible voters at the Public Comment Hearing shall be in accordance with the following table.

Second Committee Action Hearing (CAH #2)	**Desired Final Action**		
	AS	**AMC/AMPC**	**D**
AS	Simple Majority	2/3 Majority	Simple Majority
AMC	2/3 Majority	Simple Majority to sustain the Committee Action (AMC) or; 2/3 Majority on each additional modification and 2/3 Majority on entire code change proposal for AMPC	Simple Majority
D	2/3 Majority	2/3 Majority	Simple Majority

11.0 Online Governmental Consensus Vote

11.1 Public Comment Hearing Results: The results from the Individual Consideration Agenda at the combined Code Group A and Code Group B Public Comment Hearing (see Sections 10.5.6 and 10.5.9.10) shall be the basis for the Online Governmental Consensus Vote. The ballot shall include the voting options in accordance with the following table (see Section 11.1.1 for exceptions):

Second Committee Action Hearing (CAH #2)	Public Comment Hearing result and Voting Majority	Online Governmental Consensus Ballot and Voting Majority	
AS	**AS:** Simple Majority	**AS:** Simple Majority	**D:** Simple Majority
	AMPC: 2/3 Majority	**AMPC:** 2/3 Majority	**D:** Simple Majority
	D: Simple Majority	**AS:** Simple Majority	**D:** Simple Majority
AMC	**AS:** 2/3 Majority	**AS:** 2/3 Majority	**D:** Simple Majority
	AMC: Simple Majority	**AMC:** Simple Majority	**D:** Simple Majority
	AMPC: 2/3 Majority	**AMPC:** 2/3 Majority	**D:** Simple Majority
	D: Simple Majority	**AM:** Simple Majority	**D:** Simple Majority
D	**AS:** 2/3 Majority	**AS:** 2/3 Majority	**D:** Simple Majority
	AMPC: 2/3 Majority	**AMPC:** 2/3 Majority	**D:** Simple Majority
	D: Simple Majority	**AS:** 2/3 Majority	**D:** Simple Majority

11.1.1 Online Governmental Consensus Ballot Exceptions: Where Disapproval is the action at all three hearings in the code group cycle (First Committee Action Hearing (CAH #1), Second Committee Action Hearing (CAH #2) and the Public Comment Hearing), the Final Action on the code change proposal shall be Disapproval and the proposal shall not be placed on the Online Governmental Consensus Vote ballot.

11.2 Online Governmental Consensus Vote Voter Statement: In order to vote on the Online Governmental Consensus Vote, the eligible voter is required to acknowledge the following in order to proceed to the ballot:

1. I am currently an employee or public official actively engaged either full or part time in the administration, formulation, implementation or enforcement of laws, ordinances, rules or regulations relating to the public health, safety and welfare, or have Honorary Member status.
2. I am participating in this ICC activity in compliance with the ICC Code of Ethics (see Section 1.8), and I will avoid any circumstance that could create the appearance of a conflict of interest or otherwise compromise professional integrity.
3. As an eligible voting member, I have done my due diligence to become an informed voter on the matters that I am voting on, or as a representative of an ICC Governmental Member, my vote is being directed by the Governmental Member.
4. I am aware that voter guides that seek to influence or recommend voter positions are not endorsed by the International Code Council,

and I understand that I am under no obligation to vote in accordance with any such voter guides.

5. I will not vote on any code change that would provide me with a direct personal financial benefit.
6. I will not vote on any code change that would provide a direct financial benefit to any individual or company with which I have a business interest or relationship.

11.3 **Online Governmental Consensus Vote Ballot:** The ballot for each code change proposal considered at the Public Comment Hearing will include:

1. The Public Comment Hearing result and vote count.
2. The allowable Online Governmental Consensus Vote actions in accordance with Section 11.1.
3. Where the Public Comment Hearing result is As Submitted (AS) or Disapproval (D), the original code change proposal will be presented.
4. Where the Public Comment Hearing result is As Modified by the Committee (AMC) or As Modified by one or more Public Comments (AMPC), the original code change and approved modification(s) will be presented.
5. The Committee action taken at the First and Second Committee Action Hearings.
6. ICC staff identification of correlation issues.
7. For those who voted at the Public Comment Hearing, the ballot will indicate how they voted, unless an electronic vote count is not taken in accordance with Section 10.5.9.10.
8. An optional comment box to provide comments.
9. Access to the Public Comment Agenda which includes: the original code change, the report of the Committee action and the submitted public comments.
10. Access to the audio and video of the First and Second Committee Action and Public Comment Hearing proceedings.
11. Identification of the ballot period for which the online balloting will be open.

11.4 **Voting process:** Voting shall be limited to eligible voters in accordance with Section 12.0. Eligible voters are authorized to vote during the Public Comment Hearing and during the Online Governmental Consensus Vote; however, only the last vote cast will be included in the final vote tabulation. The ballot period will not be extended beyond the published period except as approved by the ICC Board.

11.4.1 **Participation requirement**: A minimum number of participants to conduct the Online Governmental Consensus Vote shall not be required unless the code change proposal(s) were not voted upon utilizing the electronic voting devices at the Public Comment Hearing and the resulting vote was not assigned to each eligible voting member in accordance with Sections
10.5.9.7 and 10.5.9.8. If this occurs, a minimum number of participants as determined by the ICC Board shall be

required for those code change proposal(s) based on an assessment of the minimum number of votes cast during the entire Public Comment Hearing. The Online Governmental Consensus Vote shall determine the Final Action on the code change proposal(s) in accordance with Section 13.1.

12.0 Eligible Final Action Voters

12.1 **Eligible Final Action Voters:** Eligible Final Action voters include ICC

Governmental Member Voting Representatives and Honorary Members in good standing who have been confirmed by ICC in accordance with the Electronic Voter Validation System. Such confirmations are required to be revalidated once each code development cycle. After initial validation, changes to the list of GMVRs for the remainder of the code development cycle shall be made in accordance with Section 12.2. Eligible Final Action voters in attendance at the Public Comment Hearing and those participating in the Online Governmental Consensus Vote shall have one vote per eligible voter on all Codes. Individuals who represent more than one Governmental Member shall be limited to a single vote.

12.2 **Applications:** Applications for Governmental Membership must be received by the ICC at least 30 days prior to the Group A First Committee Action Hearing (CAH #1) in order for its designated representatives to be eligible to vote at the Code Group A and B Public Comment Hearing or Online Governmental Consensus Vote. Applications, whether new or updated, for Governmental Member Voting Representative status must be received by the Code Council 30 days prior to the commencement of the first day of the Code Group A and B Public Comment Hearing in order for any designated representative to be eligible to vote. An individual designated as a Governmental Member Voting Representative shall provide sufficient information to establish eligibility as defined in the ICC Bylaws. The Executive Committee of the ICC Board, in its discretion, shall have the authority to address questions related to eligibility.

13.0 Tabulation, Certification and Posting of Results

13.1 **Tabulation and Validation:** Following the closing of the online ballot period, the votes received will be combined with the vote tally at the Code Group A and B Public Comment Hearing to determine the final vote on the code change proposal. If a hand/standing count is utilized per Subsection 10.5.9.7 or 10.5.9.8, those votes of the Public Comment Hearing will not be combined with the online ballot. ICC shall retain a record of the votes cast and the results shall be certified by a validation Committee appointed by the ICC Board. The validation Committee shall report the results to the ICC Board, either confirming a valid voting process and result or citing irregularities in accordance with Section 13.2.

13.2 **Voting Irregularities:** Where voting irregularities or other concerns with the Online Governmental Consensus Voting process which are material to the outcome or the disposition of a code change proposal(s) are identified by the Validation Committee, such irregularities or concerns shall be immediately brought to the attention of the ICC Board. The ICC Board shall take whatever action necessary to ensure a fair and impartial Final Action vote on all code change proposals, including but not limited to:

1. Set aside the results of the Online Governmental Consensus Vote and have the vote taken again.
2. Set aside the results of the Online Governmental Consensus Vote and declare the Final Action on all code change proposals to be in accordance with the results of the Public Comment Hearing.
3. Other actions as determined by the ICC Board.

13.3 **Failure to Achieve Majority Vote:** In the event a code change proposal does not receive any of the required majorities for Final Action in Section 11.1, the Final Action on the code change proposal in question shall be Disapproval.

13.4 **Final Action Results:** The Final Action on all code change proposals shall bepublished as soon as practicable after certification of the results. The results shall include the Final Action taken, including the vote tallies from both the Public Comment Hearing and Online Governmental Consensus Vote, as well as the required majority in accordance with Section 11.1. ICC shall maintain a record of individual votes for auditing purposes; however, the record shall not be made public. The exact wording of any resulting text modifications shall be made available to any interested party.

14.0 Code Publication

14.1 **Next Edition of the Codes:** The Final Action results on code change proposals shall be the basis for the subsequent edition of the respective Code.

14.2 **Code Correlation:** The Code Correlation Committee is authorized to resolve technical or editorial inconsistencies resulting from actions taken during the Code Development Process by making appropriate changes to the text of the affected code. The process to resolve technical or editorial inconsistencies shall be conducted in accordance with CP-44 –*Code Correlation Committee*.

15.0 Appeals

15.1 **Right to Appeal:** Any person may appeal an action or inaction in accordance with Council Policy 1 Appeals. Any appeal made regarding voter eligibility, voter fraud, voter misrepresentation or breach of ethical conduct must be supported by credible evidence and must be material to the outcome of the final disposition of a code change proposal(s).

The following actions are not appealable:

1. Variations of the results of the Code Group A and B Public Comment Hearing compared to the Final Action result in accordance with Section 13.4.
2. Denied requests to extend the voter balloting period in accordance with Section 11.4.
3. Lack of access to cdpACCESS to submit a code change proposal, to submit a comment to a Committee action, to submit a public comment or to vote.
4. Code Correlation Committee changes made in accordance with Section 14.2.

16.0 Violations

16.1 **ICC Board Action on Violations:** Violations of the policies and procedures contained in this Council Policy shall be brought to the immediate attention of the ICC Board for response and resolution. Additionally, the ICC Board may take any actions it deems necessary to maintain the integrity of the code development process.

17.0 Cost Impacts.

17.1 **Cost Impact Statement Requirements.** The proponent shall indicate one of the following regarding the cost impact of the code change proposal or the net cost impact of the code change proposal and comment submitted:

1. The code change proposal's estimated immediate cost impacts; or
2. The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction.

The proponent shall submit information which substantiates such assertion. This information will be considered by the Committee and will be included in the published code change proposal. Supporting documentation may be provided via a link to a website provided by the proponent and included in the cost substantiation statement. The cost substantiation statement shall include the date the link was created.

Any proposal submitted which does not include the requisite cost impact information shall be considered incomplete and shall not be processed.

1. The cost estimates provided shall be straightforward, allowing the Code Development Committee (CDC) members and eligible

voting members, to rapidly assess their relative validity.

2. The cost estimates shall (a) have succinct information to allow the average person to understand how it was calculated (methodology), and (b) may provide reference for the publicly available data used (basis for variables).
3. The ICC may develop a cost impact guidance document to assist code change and comment submitters in complying effectively with the cost impact requirements.

Sections added December 8, 2023, 2023 revision to CP-28

Section 1.4
Section 4.3.5.3
Section 6.2.2
Section 7.4.5
Section 8.4.

Section 17.1

Sections added October 7, 2023, 2023 revision to CP-28

Section 17 cost impacts and consolidates the language for reference throughout CP28.

Sections added in December 7, 2022 revision to CP-28:

Sections 3.0, 7.0 and 8.0 added for the new process effective with the 2024/2026 Cycle, and coordination of process requirements throughout based on these new sections

Added Section 6.5.2.3.1

Added Sections 10.5.9.10.1 and 11.1.1

Sections revised in July 16, 2021 revision to CP-28:

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Sections revised in December 3, 2020 revision to CP-28:

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Sections revised in November 2, 2020 revisions to CP-28:

5.7 (removal of entire section) 2.5

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Section revised in January 1, 2019 revision to CP-28:

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Sections revised in October 20, 2018 revision to CP-28:

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Sections revised in July 27, 2018 revision to CP-28:

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Sections revised in September 9, 2017 revision to CP-28:

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2024 GROUP A ICC CODE DEVELOPMENT CYCLE
CROSS INDEX OF PROPOSED CODE CHANGES

Some of the proposed code changes include sections that are outside of the scope of the chapters or the code listed in the table of 2024-2026 Staff Secretaries on page xiii. This is done in order to facilitate coordination among the International Codes which is one of the fundamental principles of the International Codes.

Listed in this cross index are proposed code changes that include sections of codes or codes other than those listed on page xxxvi. For example, IBC Section 412.7 is proposed for revision in code change F180-24 which is to be heard by the IFC Committee. Chapter 4 of the IBC is typically the responsibility of the IBC-General Code Committee as listed in the table of Staff Secretaries. It is therefore identified in this cross index. Another example is Section 401.1.1 of the International Mechanical Code. The International Mechanical Code is normally maintained by the IMC Committee, but Section 306.1 will be considered for revision in proposed code change G1-24 Part VII which will be placed on the IMC Committee agenda.

This information is provided to assist users in locating all of the proposed code changes that would affect a certain section or chapter. For example, to find all of the proposed code changes that would affect Chapter 2 of the IBC, locate IBC Chapter 2 in the Cross Index of proposed codes changes, then go to the proposed code changes in the portion of the monograph for the respective proposed change group. For example, the Cross Index indicates that the definition of CONTROL AREA is contained within proposed code change F17-24. The IFC portion of the monograph will contain proposed code change F17-24 for your review. While care has been taken to be accurate, there may be some omissions in this list.

Letter prefix: Each proposed change number has a letter prefix that will identify where the proposal is published. The letter designations for proposed changes and the corresponding publications are as follows:

PREFIX	**PROPOSED CHANGE GROUP (see monograph table of contents for location)**
E	International Building Code - Means of Egress
F	International Fire Code
FG	International Fuel Gas Code
FS	International Building Code - Fire Safety
G	International Building Code – General
M	International Mechanical Code
P	International Plumbing Code
PSD	International Private Sewage Disposal Code
S	International Building Code – Structural
SP	International Swimming Pool and Spa Code
WUIC	International Wildland-Urban Interface Code

INTERNATIONAL BUILDING CODE	
Section #	**Code Change #**
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112.2	F211-24
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ADULT CHANGING STATIONS (new)	E127-24 Part I
AEROSOL	F7-24
ASPHYXIANT	F9-24
ASSISTED BATHING (new)	E126-24 Part I
ASSISTED TOILETING (new)	E126-24 Part I
ASSISTIVE Table (new)	E127-24 Part I
AUTOMATIC FIRE DETECTION SYSTEM	F10-24
BACKED VINYL SIDING	FS111-24
CLINICAL NEED (new)	G2-24
COMBUSTIBLE LIQUID	F12-24
COMMERCIAL MOTOR VEHICLE	F13-24
COMPRESSED GAS	F14-24
CONTROL AREA	F17-24
CONTROL VESTIBULE (new)	E61-24
CONTINUITY HEAD-OF-WALL SYSTEM	FS29-24
CORROSIVE	F15-24
CRYOGENIC FLUID	F16-24
CRYOGENIC FLUID, FLAMMABLE	F16-24
CRYOGENIC FLUID, INERT	F16-24
CRYOGENIC FLUID, OXIDIZING	F16-24
DRAINAGE PLANE (New)	S9-24
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EMERGENCY HELICOPER LANDING AREA (EHLF)	F180-24
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EXPLOSIVE	F18-24
FAMILY OR COMPANION BATHING ROOM (new)	E126-24 Part I

FAMILY OR COMPANION TOILET ROOM (new)	E126-24 Part I
FIRESTOP IDENTIFICATION DEVICE (New)	FS42-24
FLAMMABLE CRYOGENIC FLUID	F16-24
FLAMMABLE GAS	F19-24, F21-24
FLAMMABLE LIQUID	F12-24
FLAMMABLE SOLID	F20-24
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FUEL GAS SOURCE (New)	F152-24
HIGHLY TOXIC	F23-24
INERT COMPRESSED GAS	F24-24
LANDING (new)	E48-24
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LIQUID STORAGE WAREHOUSE	F25-24
LIQUID USE, DISPENSING AND MIXING ROOM	F25-24
NONCOMBUSTIBLE MATERIAL (new)	G12-24 Part I
MANUFACTURER'S INSTALLATION INSTRUCTIONS (New)	FS43-24
MAGNESIUM-OXIDE-CEMENT PANEL PRODUCT	FS113-24
OCCUPANT SENSOR CONTROL (new)	E32-24
ORGANIC PEROXIDE	F26-24, F270-24
OXIDIZER	F27-24
OXIDIZING CRYOGENIC FLUID	F16-24
OXIDIZING GAS	F28-24
PartY WALL (New)	FS22-24
PYROPHORIC	F29-24
READY ACCESS (TO) (new)	E1-24 Part 1
REMOTE SYSTEM ACCESS	F127-24, F128-24
RESTRICTED AUDIBLE MODE OPERATION (RAMO) NOTIFICATION	F135-24, F136-24
SOCIAL STAIRS (new)	E124-24

STUCCO BOND BREAK (New)	S9-24
TOXIC	F23-24
UNSTable(REACTIVE) MATERIAL	F32-24
VERTIPORT	F180-24
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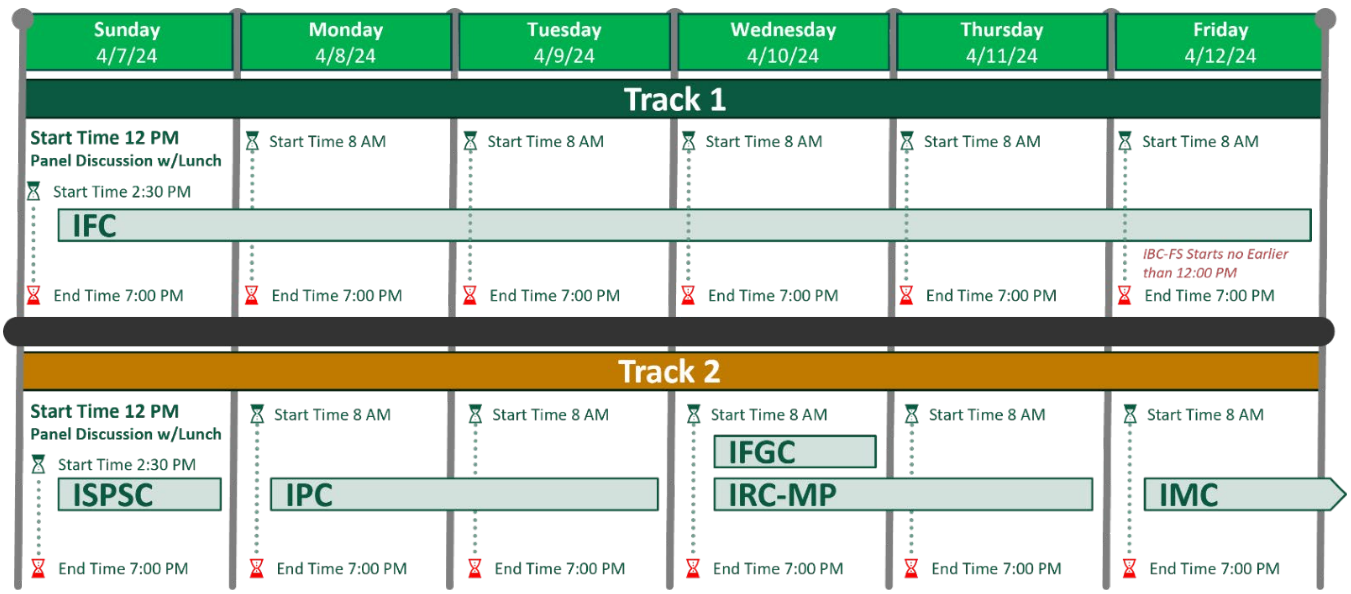
2024 GROUP A COMMITTEE ACTION HEARING SCHEDULE
April 7 – April 16, 2024
DoubleTree by Hilton
at the Entrance to Universal Orlando, Orlando Fl

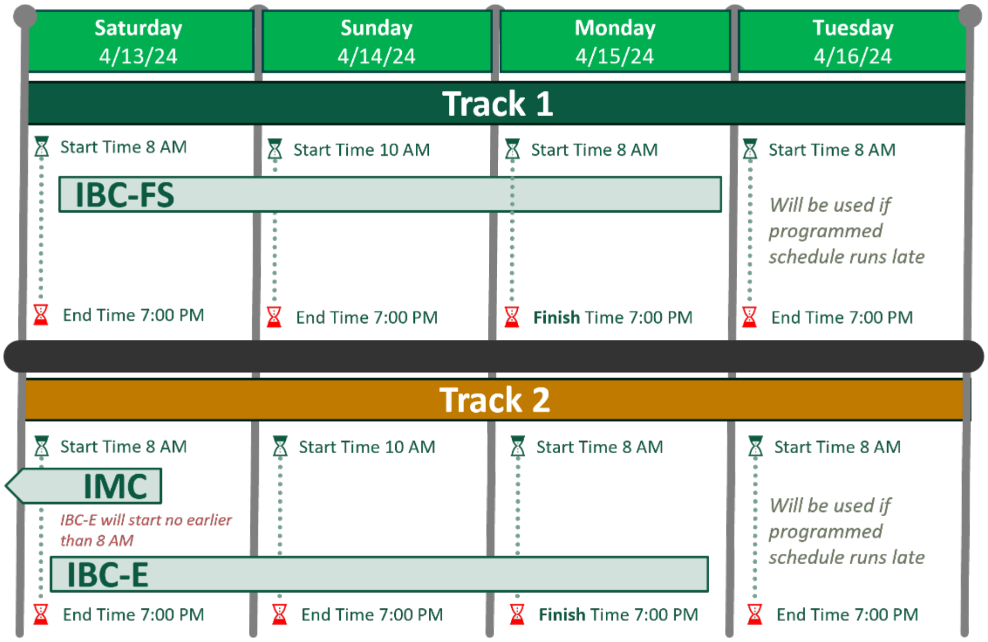
2024 Group A | Committee Action Hearing #1 (CAH#1)

This year the code action hearings will start with a panel discussion and lunch at 12:00 PM on Sunday April 7, 2024. This will allow for Membership Council meetings to be held prior to the start of the hearings and CAH attendees to participate in the panel discussion event where lunch will be provided for attendees.

The hearings will be conducted **in-person only**. The hearings will be streamed live for individuals wishing to watch them online (note this is a watch only option).

Unless noted by "Start no earlier than 8 am" each Code Committee will begin immediately upon completion of the hearings for the prior Committee. This includes moving a Committee forward or back from the day indicated based on hearing progress. The actual start times for the various Committees are not stipulated because of uncertainties in hearing progress. The schedule anticipates that the hearings will finish on the date indicated in the schedule provided below. This may require going beyond the scheduled finish time.





Important Notes

1. Code change agenda to be posted on or before February 26th.
2. Hearing times may be modified at the discretion of the Chair based on hearing progress.
3. Morning and afternoon breaks will be announced. A lunch break is planned. A dinner break is not planned. The hearings are scheduled to adjourn for dinner and resume the next day, unless otherwise necessary to complete the agenda.
4. Because of uncertainties in hearing progress, the start time indicated as “Start No Earlier than [8 AM or 12:00 PM]” is conservatively estimated and is not intended to be a hearing progress target.
5. Consult the hearing order in the posted code change agenda for:
   a. Code changes to be heard by a Committee other than the Committee under which the code change is designated.
   b. Code changes comprised of multiple parts where each part is heard by a different Committee.
   c. Code changes to the definitions to determine the applicable Committee who will hear the change to the definition for the respective code.

Code Development Committees (CDC) [Governed by ICC CP 28]

Details related to the sections of the code that each committee covers can be found in the Committee Responsibility Matrix. The 2024 CAH's will include the **Group A** committees.

Acronym	*Cycle Group*	*Description*
ADMIN	B	Provisions (Chapter 1 for all I-Codes except the IECC, IgCC and IRC) and referenced standards updates (multi-discipline committee)
IBC-E	**A**	Building Code – Means of Egress Committee
IBC-FS	**A**	Building Code – Fire Safety Committee
IBC-G	B	International Building Code – General Committee
IBC-S	B	International Building Code – Structural Committee (Includes structural provisions of IEBC)
IEBC	B	International Existing Building Code Committee (Excludes structural provisions)
IFC	**A**	International Fire Code Committee (includes International Wildland – Urban Interface Code)
IFGC	**A**	International Fuel Gas Code Committee
IgCC	B	International Green Construction Code – Chapter 1 only (remaining provisions per ASHRAE 189.1)
IMC	**A**	International Mechanical Code Committee
IPC	**A**	International Plumbing Code Committee (includes International Private Sewage Disposal Code)
IPM/ZC	B	International Property Maintenance and Zoning Code Committee
IRC-B	B	Residential Code –Building Committee
IRC-MP	**A**	International Residential Code – Mechanical-Plumbing Committee
ISPSC	**A**	International Swimming Pool and Spa Code Committee

2024 PROPOSED CHANGES TO THE INTERNATIONAL CODES

CODE	PAGE
IADMIN	ADM1
IBC – Egress	E1
IBC – Fire Safety	FS1
IBC – General	G1
IBC – Structural	S1
IFC	F1
IFGC	FG1
IMC	M1
IPC	P1
IPSDC	PSD1
IRC – Mechanical	RM1
IRC – Plumbing	RP1
ISPSC	SP1
IWUIC	WUIC1
CCC	CCC1

IADMIN Code Change Proposals

The following code change proposal is labeled as ADM change proposal because it is a proposal for a change to sections in chapters that are designated as the responsibility of the IADMIN Committee (see page iv of the Introductory pages of this monograph), which meets in the Group B cycle in 2025. However, the change is included in this Group A code development cycle because, at their February 14, 2024 meeting, the ICC Code Correlation Committee approved scoping the change to be heard by the IFGC Committee.

The committee assigned for each code change proposal is indicated in a banner statement near the beginning of the proposal. See the IFGC hearing order.

ADM1-24

IFGC: 101.2.2.1 (New), 107.1.1 (New)

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

THIS PROPOSAL WILL BE HEARD BY THE IFGC CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEE.

2024 International Fuel Gas Code

Add new text as follows:

101.2.2.1 Systems where hydrogen admixtures greater than 5-percent are supplied. Fuel gas, where hydrogen admixtures are delivered, shall meet the requirements of Chapters 3, 4, 5, and 6 for the supplier-defined hydrogen admixture limits, expressed in volume concentration of gaseous hydrogen for service up to the defined hydrogen admixture limits.

107.1.1 Fuel gases. Where hydrogen admixtures are supplied, the code official shall be provided with compositional description of the fuel gas.

Reason: Section 101.2.2.1

This is one of several revisions that address the potential for hydrogen admixtures. This language confirms that systems delivering hydrogen admixtures to end use appliances and equipment must conform with requirements already in effect for natural gas including installation locations, clearances, and other installation conditions (Chapter 3), gas piping requirements (Chapter 4), appliance and equipment chimneys and vents (Chapter 5), and appliance-specific installation requirements (Chapter 6). This section is applicable to the IRC Chapter 24 as well as the IFGC. Hydrogen admixtures above 5% have a range of >5% - <95% due to the requirements found in Chapter 7 which are exclusively for Gaseous Hydrogen Systems which are defined as having at least 95% hydrogen gas by volume and not more than 1 percent oxygen by volume.

[F] GASEOUS HYDROGEN SYSTEM.

An assembly of *piping*, devices and apparatus designed to generate, store, contain, distribute or transport a nontoxic, gaseous hydrogen containing mixture having at least 95-percent hydrogen gas by volume and not more than 1-percent oxygen by volume. Gaseous hydrogen systems consist of items such as compressed gas containers, reactors and appurtenances, including pressure regulators, pressure relief devices, manifolds, pumps, compressors and interconnecting *piping* and tubing and controls.

Section 107.1.1

Due to the introduction of Hydrogen Admixtures in Natural Gas supplies, this proposed revision provides the requirement the code official be provided with the compositional description of the fuel gas to ensure appliances and equipment and piping systems are listed for use with the correct fuel gas and admixtures for the type of fuel supplied in accordance with section 301.3 Listed and labeled.

301.3 Listed and labeled.

Appliances regulated by this code shall be *listed* and *labeled* for the application in which they are used unless otherwise *approved* in accordance with Section 105. The approval of unlisted appliances in accordance with Section 105 shall be based on *approved* engineering evaluation.

This proposal is submitted by the ICC Plumbing Mechanical Gas Code Action Committee (PMGCAC)

PMGCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 PMGCAC has held 26 virtual meetings open to any interested party. In addition, there were several virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the PMGCAC website at PMGCAC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The two new sections merely define what is fuel gas as opposed to a hydrogen admixture. The sections do not require any technical change and thus there will not be any labor or material expended as a result of the inclusion of these two sections in the code.

ADM1-24

2024 GROUP A – PROPOSED CHANGES TO THE INTERNATIONAL BUILDING CODE – MEANS OF EGRESS

MEANS OF EGRESS CODE COMMITTEE

Christopher (Chris) Brunette, *Chair*
MS, FM, CFPS
Rep: National Association of State Fire Marshals
Fire & Life Safety Section Chief
Colorado Division of Fire Prevention & Control
Lakewood, CO

Timothy Pate, *Vice Chair*
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TENTATIVE ORDER OF DISCUSSION
2024 PROPOSED CHANGES TO THE
INTERNATIONAL BUILDING CODE – EGRESS

The following is the tentative order in which the proposed changes to the code will be discussed at the public hearings. Proposed changes which impact the same subject have been grouped to permit consideration in consecutive changes.

Proposed change numbers that are indented are those which are being heard out of numerical order. Indentation does not necessarily indicate that one change is related to another. Proposed changes may be grouped for purposes of discussion at the hearing at the discretion of the chair. Note that some E code change proposals may not be included on this list, as they are being heard by another committee.

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  G8-24 Part 1
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IBC: SECTION 202 (New), 703.5, 1004.7, 1011.5.5.3, 1011.7.1, 1015.2, 1607.9.1.1, 1704.2.2, 1807.2.5, 2111.3.1, 2113.9.2, 2405.3.3, 2406.4.3, 3008.9, F101.5.1, H110.1; IFC: [BE] 1004.7, [BE] 1011.5.5.3, [BE] 1011.7.1, [BE] 1015.2

Proponents: Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org); Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org); Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

THIS IS A 5 PART CODE CHANGE.

PART I WILL BE HEARD BY THE IBC EGRESS CODE COMMITTEE.

PART II AND III WILL BE HEARD BY THE FIRE/WILDLAND-URBAN INTERFACE CODE COMMITTEE.

PART IV WILL BE HEARD BY THE MECHANICAL CODE COMMITTEE.

PART V WILL BE HEARD BY THE RESIDENTIAL CODE - PLUMBING & MECHANICAL CODE COMMITTEE.
SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Building Code

Add new definition as follows:

ACCESS (TO). That which enables a device, an *appliance* or equipment to be reached by *ready access* or by a means that first requires the removal or movement of a panel or similar obstruction [see also "Ready access (to)"].

READY ACCESS (TO). That which enables a device, *appliance* or equipment to be directly reached, without requiring the removal or movement of any panel or similar obstruction [see also "Access (to)"].

Revise as follows:

703.5 Marking and identification.
Where ~~there is an accessible~~ access is provided to a concealed space that is located under a floor, within a floor-ceiling or an *attic* space, *fire walls*, *fire barriers*, *fire partitions*, *smoke barriers* and *smoke partitions* or any other wall required to have protected openings or penetrations shall be effectively and permanently identified with signs or stenciling in the concealed space. Such identification shall:

1. Be located within 15 feet (4572 mm) of the end of each wall and at intervals not exceeding 30 feet (9144 mm) measured horizontally along the wall or partition.
2. Include lettering not less than 3 inches (76 mm) in height with a minimum $^{3}/_{8}$-inch (9.5 mm) stroke in a contrasting color incorporating the suggested wording, "FIRE AND/OR SMOKE BARRIER—PROTECT ALL OPENINGS," or other wording.

1004.7 Outdoor areas.
Yards, patios, *occupiable roofs* , *courts* and similar outdoor areas ~~accessible to and usable~~ intended for use by the *building* occupants shall be provided with *means of egress* as required by this chapter. The *occupant load* of such outdoor areas shall be assigned by the *building official* in accordance with the anticipated use. Where outdoor areas are to be used by *persons* in addition to the occupants of the *building*, and the path of egress travel from the outdoor areas passes through the *building*, *means of egress* requirements for the *building* shall be based on the sum of the *occupant loads* of the *building* plus the outdoor areas.

Exceptions:

1. Outdoor areas used exclusively for service of the building need only have one *means of egress*.
2. Both outdoor areas associated with Group R-3 and individual *dwelling units* of Group R-2.

1011.5.5.3 Solid risers.
Risers shall be solid.

Exceptions:

1. Solid risers are not required for *stairways* that are not required to comply with Section 1009.3, provided that the opening between treads does not permit the passage of a sphere with a diameter of 4 inches (102 mm).

2. Solid risers are not required for occupancies in Group I-3 or in Group F, H and S occupancies other than areas ~~accessible~~ open to the public. The size of the opening in the riser is not restricted.
3. Solid risers are not required for *spiral stairways* constructed in accordance with Section 1011.10.

1011.7.1 Stairway walking surface.
The walking surface of treads and landings of a *stairway* shall not be sloped steeper than one unit vertical in 48 units horizontal (2-percent slope) in any direction. *Stairway* treads and landings shall have a solid surface. Finish floor surfaces shall be securely attached.

Exceptions:

1. Openings in *stair* walking surfaces shall be a size that does not permit the passage of $^1/_2$-inch-diameter (12.7 mm) sphere. Elongated openings shall be placed so that the long dimension is perpendicular to the direction of travel.
2. In Group F, H and S occupancies, other than areas of parking *structures* ~~accessible~~ open to the public, openings in treads and landings shall not be prohibited provided that a sphere with a diameter of 1 $^1/_8$ inches (29 mm) cannot pass through the opening.

1015.2 Where required.
Guards shall be located along open-sided walking surfaces, such as *mezzanines*, *equipment platforms*, *aisles*, *stairs*, *ramps* and landings, that are located more than 30 inches (762 mm) measured vertically to the floor or grade below at any point within 36 inches (914 mm) horizontally to the edge of the open side and at the perimeter of *occupiable roofs* . *Guards* shall be adequate in strength and attachment in accordance with Section 1607.9.

Exceptions: *Guards* are not required for the following locations:

1. On the loading side of loading docks or piers.
2. On the audience side of *stages* and raised *platforms*, including *stairs* leading up to the *stage* and raised *platforms*.
3. On raised *stage* and *platform* floor areas, such as runways, *ramps* and side *stages* used for entertainment or presentations.
4. At vertical openings in the performance area of *stages* and *platforms*.
5. At elevated walking surfaces appurtenant to *stages* and *platforms* for access to and utilization of special lighting or equipment.
6. Along vehicle service pits not ~~accessible~~ open to the public.
7. In assembly seating areas at cross *aisles* in accordance with Section 1030.17.2.
8. On the loading side of station platforms on fixed guideway transit or passenger rail systems.
9. Portions of an *occupiable roof* located less than 30 inches (762 mm) measured vertically to adjacent unoccupiable roof areas where *approved guards* are present at the perimeter of the roof.
10. At portions of an *occupiable roof* where an *approved* barrier is provided.

1607.9.1.1 Uniform load.
Handrails and *guards* shall be designed to resist a linear *load* of 50 pounds per linear foot (plf) (0.73 kN/m) in accordance with Section 4.5.1.1 of ASCE 7. This load need not be assumed to act concurrently with the concentrated load specified in Section 1607.9.1.

Exceptions:

1. For one- and two-family *dwellings*, only the single concentrated *load* required by Section 1607.9.1 shall be applied.
2. In Group I-3, F, H and S occupancies, for areas that are not ~~accessible~~ open to the ~~general~~ public and that have an *occupant load* less than 50, the minimum *load* shall be 20 pounds per foot (0.29 kN/m).
3. For roofs not intended for occupancy, only the single concentrated load required by Section 1607.9.1 shall be applied.

1704.2.2 Access for special inspection.
The construction or work for which *special inspection* or testing is required shall remain ~~accessible and~~ exposed and with access for *special inspection* or testing purposes until completion of the required *special inspections* or tests.

1807.2.5 Guards.
Guards shall be provided at retaining walls in accordance with Sections 1807.2.5.1 through 1807.2.5.3.

Exception: *Guards* are not required at retaining walls in areas not ~~accessible~~ open to the public.

2111.3.1 Ash dump cleanout. Cleanout openings, located within foundation walls below fireboxes, where provided, shall be equipped with ferrous metal or *masonry* doors and frames constructed to remain tightly closed, except when in use. Cleanouts shall be ~~accessible~~ provided with access and located so that ash removal will not create a hazard to combustible materials.

2113.9.2 Spark arrestors. Where a spark arrestor is installed on a *masonry* chimney, the spark arrestor shall meet all of the following requirements:

1. The net free area of the arrestor shall be not less than four times the net free area of the outlet of the chimney flue it serves.
2. The arrestor screen shall have heat and *corrosion resistance* equivalent to 19-gage galvanized steel or 24-gage stainless steel.
3. Openings shall not permit the passage of spheres having a diameter greater than $^1/_2$ inch (12.7 mm) nor block the passage of spheres having a diameter less than $^3/_8$ inch (9.5 mm).
4. The spark arrestor shall be ~~accessible~~ provided with access for cleaning and the screen or chimney cap shall be removable to allow for cleaning of the chimney flue.

2405.3.3 Screening not required in monolithic and multiple-layer sloped glazing systems.
In monolithic and multiple-layer sloped glazing systems, retention screens are not required for any of the following:

1. Fully tempered glass where glazed between intervening floors at a slope of 30 degrees (0.52 rad) or less from the vertical plane, and the highest point of the glass is 10 feet (3048 mm) or less above the walking surface.
2. Any glazing material, including annealed glass, where the walking surface below the glazing material is permanently protected from the risk of falling glass or the area below the glazing material is not a walking surface.
3. Any glazing material, including annealed glass, in the sloped glazing systems of commercial or detached noncombustible *greenhouses* used exclusively for growing plants and not open to the public, provided that the height of the *greenhouse* at the ridge does not exceed 30 feet (9144 mm) above grade.
4. Individual *dwelling units* in Groups R-2, R-3 and R-4 where fully tempered glass is used as single glazing or as both panes in an insulating glass unit, and all of the following conditions are met:
   4.1. Each pane of the glass is 16 square feet (1.5 m^2) or less in area.
   4.2. The highest point of the glass is 12 feet (3658 mm) or less above any walking surface ~~or other accessible area~~.
   4.3. The glass thickness is $^3/_{16}$ inch (4.8 mm) or less.
5. Laminated glass with a 15-mil (0.38 mm) polyvinyl butyral or equivalent interlayer used in individual *dwelling units* in Groups R-2, R-3 and R-4 where both of the following conditions are met:
   5.1. Each pane of glass is 16 square feet (1.5 m^2) or less in area.
   5.2. The highest point of the glass is 12 feet (3658 mm) or less above a walking surface ~~or other accessible area~~.

2406.4.3 Glazing in windows. Glazing in an individual fixed or operable panel that meets all of the following conditions shall be considered to be a hazardous location:

1. The exposed area of an individual pane is greater than 9 square feet (0.84 m^2).
2. The bottom edge of the glazing is less than 18 inches (457 mm) above the floor or adjacent walking surface.
3. The top edge of the glazing is greater than 36 inches (914 mm) above the floor or adjacent walking surface.
4. One or more walking surface(s) are within 36 inches (914 mm), measured horizontally and in a straight line, of the plane of the glazing.

Exceptions:

1. *Decorative glazing*.
2. Where a horizontal rail is installed on the ~~accessible~~ walking surfaces side~~(s)~~ of the glazing at 34 to 38 inches (864 to 965 mm) above the walking surface, the~~. The~~ rail shall be capable of withstanding a horizontal *load* of 50 pounds per linear foot (730 N/m) without contacting the glass and be not less than $1^1/_2$ inches (38 mm) in cross-sectional height.
3. Outboard panes in insulating glass units or multiple glazing where the bottom exposed edge of the glass is 8 feet (2438 mm) or more above any grade or walking surface adjacent to the glass exterior.

3008.9 Emergency voice/alarm communication system.
The *building* shall be provided with an *emergency voice/alarm communication system*~~. The *emergency voice/alarm communication system* shall be accessible to the fire department. The system shall be provided~~ in accordance with Section 907.5.2.2.

F101.5.1 Rodent~~-accessible~~ access to openings. Windows and other openings for the purpose of light and ventilation in the *exterior walls* not covered in this chapter, ~~accessible to~~ that are susceptible to entry by rodents by way of exposed pipes, wires, conduits and other appurtenances, shall be covered with wire cloth of at least 0.035-inch (0.89 mm) wire. In lieu of wire cloth covering, said pipes, wires, conduits and other appurtenances shall be blocked from rodent usage by installing solid sheet metal guards 0.024 inch (0.61 mm) thick or heavier. Guards shall be fitted around pipes, wires, conduits or other appurtenances. In addition, they shall be fastened securely to and shall extend perpendicularly from the *exterior wall* for not less than 12 inches (305 mm) beyond and on either side of pipes, wires, conduits or appurtenances.

H110.1 General.
Roof signs shall be constructed entirely of metal or other *approved* noncombustible material except as provided for in Sections H106.1.1 and H107.1. Provisions shall be made for electric grounding of metallic parts. Where combustible materials are permitted in letters or other ornamental features, wiring and tubing shall be kept free and insulated therefrom. *Roof signs* shall be so constructed as to leave a clear space of not less than 6 feet (1829 mm) between the roof level and the lowest part of the *sign* and shall have not less than 5 feet (1524 mm) clearance between the vertical supports thereof. *Roof sign structures* shall not project beyond an *exterior wall*.

Exception: *Signs* on flat roofs ~~with every part of the roof accessible~~ where there is access to the signs.

2024 International Fire Code

Revise as follows:

[BE] 1004.7 Outdoor areas. *Yards*, patios, *occupiable roofs* , *courts* and similar outdoor areas ~~accessible to and usable~~ intended for use by the *building* occupants shall be provided with *means of egress* as required by this chapter. The *occupant load* of such outdoor areas shall be assigned by the *building official* in accordance with the anticipated use. Where outdoor areas are to be used by *persons* in addition to the occupants of the *building*, and the path of egress travel from the outdoor areas passes through the *building*, *means of egress* requirements for the *building* shall be based on the sum of the *occupant loads* of the *building* plus the outdoor areas.

Exceptions:
1. Outdoor areas used exclusively for service of the building need only have one *means of egress*.
2. Both outdoor areas associated with Group R-3 and individual *dwelling units* of Group R-2.

[BE] 1011.5.5.3 Solid risers.
Risers shall be solid.

Exceptions:
1. Solid risers are not required for *stairways* that are not required to comply with Section 1009.3, provided that the opening between treads does not permit the passage of a sphere with a diameter of 4 inches (102 mm).
2. Solid risers are not required for occupancies in Group I-3 or in Group F, H and S occupancies other than areas ~~accessible~~ open to the public. The size of the opening in the riser is not restricted.
3. Solid risers are not required for *spiral stairways* constructed in accordance with Section 1011.10.

[BE] 1011.7.1 Stairway walking surface.

The walking surface of treads and landings of a *stairway* shall not be sloped steeper than 1 unit vertical in 48 units horizontal (2-percent slope) in any direction. *Stairway* treads and landings shall have a solid surface. Finish floor surfaces shall be securely attached.

Exceptions:

1. Openings in *stair* walking surfaces shall be a size that does not permit the passage of $^{1}/_{2}$-inch-diameter (12.7 mm) sphere. Elongated openings shall be placed so that the long dimension is perpendicular to the direction of travel.
2. In Group F, H and S occupancies, other than areas of parking *structures* ~~accessible~~ open to the public, openings in treads and landings shall not be prohibited provided that a sphere with a diameter of 1$^{1}/_{8}$ inches (29 mm) cannot pass through the opening.

[BE] 1015.2 Where required.

Guards shall be located along open-sided walking surfaces, such as *mezzanines*, equipment platforms, *aisles*, *stairs*, *ramps* and landings, that are located more than 30 inches (762 mm) measured vertically to the floor or grade below at any point within 36 inches (914 mm) horizontally to the edge of the open side and at the perimeter of *occupiable roofs* . *Guards* shall be adequate in strength and attachment in accordance with Section 1607.9 of the International Building Code.

Exception: *Guards* are not required for the following locations:

1. On the loading side of loading docks or piers.
2. On the audience side of stages and raised platforms, including *stairs* leading up to the stage and raised platforms.
3. On raised stage and platform floor areas, such as runways, *ramps* and side stages used for entertainment or presentations.
4. At vertical openings in the performance area of stages and platforms.
5. At elevated walking surfaces appurtenant to stages and platforms for access to and utilization of special lighting or equipment.
6. Along vehicle service pits not ~~accessible~~ open to the public.
7. In assembly seating areas at cross *aisles* in accordance with Section 1030.17.2.
8. On the loading side of station platforms on fixed guideway transit or passenger rail systems.
9. Portions of an *occupiable roof* located less than 30 inches (762 mm) measured vertically to adjacent unoccupiable roof areas where approved guards are present at the perimeter of the roof.
10. At portions of an *occupiable roof* where an *approved* barrier is provided.

E1-24 Part I

E1-24 Part II

IFC: SECTION 202, 907.8.2

Proponents: Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org); Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org); Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Fire Code

Revise as follows:

WILDFIRE RISK AREA. Land that is covered with grass, grain, brush or forest, whether privately or publicly owned, ~~which is so situated or is of such inaccessible location that~~ where a fire originating upon it would present an abnormally difficult job of suppression or would result in great or unusual damage through fire or such areas designated by the *fire code official*.

907.8.2 Testing.
Testing shall be performed in accordance with the schedules in NFPA 72 or more frequently where required by the *fire code official*. Records of testing shall be maintained.

Exception: Devices or equipment ~~that are inaccessible~~ located without access because of safety considerations shall be tested during scheduled shutdowns where *approved* by the *fire code official*, but not less than every 18 months.

E1-24 Part II

E1-24 Part III

IWUIC: A103.2, TABLE C101.1, G101.3.2

Proponents: Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org); Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org); Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Wildland Urban Interface Code

Revise as follows:

A103.2 ~~Trespassing on posted private property~~ Restricted areas.
Where the *code official* determines that a specific area within a *wildland-urban interface area* presents an exceptional and continuing fire danger because of the density of natural growth, difficulty of terrain, proximity to structures or ~~accessibility~~ open to the public, such areas shall be restricted or closed until changed conditions warrant termination of such restriction or closure. Such areas shall be posted in accordance with Section A103.2.1.

TABLE C101.1 FIRE HAZARD SEVERITY FORM

Portions of table not shown remain unchanged.

A. Subdivision Design Points	
3. ~~Accessibility~~ Vehicle access	
Road grade 5% or less	1___
Road grade more than 5%	3___

G101.3.2 Alternative water supply systems for exposure protection.
Pools and spas are often offered as an alternative water source for fire departments. These water sources must be reliable and able to be accessed to be of any use by fire protection forces. ~~Accessibility~~ Access means that the fire department ~~must be~~ is able to withdraw the water without having to go through extraordinary measures such as knocking down fences or having to set up drafting situations. Designs have been created to put liquid- or gas-fueled pumps or gravity valves on pools and spas to allow fire departments to access these water systems. A key vulnerability to the use of these alternative water systems is loss of electrical power. When the reliability of a water system depends on external power sources, it cannot be relied upon by fire fighters to be available in a worst-case scenario.

E1-24 Part III

E1-24 Part IV

IFC: SECTION 202; IFGC: SECTION 202; IMC®: SECTION 202, 506.3.8, 603.4.1; IPC: SECTION 202, 712.2, 1111.1

Proponents: Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org); Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org); Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Fire Code

[M] ACCESS (TO). That which enables a device, appliance or equipment to be reached by *ready access* or by a means that first requires the removal or movement of a panel or similar obstruction [see also "Ready access (to)"].

Revise as follows:

[M] READY ACCESS (TO). That which enables a device, appliance or equipment to be directly reached, without requiring the removal or movement of any panel or similar obstruction [see <u>also</u> "Access (to)"].

2024 International Fuel Gas Code

Revise as follows:

[M] ACCESS (TO). That which enables a device, *appliance* or *equipment* to be reached by *ready access* or by a means that first requires the removal or movement of a panel, ~~door~~ or similar obstruction (see also "Ready access <u>(to)</u>").

[M] READY ACCESS (TO). That which enables a device, *appliance* or *equipment* to be directly reached, without requiring the removal or movement of any panel~~, door~~ or similar obstruction (see <u>also</u> "*Access (to)*").

2024 International Mechanical Code

ACCESS (TO). That which enables a device, *appliance* or *equipment* to be reached by *ready access* or by a means that first requires the removal or movement of a panel or similar obstruction [see also "*Ready access (to)"*].

Revise as follows:

NET OCCUPIABLE FLOOR AREA. The floor area of an *occupiable space* defined by the inside surfaces of its walls but excluding shafts, column enclosures and other permanently enclosed, ~~inaccessible and~~ unoccupiable areas <u>and not provided with access</u>. Obstructions in the space such as furnishings, display or storage racks and other obstructions, whether temporary or permanent, shall not be deducted from the space area.

READY ACCESS (TO). That which enables a device, *appliance* or *equipment* to be directly reached, without requiring the removal or movement of any panel or similar obstruction [see <u>also</u> "*Access (to)*"].

506.3.8 Grease duct cleanouts and openings. Grease duct cleanouts and openings shall comply with all of the following:

1. Grease ducts shall not have openings except where required for the operation and maintenance of the system.
2. Sections of grease ducts ~~that are inaccessible~~ <u>that cannot be accessed</u> from the hood or discharge openings shall be provided with cleanout openings spaced not more than 20 feet (6096 mm) apart and not more than 10 feet (3048 mm) from changes in direction greater than 45 degrees (0.79 rad).
3. Cleanouts and openings shall be equipped with tight-fitting doors constructed of steel having a thickness not less than that required for the grease duct.
4. Cleanout doors shall be installed liquid tight.
5. Door assemblies including any frames and gaskets shall be *approved* for the application and shall not have fasteners that penetrate the grease duct.
6. Gasket and sealing materials shall be rated for not less than 1,500°F (816°C).

7. *Listed* door assemblies shall be installed in accordance with the manufacturer's instructions.

603.4.1 Minimum fasteners. Round metallic ducts shall be mechanically fastened by means of not less than three sheet metal screws or rivets spaced equally around the joint.

Exception: Where a duct connection is made that is partially ~~inaccessible~~ cannot be accessed, three screws or rivets shall be equally spaced on the exposed portion so as to prevent a hinge effect.

2024 International Plumbing Code

Revise as follows:

[M] ACCESS (TO). That which enables a fixture, appliance or equipment to be reached by *ready access* or by a means that first requires the removal or movement of a panel or similar obstruction (see also "Ready access (to)").

[M] READY ACCESS (TO). That which enables a fixture, appliance or equipment to be directly reached without requiring the removal or movement of any panel or similar obstruction and ~~without the use of a portable ladder, step stool or similar device~~ (see also "Access (to)").

712.2 Valves required.
A check valve and a full-open valve located on the discharge side of the check valve shall be installed in the pump or ejector discharge piping between the pump or ejector and the gravity drainage system. *Access* shall be provided to such valves. Such valves shall be located above the sump cover required by Section 712.1 or, where the discharge pipe from the ejector is below grade, the valves shall be ~~accessibly~~ located outside the sump below grade in an access pit with a removable *access* cover.

1111.1 Subsoil drains.
Subsoil drains shall be open-jointed, horizontally split or perforated pipe conforming to one of the standards listed in Table 1102.5. Such drains shall be not less than 4 inches (102 mm) in diameter. Where the building is subject to backwater, the subsoil drain shall be protected by ~~an accessibly located~~ a backwater valve that is provided with access. Subsoil drains shall discharge to a trapped area drain, sump, dry well or *approved* location above ground. The subsoil sump shall not be required to have either a gastight cover or a vent. The sump and pumping system shall comply with Section 1113.1.

E1-24 Part IV

E1-24 Part V

IRC: TABLE M1306.2, M1803.4.1, M2006.2, P2704.1, P2706.1, P2712.6, P2720.2, P2722.4, P2903.9.5, P2903.10.1, P2903.10.2, P2903.10.3, P2903.11, P2911.5, P2911.8.1, P2911.9, P2912.4, P2912.8, P2912.12, P3005.1.5, P3007.2, P3007.3.2, P3302.1, P3303.1.2, P3303.1.4

Proponents: Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org); Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org); Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Residential Code

Revise as follows:

TABLE M1306.2 REDUCTION OF CLEARANCES WITH SPECIFIED FORMS OF PROTECTION [a, c, d, e, f, g, h, i, j, k, l]

Portions of table not shown remain unchanged.

For SI: 1 inch = 25.4 mm, 1 pound per cubic foot = 16.019 kg/m^3, °C = [(°F) – 32/1.8], 1 Btu/(h × ft^2× °F/in.) = 0.001442299 (W/cm^2× °C/cm).

a. Reduction of clearances from combustible materials shall not interfere with combustion air, draft hood clearance and relief, and ~~accessibility of~~ access for servicing.

b. Clearances shall be measured from the surface of the heat-producing appliance or equipment to the outer surface of the combustible material or combustible assembly.

c. Spacers and ties shall be of noncombustible material. Spacers and ties shall not be used directly opposite appliance or connector.

d. Where all clearance reduction systems use a ventilated airspace, adequate provision for air circulation shall be provided as described (see Figures M1306.1 and M1306.2).

e. There shall be not less than 1 inch between clearance reduction systems and combustible walls and ceilings for reduction systems using ventilated airspace.

f. If a wall protector is mounted on a single flat wall away from corners, adequate air circulation shall be permitted to be provided by leaving only the bottom and top edges or only the side and top edges open with not less than a 1-inch air gap.

g. Mineral wool and glass fiber batts (blanket or board) shall have a minimum density of 8 pounds per cubic foot and a minimum melting point of 1,500°F.

h. Insulation material used as part of a clearance reduction system shall have a thermal conductivity of 1.0 Btu inch per square foot per hour °F or less. Insulation board shall be formed of noncombustible material.

i. There shall be not less than 1 inch between the appliance and the protector. The clearance between the appliance and the combustible surface shall not be reduced below that allowed in this table.

j. All clearances and thicknesses are minimum; larger clearances and thicknesses are acceptable.

k. Listed single-wall connectors shall be permitted to be installed in accordance with the terms of their listing and the manufacturer's instructions.

l. For limitations on clearance reduction for solid-fuel-burning appliances, see Section M1306.2.3.

M1803.4.1 Closure and ~~accessibility~~ access.
A noncombustible seal shall be provided below the point of connection to prevent entry of room air into the flue. Means shall be provided for *access to* the flue for inspection and cleaning.

M2006.2 Clearances.
The clearances shall not interfere with *combustion air*, draft hood or flue terminal relief, or ~~accessibility~~ access for servicing.

P2704.1 Slip joints.
Slip-joint connections shall be installed only for tubular waste piping and only between the waste outlet of a fixture and the connection to the drainage piping. Slip-joint connections shall be made with an *approved* elastomeric sealing gasket. Slip-joint connections shall ~~be accessible. Such access shall~~ ~~provide~~ be provided with access. Such access shall be provided by an opening that is not less than 12 inches (305 mm) in its smallest dimension.

P2706.1 General. For other than hub drains that receive only clear-water waste and standpipes, a removable strainer or basket shall cover the waste outlet of waste receptors. Waste receptors shall not be installed in concealed spaces. Waste receptors shall not be installed in plenums, attics, *crawl spaces* or interstitial spaces above ceilings and below floors. Ready access to waste ~~Waste~~ receptors shall be provided~~readily accessible~~.

P2712.6 Access. ~~Parts~~ Access to the parts in a flush tank shall be ~~accessible~~ provided for repair and replacement.

P2720.2 Piping drainage. The circulation pump shall be ~~accessibly~~ located above the crown weir of the trap. Access to the circulation pump shall be provided. The pump drain line shall be properly graded to ensure minimum water retention in the volute after fixture use. The circulation piping shall be installed to be self-draining.

P2722.4 Individual pressure-balancing in-line valves for individual fixture fittings.
Individual pressure-balancing in-line valves for individual fixture fittings shall comply with ASSE 1066. Such valves ~~shall be installed in an accessible location and~~ shall not be used as a substitute for the balanced pressure, thermostatic or combination shower valves required in Section P2708.4. Access to such valves shall be provided.

P2903.9.5 Hose bibb bleed.
~~A *readily accessible*~~ An air bleed shall be installed in hose bibb supplies at the manifold or at the hose bibb exit point. Ready access to the air bleed shall be provided.

P2903.10.1 Service valve. Each *dwelling unit* shall be provided with a ~~an accessible~~ *main* shutoff valve near the entrance of the water service. The valve shall be of a full-open type having nominal restriction to flow, with provision for drainage such as a bleed orifice or installation of a separate drain valve. Additionally, the water service shall be valved at the curb or *lot line* in accordance with local requirements.

P2903.10.2 Water heater valve. A ~~readily accessible~~ full-open valve with ready access shall be installed in the cold-water supply pipe to each water heater at or near the water heater.

P2903.10.3 Fixture valves and access. Shutoff valves shall be required on each fixture supply pipe to each plumbing *appliance* and to each plumbing fixture other than bathtubs and showers. ~~Valves~~ Access shall be provided to valves serving individual plumbing fixtures, *plumbing appliances,* risers and branches ~~shall be accessible~~.

P2903.11 Hose bibb.
Hose bibbs subject to freezing, including the "frostproof" type, shall be equipped with ~~an accessible~~ a stop-and-waste-type valve inside the *building* so that they can be controlled and drained during cold periods.

> **Exception:** Frostproof hose bibbs installed such that the stem extends through the building insulation into an open heated or *semiconditioned space* need not be separately valved (see Figure P2903.11).

P2911.5 Filtration. Untreated water collected for reuse shall be filtered as required for the intended end use. Access shall be provided to filters ~~Filters shall be accessible~~ for inspection and maintenance. Filters shall utilize a pressure gauge or other *approved* method to provide indication when a filter requires servicing or replacement. Filters shall be installed with shutoff valves immediately upstream and downstream to allow for isolation during maintenance.

P2911.8.1 Bypass valve.

One three-way diverter valve certified to NSF 50 or other *approved* device shall be installed on collection piping upstream of each storage tank, or drainfield, as applicable, to divert untreated on-site reuse sources to the sanitary sewer to allow servicing and inspection of Bypass valves shall be *labeled* to indicate the direction of flow, connection and storage tank or drainfield connection. Access shall be provided to bypass ~~Bypass~~ valves ~~shall be installed in accessible locations~~. Two shutoff valves shall not be installed to serve as a bypass valve.

P2911.9 Pumping and control system.

Access shall be provided to mechanical ~~Mechanical~~ equipment including pumps, valves and filters ~~shall be accessible~~ and shall be removable in order to perform *repair*, maintenance and cleaning. The minimum flow rate and *flow pressure* delivered by the pumping system shall be appropriate for the application and in accordance with Section P2903.

P2912.4 Roof washer. An amount of rainwater shall be diverted at the beginning of each rain event, and not allowed to enter the storage tank, to wash accumulated debris from the collection surface. The amount of rainfall to be diverted shall be field adjustable as necessary to minimize storage tank water contamination. The roof washer shall not rely on manually operated valves or devices and shall operate automatically. Diverted rainwater shall not be drained to the roof surface and shall be discharged in a manner consistent with the stormwater runoff requirements of the *jurisdiction*.Access shall be provided to roof ~~Roof~~ washers ~~shall be accessible~~ for maintenance and service.

P2912.8 Filtration. Collected rainwater shall be filtered as required for the intended end use. Access shall be provided to filters ~~Filters shall be accessible~~ for inspection and maintenance. Filters shall utilize a pressure gauge or other *approved* method to provide indication when a filter requires servicing or replacement. Filters shall be installed with shutoff valves installed immediately upstream and downstream to allow for isolation during maintenance.

P2912.12 Pumping and control system.

Access shall be provided to mechanical ~~Mechanical~~ equipment, including pumps, valves and filters ~~shall be easily accessible~~ and shall be removable in order to perform repair, maintenance and cleaning. The minimum flow rate and *flow pressure* delivered by the pumping system shall be appropriate for the application and in accordance with Section P2903.

P3005.1.5 Provisions for future fixtures. Where drainage has been roughed-in for future fixtures, the drainage unit values of the future fixtures shall be considered in determining the required drain sizes. Such future installations shall be terminated with ~~an accessible~~ a permanent plug or cap fitting. Access to such plugs or caps shall be provided.

P3007.2 Valves required.

A check valve and a *full open valve* located on the discharge side of the check valve shall be installed in the pump or ejector discharge piping between the pump or ejector and the gravity drainage system. Access shall be provided to such valves. Such valves shall be located above the sump cover required by Section P3007.3.2 or, where the discharge pipe from the ejector is below grade, the valves shall be ~~accessibly~~ located outside the sump below grade in an access pit with a removable access cover.

P3007.3.2 Sump.

The sump shall be not less than 18 inches (457 mm) in diameter and 24 inches (610 mm) deep, unless otherwise *approved*. ~~The sump shall be accessible and~~ Access shall be provided to the sump. The sump shall be located so that drainage flows into the sump by gravity. The sump shall be constructed of tile, concrete, steel, plastic or other *approved* materials. The sump bottom shall be solid and provide permanent support for the pump. The sump shall be fitted with a gastight removable cover that is installed not more than 2 inches (51 mm) below grade or floor level. The cover shall be adequate to support anticipated loads in the area of use. The sump shall be vented in accordance with Chapter 31.

P3302.1 Subsoil drains.

Subsoil drains shall be open-jointed, horizontally split or perforated pipe conforming to one of the standards indicated in Table P3302.1. Such drains shall be not less than 4 inches (102 mm) in diameter. Where the *building* is subject to backwater, the *subsoil drain* shall be protected by ~~an accessibly located~~ backwater valve. Access shall be provided to the backwater valve. *Subsoil drains* shall discharge to a trapped area drain, sump, dry well or *approved* location above ground. The subsoil sump shall not be required to have either a gastight cover or a vent. The sump and pumping system shall comply with Section P3303.

P3303.1.2 Sump pit.

The sump shall be not less than 18 inches (457 mm) in diameter and 24 inches (610 mm) deep, unless otherwise *approved*. ~~The sump shall be *accessible* and~~ ~~The sump shall be accessible~~ Access shall be provided to the sump. The sump shall be located so that all drainage flows into the sump by gravity. The sump shall be constructed of tile, steel, plastic, cast iron, concrete or other *approved* material, with a removable cover adequate to support anticipated loads in the area of use. The sump floor shall be solid and provide permanent support for the pump.

P3303.1.4 Piping.

Discharge piping shall meet the requirements of Sections P3002.1, P3002.2, P3002.3 and P3003. Discharge piping shall include ~~an *accessible*~~ afull-flow check valve that is provided with access. Pipe and fittings shall be the same size as, or larger than, the pump discharge tapping.

Reason: Because the term ‘accessible’ is most commonly understood as requiring access for persons with disabilities we are making the changes to delete the word accessible from the remaining codes and replace it with other words, defined terms or phrases that are not attributed to requiring access for the physically disabled. Many of the codes use the defined term ‘access (to)’ or ‘ready access (to)’ for access by maintenance and service personnel or fire departments. This proposal provides clarity and consistency in the remaining codes where those coordination modifications missed or came in as part of new code changes.
This a correlation piece for proposals over the last couple of cycles. This effort was started by the CACs in 2015/16 code change cycle, and continued in 2018/19. This proposal is to provide coordination with the action taken with -P84-15, M2-15, RB2-16, F12-16, CE137-16 Part 1, CE29-19 Part 1 and 2 . G1-21 Part 1 was disapproved; however Part 2 through 7 were approved.

Correlative pieces will be entered in Group B for parts of IRC, IPMC, IZC and IECC.

This proposal is submitted by the ICC Building Code Action Committee (BCAC), the ICC Fire Code Action Committee (FCAC) and ICC Plumbing Mechanical Gas Code Action Committee (PMGCAC)

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC webpage.

Insert FCAC paragraph

PMGCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 PMGCAC has held 26 virtual meetings open to any interested party. In addition, there were several virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the PMGCAC website at PMGCAC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is a coordination of terms with no changes to construction requirements. See reason statement for additional information on coordination with previous proposals.

E1-24 Part V

E2-24 Part I

IBC: SECTION 1001, 1001.1, [F] SECTION 1002, [F] 1002.1, 1001.2, [F] 1002.2, SECTION 1003, 1003.1; IFC: SECTION 1002 (New), [BE] 1001.2, SECTION 1002, [BE] 1002.1, SECTION 1003, [BE] 1003.1

Proponents: Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE IBC EGRESS CODE COMMITTEE. PART II WILL BE HEARD BY THE FIRE/WILDLAND-URBAN INTERFACE CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Building Code

Revise as follows:

SECTION 1001 ~~ADMINISTRATION~~ GENERAL

1001.1 ~~General~~ Scope.
Buildings or portions thereof shall be provided with a *means of egress* system as required by this chapter. The provisions of this chapter shall control the design, construction and arrangement of all parts of the *means of egress* components required to provide an *approved means of egress* from *structures* and portions thereof.

~~[F]~~ SECTION 1002 MAINTENANCE, ALTERATIONS AND PLANS

[F] 1002.1 Maintenance.
Means of egress shall be maintained in accordance with the *International Fire Code* .

Revise as follows:

~~1001.2~~ 1002.2 ~~Minimum requirements~~ Alterations.
~~It shall be unlawful to alter a *building* or *structure* in a manner that will reduce the~~ The number of *exits* or the minimum width or required capacity of the *means of egress* shall not be altered to less than required by this code.

[F] ~~1002.2~~ 1002.3 Fire safety and evacuation plans.
Fire safety and evacuation plans shall be provided for all occupancies and *buildings* where required by the *International Fire Code* . Such fire safety and evacuation plans shall comply with the applicable provisions of Sections 401.2 and 404 of the International Fire Code.

SECTION 1003 GENERAL MEANS OF EGRESS

Revise as follows:

1003.1 ~~Applicability~~ General.
The ~~general~~ requirements specified in Sections 1003 through 1015 shall apply to all three elements of the *means of egress* system, in addition to those specific requirements for the *exit access*, the *exit* and the *exit discharge* detailed elsewhere in this chapter.

2024 International Fire Code

Add new text as follows:

SECTION 1002 ALTERATIONS

Revise as follows:

[BE] ~~1001.2~~ 1002.1 ~~Minimum requirements~~ Alterations. ~~It shall be unlawful to alter a building or structure in a manner that will reduce the~~ The number of *exits* or the capacity of the *means of egress* shall not be altered to less than required by this code.

Delete without substitution:

~~SECTION 1002 DEFINITIONS~~

~~[BE] 1002.1 Definitions~~.
~~The following terms are defined in Chapter 2:~~

~~ACCESSIBLE MEANS OF EGRESS.~~

~~AISLE.~~

~~AISLE ACCESSWAY.~~

~~ALTERNATING TREAD DEVICE.~~

~~AREA OF REFUGE.~~

~~AUTOMATIC FLUSH BOLT.~~

~~BLEACHERS.~~

~~BREAKOUT.~~

~~CIRCULATION PATH.~~

~~COMMON PATH OF EGRESS TRAVEL.~~

~~CONSTANT LATCHING BOLT.~~

~~CORRIDOR.~~

~~DEAD BOLT.~~

~~DEFEND-IN-PLACE.~~

~~DOOR, BALANCED.~~

~~EGRESS COURT.~~

~~EMERGENCY ESCAPE AND RESCUE OPENING.~~

~~EXIT.~~

~~EXIT ACCESS.~~

~~EXIT ACCESS DOORWAY.~~

~~EXIT ACCESS RAMP.~~

~~EXIT ACCESS STAIRWAY.~~

~~EXIT DISCHARGE.~~

~~EXIT DISCHARGE, LEVEL OF.~~

~~EXIT PASSAGEWAY.~~

~~EXTERIOR EXIT RAMP.~~

~~EXTERIOR EXIT STAIRWAY.~~

~~FIRE EXIT HARDWARE.~~

~~FIXED SEATING.~~

~~FLIGHT.~~

~~FLOOR AREA, GROSS.~~

~~FLOOR AREA, NET.~~

~~FOLDING AND TELESCOPIC SEATING.~~

~~GRADE FLOOR EMERGENCY ESCAPE AND RESCUE OPENINGS.~~

~~GRANDSTAND.~~

~~GUARD.~~

~~HANDRAIL.~~

~~HORIZONTAL EXIT.~~

~~INTERIOR EXIT RAMP.~~

~~INTERIOR EXIT STAIRWAY.~~

~~LOW ENERGY POWER-OPERATED DOOR.~~

~~MANUAL BOLT.~~

~~MEANS OF EGRESS.~~

~~MERCHANDISE PAD.~~

~~NOSING.~~

~~OCCUPANT LOAD.~~

~~OPEN-AIR ASSEMBLY SEATING.~~

~~OPEN-ENDED CORRIDOR.~~

~~OVERHEAD DOORSTOP.~~

~~PANIC HARDWARE.~~

~~PHOTOLUMINESCENT.~~

~~POWER-ASSISTED DOOR.~~

~~POWER-OPERATED DOOR.~~

~~PUBLIC WAY.~~

~~RAMP.~~

~~SCISSOR STAIRWAY.~~

~~SELF-LUMINOUS.~~

~~SMOKE-PROTECTED ASSEMBLY SEATING.~~

~~STAIR.~~

~~STAIRWAY.~~

~~STAIRWAY, INTERIOR EXIT.~~

~~STAIRWAY, SPIRAL.~~

~~WINDER.~~

Revise as follows:

SECTION 1003
GENERAL MEANS OF EGRESS

[BE] 1003.1 ~~Applicability~~ General.

The ~~general~~ requirements specified in Sections 1003 through 1015 shall apply to all three elements of the *means of egress* system, in addition to those specific requirements for the *exit access*, the *exit* and the *exit discharge* detailed elsewhere in this chapter.

E2-24 Part I

E2-24 Part II

IFC: SECTION 1001, 1001.1

Proponents: Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org)

2024 International Fire Code

Revise as follows:

SECTION 1001
~~ADMINISTRATION~~ GENERAL

1001.1 ~~General~~ Scope.
Buildings or portions thereof shall be provided with a *means of egress* system as required by this chapter. The provisions of this chapter shall control the design, construction and arrangement of all parts of the *means of egress* components required to provide an *approved means of egress* from structures and portions thereof. Sections 1003 through 1031 shall apply to new construction. Section 1032 shall apply to existing buildings.

> **Exception:** Detached one- and two-family *dwellings* and *townhouses* not more than three stories above *grade plane* in height with a separate means of egress and their accessory structures shall comply with the *International Residential Code*.

Reason: This is a reorganization of the beginning of Chapter 10 in IBC and IFC. This is coordinated with the larger scoping proposals for all the codes and the proposal to move all IFC definitions to Chapter 2 for consistency with the rest of the codes.

- Renamed IBC/IFC Section 1001.1 to "Scope" in-line with other Chapters.
- Renamed IBC/IFC Section 1003.1 to "General" in-line with other Chapters.
- Moved IBC Section 1001.2 "Minimum requirements" to be coordinated with the existing building provisions in IBC 1002.

Among other things this change makes the egress chapter of the IBC and IFC become more in-line with other chapters of the code and makes navigating the provisions more intuitive.

The change to 1001.2 is to remove "it shall be unlawful" and to provide better code language for alterations.

There will be correlative changes during Group B to repeat current IBC Section 1001.2 in IEBC as Section 302.6; and current IBC Section 1002.2 (Fire and safety evacuation plans) in IBC as Section 107.2.3.1.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).
BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC webpage.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This language is clearer and more concise. This change is primarily editorial.

E2-24 Part II

E3-24

IBC: 1003.3.1, 1003.4; IFC: [BE] 1003.3.1, [BE] 1003.4

Proponents: Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org)

2024 International Building Code

Revise as follows:

1003.3.1 Headroom.
Protruding objects are permitted to extend below the minimum ceiling height required by Section 1003.2 where a minimum headroom of 80 inches (2032 mm) is provided over any *circulation paths*, including walks, *corridors*, *aisles* and passageways. Not more than 50 percent of the ceiling area of a ~~*means of egress*~~ circulation path shall be reduced in height by protruding objects.

Exception: Door closers, *overhead doorstops*, frame stops, power door operators and electromagnetic door locks shall be permitted to project into the door opening height not lower than 78 inches (1980 mm) above the floor.

A barrier shall be provided where the vertical clearance above a *circulation path* is less than 80 inches (2032 mm) high above the finished floor. The leading edge of such a barrier shall be located 27 inches (686 mm) maximum above the finished floor.

1003.4 Slip-resistant surface.
Circulation paths ~~of the *means of egress*~~ shall have a slip-resistant surface and be securely attached.

2024 International Fire Code

Revise as follows:

[BE] 1003.3.1 Headroom.
Protruding objects are permitted to extend below the minimum ceiling height required by Section 1003.2 where a minimum headroom of 80 inches (2032 mm) is provided over any circulation paths, including walks, *corridors*, *aisles* and passageways. Not more than 50 percent of the ceiling area of a ~~*means of egress*~~ circulation path shall be reduced in height by protruding objects.

Exception: Door closers, overhead doorstops, frame stops, power door operators and electromagnetic door locks shall be permitted to project into the door opening height not lower than 78 inches (1980 mm) above the floor.

A barrier shall be provided where the vertical clearance above a circulation path is less than 80 inches (2032 mm) high above the finished floor. The leading edge of such a barrier shall be located 27 inches (686 mm) maximum above the finished floor.

[BE] 1003.4 Slip-resistant surface. Circulation paths ~~of the *means of egress*~~ shall have a slip-resistant surface and be securely attached.

Reason: Section 1003 applies to all parts of the *means of egress* system.

- In IBC/IFC 1003.3 "*circulation path*" is not followed by "of the *means of egress*".
- In IBC/IFC 1003.4 "*circulation path*" is followed by "of the *means of egress*".

The inclusion of "of the *means of egress*" in one, but not the other, gives the unintended mistaken interpretation that the provisions of section 1003.3 apply to all circulation paths and the provisions of section 1003.4 applies only circulations paths of the means of egress.

This proposal is primarily editorial and to remove the possibility of misinterpretation.

Please refer to the definition of 'circulation path'. The term is also used in Sections 1003.3 and 1003.3.3.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).
BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC webpage.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is an editorial clarification for circulation paths. There are not change to construction requirements.

E3-24

E4-24

IBC: 1003.3.3, 1003.3.1, 1003.3.4; IFC: [BE] 1003.3.3, [BE] 1003.3.1, [BE] 1003.3.4

Proponents: Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org)

2024 International Building Code

1003.3 Protruding objects.
Protruding objects on *circulation paths* shall comply with the requirements of Sections 1003.3.1 through 1003.3.4.

Revise as follows:

~~1003.3.3~~ 1003.3.1 ~~Horizontal projections~~ Protrusion limits.
Objects with leading edges more than 27 inches (685 mm) and not more than 80 inches (2030 mm) above the finished floor shall not ~~project horizontally~~ protrude more than 4 inches (102 mm) horizontally into the *circulation path*.

> **Exception:** *Handrails* ~~are permitted to~~ shall not protrude more than $4^1/_2$ inches (114 mm) from the wall or *guard*.

1003.3.2 Post-mounted objects.
A free-standing object mounted on a post or pylon shall not overhang that post or pylon more than 4 inches (102 mm) where the lowest point of the leading edge is more than 27 inches (686 mm) and less than 80 inches (2032 mm) above the finished floor. Where a sign or other obstruction is mounted between posts or pylons and the clear distance between the posts or pylons is greater than 12 inches (305 mm), the lowest edge of such sign or obstruction shall be 27 inches (686 mm) maximum or 80 inches (2032 mm) minimum above the finished floor or ground.

> **Exception:** These requirements shall not apply to sloping portions of *handrails* between the top and bottom riser of *stairs* and above the ramp run.

Revise as follows:

~~1003.3.1~~ 1003.3.3 ~~Headroom~~ Vertical clearance.
Protruding objects are permitted to extend below the minimum ceiling height required by Section 1003.2 where a minimum ~~headroom~~ vertical clearance of 80 inches (2032 mm) is provided over any *circulation paths*, including walks, *corridors*, *aisles* and passageways. Not more than 50 percent of the ceiling area of a *means of egress* shall be reduced in height by protruding objects.

> **Exception:** Door closers, *overhead doorstops*, frame stops, power door operators and electromagnetic door locks shall be permitted to project into the door opening height not lower than 78 inches (1980 mm) above the floor.

A barrier shall be provided where the vertical clearance above a *circulation path* is less than 80 inches (2032 mm) high above the finished floor. The leading edge of such a barrier shall be located 27 inches (686 mm) maximum above the finished floor.

1003.3.4 ~~Clear~~ Required clear width.
Protruding objects shall not reduce the minimum clear width of *accessible routes*.

2024 International Fire Code

[BE] 1003.3 Protruding objects.
Protruding objects on circulation paths shall comply with the requirements of Sections 1003.3.1 through 1003.3.4.

Revise as follows:

[BE] ~~1003.3.3~~ 1003.3.1 ~~Horizontal projections~~ Protrusion limits. Objects with leading edges more than 27 inches (685 mm) and not more than 80 inches (2030 mm) above the finished floor shall not ~~project horizontally~~ protrude more than 4 inches (102 mm) horizontally into the circulation path.

> **Exception:** *Handrails* ~~are permitted to~~ shall not protrude more than $4^1/_2$ inches (114 mm) from the wall or guard.

[BE] 1003.3.2 Post-mounted objects. A free-standing object mounted on a post or pylon shall not overhang that post or pylon more than 4 inches (102 mm) where the lowest point of the leading edge is more than 27 inches (686 mm) and less than 80 inches (2032 mm) above the finished floor. Where a sign or other obstruction is mounted between posts or pylons and the clear distance between the posts or pylons is greater than 12 inches (305 mm), the lowest edge of such sign or obstruction shall be 27 inches (686 mm) maximum or 80 inches (2032 mm) minimum above the finished floor or ground.

Exception: These requirements shall not apply to sloping portions of *handrails* between the top and bottom riser of *stairs* and above the *ramp* run.

Revise as follows:

[BE] ~~1003.3.1~~ 1003.3.3 ~~Headroom~~ Vertical clearance.
Protruding objects are permitted to extend below the minimum ceiling height required by Section 1003.2 where a minimum ~~headroom~~ vertical clearance of 80 inches (2032 mm) is provided over any circulation paths, including walks, *corridors*, *aisles* and passageways. Not more than 50 percent of the ceiling area of a *means of egress* shall be reduced in height by protruding objects.

Exception: Door closers, overhead doorstops, frame stops, power door operators and electromagnetic door locks shall be permitted to project into the door opening height not lower than 78 inches (1980 mm) above the floor.

A barrier shall be provided where the vertical clearance above a circulation path is less than 80 inches (2032 mm) high above the finished floor. The leading edge of such a barrier shall be located 27 inches (686 mm) maximum above the finished floor.

[BE] 1003.3.4 Required clear ~~Clear~~ width. Protruding objects shall not reduce the minimum clear width of *accessible routes*.

Reason: IBC 1003.3 and ICC A117.1 requirements are essentially the same but worded differently. This change is editorial to coordinate the sequence of the requirements between the the two documents, with minor readability modifications. Headroom is addressed in Section 1208 for interior space dimensions.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).
BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC webpage.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The requirements between ICC A117.1 and the IBC/IFC are essentially the same. There are no significant changes with this code change for coordination between the two documents.

E4-24

E5-24

IBC: 1003.7; IFC: [BE] 1003.7

Proponents: Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org)

2024 International Building Code

Revise as follows:

1003.7 Elevators, escalators and moving walks.
Elevators, escalators and moving walks shall not be used as a component of a required *means of egress* ~~from any other part of the *building*~~.

Exception: Elevators used as an *accessible means of egress* in accordance with Section 1009.4.

2024 International Fire Code

Revise as follows:

[BE] 1003.7 Elevators, escalators and moving walks.
Elevators, escalators and moving walks shall not be used as a component of a required *means of egress* ~~from any other part of the building~~.

Exception: Elevators used as an *accessible means of egress* in accordance with Section 1009.4.

Reason: “From any other part of the building” is redundant. This code change removes redundancy for clarity.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC webpage.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal removes redundant language.

E5-24

E6-24

IBC: 1004.4; IFC: [BE] 1004.4

Proponents: Gabriel Levy, PE, incandescence life safety, inc, Colorado Chapter Code Development Committee (glevy@incandescencels.com)

2024 International Building Code

Revise as follows:

~~1004.4~~ 1003.7 Multiple occupancies.
Where a *building* contains two or more occupancies, the *means of egress* requirements shall apply to each portion of the *building* based on the occupancy of that space. Where two or more occupancies utilize portions of the same *means of egress* system, those egress components shall meet the more stringent requirements of all occupancies that are served.

2024 International Fire Code

Revise as follows:

[BE] ~~1004.4~~ 1003.7 Multiple occupancies. Where a building contains two or more occupancies, the *means of egress* requirements shall apply to each portion of the building based on the occupancy of that space. Where two or more occupancies utilize portions of the same *means of egress* system, those egress components shall meet the more stringent requirements of all occupancies that are served.

Reason: IBC 1004 is intended to provide requirements for occupant load, not occupancy classification. The "Multiple occupancies" code provision relates to occupancy classification and is a general means of egress requirement. Therefore, it is more appropriate in IBC 1003. It is proposed that the multiple occupancies section be moved to 1003.7, after 1003.6 (Means of egress continuity). This change will make it clear that the multiple occupancies section is a general requirement regarding all means of egress requirements, not just occupant load.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal rearranges the provisions into a logical order based on the traditional method of design and construction. There is no change to the technical content of the provisions. By modifying the section numbers and titles only there will be no cost impact when approving this proposal.

E6-24

E7-24

IBC: TABLE 1004.5; IFC: [BE] TABLE 1004.5

Proponents: William Cooper, Protection Engineers, LLC, FAA Fire Protection Engineering Code Team (wacooper@protengineers.com); David Clark, Protection Engineers, LLC, FAA Fire Protection Engineering Code Team (dwclark@protengineers.com)

2024 International Building Code

Revise as follows:

TABLE 1004.5 MAXIMUM FLOOR AREA ALLOWANCES PER OCCUPANT

FUNCTION OF SPACE	OCCUPANT LOAD FACTOR[a]
Accessory storage areas, mechanical equipment room	300 gross
Agricultural building	300 gross
Aircraft hangars	500 gross
Airport terminal	
Airport traffic control tower cab	40 gross
Baggage claim	20 gross
Baggage handling	300 gross
Concourse	100 gross
Waiting areas	15 gross
Assembly	
Gaming floors (keno, slots, etc.)	11 gross
Exhibit gallery and museum	30 net
Assembly with fixed seats	See Section 1004.6
Assembly without fixed seats	
Concentrated (chairs only—not fixed)	7 net
Standing space	5 net
Unconcentrated (tables and chairs)	15 net
Bowling centers, allow 5 persons for each lane including 15 feet of runway, and for additional areas	7 net
Business areas	150 gross
Concentrated business use areas	See Section 1004.8
Courtrooms—other than fixed seating areas	40 net
Day care	35 net
Dormitories	50 gross
Educational	
Classroom area	20 net
Shops and other vocational room areas	50 net
Exercise rooms	50 gross
Group H-5 fabrication and manufacturing areas	200 gross
Industrial areas	100 gross
Information technology equipment facilities	300 gross
Institutional areas	
Inpatient treatment areas	240 gross
Outpatient areas	100 gross
Sleeping areas	120 gross
Kitchens, commercial	200 gross
Library	
Reading rooms	50 net
Stack area	100 gross
Locker rooms	50 gross
Mall buildings—covered and open	See Section 402.8.2
Mercantile	60 gross
Storage, stock, shipping areas	300 gross
Parking garages	200 gross
Residential	200 gross
Skating rinks, swimming pools	
Rink and pool	50 gross
Decks	15 gross
Stages and platforms	15 net
Warehouses	500 gross

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m^2.

a. Floor area in square feet per occupant.

2024 International Fire Code

Revise as follows:

[BE] TABLE 1004.5 MAXIMUM FLOOR AREA ALLOWANCES PER OCCUPANT

FUNCTION OF SPACE	OCCUPANT LOAD FACTOR[a]
Accessory storage areas, mechanical equipment room	300 gross
Agricultural building	300 gross
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Airport terminal	
Airport traffic control tower cab	40 gross
Baggage claim	20 gross
Baggage handling	300 gross
Concourse	100 gross
Waiting areas	15 gross
Assembly	
Gaming floors (keno, slots, etc.)	11 gross
Exhibit gallery and museum	30 net
Assembly with fixed seats	See Section 1004.6
Assembly without fixed seats	
Concentrated (chairs only—not fixed)	7 net
Standing space	5 net
Unconcentrated (tables and chairs)	15 net
Bowling centers, allow 5 persons for each lane including 15 feet of runway, and for additional areas	7 net
Business areas	150 gross
Concentrated business use areas	See Section 1004.8
Courtrooms—other than fixed seating areas	40 net
Day care	35 net
Dormitories	50 gross
Educational	
Classroom area	20 net
Shops and other vocational room areas	50 net
Exercise room	50 gross
Group H-5 fabrication and manufacturing areas	200 gross
Industrial areas	100 gross
Information technology equipment facilities	300 gross
Institutional areas	
Inpatient treatment areas	240 gross
Outpatient areas	100 gross
Sleeping areas	120 gross
Kitchens, commercial	200 gross
Library	
Reading rooms	50 net
Stack area	100 gross
Locker rooms	50 gross
Mall buildings—covered and open	See Section 402.8.2 of the International Building Code
Mercantile	60 gross
Storage, stock, shipping areas	300 gross
Parking garages	200 gross
Residential	200 gross
Skating rinks, swimming pools	
Rink and pool	50 gross
Decks	15 gross
Stages and platforms	15 net
Warehouses	500 gross

For SI: 1 square foot = 0.0929 m^2, 1 foot = 304.8 mm.

a. Floor area in square feet per occupant.

Reason: Empirical evidence from the design of Federal Aviation Administration airport traffic control towers demonstrates a 400 sf cab serves approximately 5 controller positions, a 500 sf cab serves approximately 6 to 7 controller positions, a 600 sf cab serves approximately 7 to 8 controller positions. The occupant load of an airport traffic control tower observation level (cab) is based upon the anticipated occupant load during a shift change of staff or twice the number of controller positions. Additionally, the cab is occasionally occupied by others in addition to air traffic controllers to include survey and maintenance personnel and other visitors, which results in similar occupant loading. Note that these visitors would not be expected during the critical shift change operations. Currently, establishment of the occupant load for these spaces is not adequately captured in the ICC standards.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This added occupant load factor reflects the Federal Aviation Administration practice and it's incorporation will harmonize the ICC occupant load factors and federal practice.

E7-24

E8-24

IBC: TABLE 1004.5, 1004.8 (New); IFC: [BE] TABLE 1004.5, 1004.9 (New)

Proponents: William Koffel, Koffel Associates, Inc., Semiconductor Industry Association (wkoffel@koffel.com)

2024 International Building Code

Revise as follows:

TABLE 1004.5 MAXIMUM FLOOR AREA ALLOWANCES PER OCCUPANT

FUNCTION OF SPACE	OCCUPANT LOAD FACTOR[a]
Accessory storage areas, mechanical equipment room	300 gross
Agricultural building	300 gross
Aircraft hangars	500 gross
Airport terminal	
Baggage claim	20 gross
Baggage handling	300 gross
Concourse	100 gross
Waiting areas	15 gross
Assembly	
Gaming floors (keno, slots, etc.)	11 gross
Exhibit gallery and museum	30 net
Assembly with fixed seats	See Section 1004.6
Assembly without fixed seats	
Concentrated (chairs only—not fixed)	7 net
Standing space	5 net
Unconcentrated (tables and chairs)	15 net
Bowling centers, allow 5 persons for each lane including 15 feet of runway, and for additional areas	7 net
Business areas	150 gross
Concentrated business use areas	See Section 1004.8
Courtrooms—other than fixed seating areas	40 net
Day care	35 net
Dormitories	50 gross
Educational	
Classroom area	20 net
Shops and other vocational room areas	50 net
Exercise rooms	50 gross
Group H-5 fabrication and manufacturing areas	200 gross
Automated fabricaion and manufacturing areas	See Section 1004.9
Industrial areas	100 gross
Information technology equipment facilities	300 gross
Institutional areas	
Inpatient treatment areas	240 gross
Outpatient areas	100 gross
Sleeping areas	120 gross
Kitchens, commercial	200 gross
Library	
Reading rooms	50 net
Stack area	100 gross
Locker rooms	50 gross
Mall buildings—covered and open	See Section 402.8.2
Mercantile	60 gross
Storage, stock, shipping areas	300 gross
Parking garages	200 gross
Residential	200 gross
Skating rinks, swimming pools	
Rink and pool	50 gross
Decks	15 gross
Stages and platforms	15 net
Warehouses	500 gross

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m^2.

a. Floor area in square feet per occupant.

Add new text as follows:

1004.9 Automated fabrication and manufacturing areas.

The *occupant load* factor for Group H-5 automated fabrication and manufacturing areas with a lower density of occupants than would normally be expected in a typical Group H-5 occupancy environment shall be applied to such areas. Where *approved* by the *building official*, the *occupant load* for automated fabrication and manufacturing areas shall be the actual *occupant load*, but not less than one occupant per 300 square feet (27.87 m^2) of gross occupiable floor space.

2024 International Fire Code

Revise as follows:

[BE] TABLE 1004.5 MAXIMUM FLOOR AREA ALLOWANCES PER OCCUPANT

FUNCTION OF SPACE	OCCUPANT LOAD FACTOR[a]
Accessory storage areas, mechanical equipment room	300 gross
Agricultural building	300 gross
Aircraft hangars	500 gross
Airport terminal	
Baggage claim	20 gross
Baggage handling	300 gross
Concourse	100 gross
Waiting areas	15 gross
Assembly	
Gaming floors (keno, slots, etc.)	11 gross
Exhibit gallery and museum	30 net
Assembly with fixed seats	See Section 1004.6
Assembly without fixed seats	
Concentrated (chairs only—not fixed)	7 net
Standing space	5 net
Unconcentrated (tables and chairs)	15 net
Bowling centers, allow 5 persons for each lane including 15 feet of runway, and for additional areas	7 net
Business areas	150 gross
Concentrated business use areas	See Section 1004.8
Courtrooms—other than fixed seating areas	40 net
Day care	35 net
Dormitories	50 gross
Educational	
Classroom area	20 net
Shops and other vocational room areas	50 net
Exercise rooms	50 gross
Group H-5 fabrication and manufacturing areas	200 gross
Automated fabricaion and manufacturing areas	See Section 1004.9
Industrial areas	100 gross
Information technology equipment facilities	300 gross
Institutional areas	
Inpatient treatment areas	240 gross
Outpatient areas	100 gross
Sleeping areas	120 gross
Kitchens, commercial	200 gross
Library	
Reading rooms	50 net
Stack area	100 gross
Locker rooms	50 gross
Mall buildings—covered and open	See Section 402.8.2 of the International Building Code
Mercantile	60 gross
Storage, stock, shipping areas	300 gross
Parking garages	200 gross
Residential	200 gross
Skating rinks, swimming pools	
Rink and pool	50 gross
Decks	15 gross
Stages and platforms	15 net
Warehouses	500 gross

For SI: 1 square foot = 0.0929 m^2, 1 foot = 304.8 mm.

a. Floor area in square feet per occupant.

Add new text as follows:

1004.9 Automated fabrication and manufacturing areas. The *occupant load* factor for Group H-5 automated fabrication and manufacturing areas with a lower density of occupants than would normally be expected in a typical Group H-5occupancy environment shall be applied to such areas. Where *approved* by the *building official*, the *occupant load* for automated fabrication and manufacturing areas shall be the actual *occupant load*, but not less than one occupant per 300 square feet (27.87 m^2) of gross occupiable floor space.

Reason: As the manufacturing of semiconductors is becoming increasingly automated, there are few personnel in the fabrication and manufacturing areas. Similar to what is done for other occupancies, the proposed language provides the code official with the ability to approve an occupant load determination that uses a concentration of something less than 1 person per 200 sq. ft, with a limit that the concentration cannot be less than 1 person per 300 sq. ft.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0

Estimated Immediate Cost Impact Justification (methodology and variables):

While reducing the occupant load itself does not reduce construction cost, the associated code requirements for egress capacity, plumbing fixtures, etc. could result in a decrease in the cost of construction.

E8-24

E9-24

IFC: [BE] TABLE 1004.5; IBC: TABLE 1004.5

Proponents: Greg Johnson, Johnson & Associates Consulting Services, Jay Peters, Codes and Standards International (gjohnsonconsulting@gmail.com); Jay Peters, Codes and Standards International LLC, IPS Corporation (peters.jay@me.com)

2024 International Fire Code

Revise as follows:

[BE] TABLE 1004.5 MAXIMUM FLOOR AREA ALLOWANCES PER OCCUPANT

FUNCTION OF SPACE	OCCUPANT LOAD FACTOR[a]
Accessory storage areas, mechanical equipment room	300 gross
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Concourse	100 gross
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Gaming floors (keno, slots, etc.)	11 gross
Exhibit gallery and museum	30 net
Assembly with fixed seats	See Section 1004.6
Assembly without fixed seats	
Concentrated (chairs only—not fixed)	7 net
Standing space	5 net
Unconcentrated (tables and chairs)	15 net
Bowling centers, allow 5 persons for each lane including 15 feet of runway, and for additional areas	7 net
Business areas	150 gross
Concentrated business use areas	See Section 1004.8
Courtrooms—other than fixed seating areas	40 net
Day care	35 net
Dormitories	50 gross
Educational	
Classroom area	20 net
Shops and other vocational room areas	50 net
Exercise rooms	50 gross
Group H-5 fabrication and manufacturing areas	200 gross
Industrial areas	100 gross
Information technology equipment facilities	~~300~~ 500 gross
Institutional areas	
Inpatient treatment areas	240 gross
Outpatient areas	100 gross
Sleeping areas	120 gross
Kitchens, commercial	200 gross
Library	
Reading rooms	50 net
Stack area	100 gross
Locker rooms	50 gross
Mall buildings—covered and open	See Section 402.8.2 of the International Building Code
Mercantile	60 gross
Storage, stock, shipping areas	300 gross
Parking garages	200 gross
Residential	200 gross
Skating rinks, swimming pools	
Rink and pool	50 gross
Decks	15 gross
Stages and platforms	15 net
Warehouses	500 gross

For SI: 1 square foot = 0.0929 m^2, 1 foot = 304.8 mm.

a. Floor area in square feet per occupant.

2024 International Building Code

Revise as follows:

TABLE 1004.5 MAXIMUM FLOOR AREA ALLOWANCES PER OCCUPANT

FUNCTION OF SPACE	OCCUPANT LOAD FACTOR[a]
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Industrial areas	100 gross
Information technology equipment facilities	~~300~~ 500 gross
Institutional areas	
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Outpatient areas	100 gross
Sleeping areas	120 gross
Kitchens, commercial	200 gross
Library	
Reading rooms	50 net
Stack area	100 gross
Locker rooms	50 gross
Mall buildings—covered and open	See Section 402.8.2
Mercantile	60 gross
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Parking garages	200 gross
Residential	200 gross
Skating rinks, swimming pools	
Rink and pool	50 gross
Decks	15 gross
Stages and platforms	15 net
Warehouses	500 gross

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m^2.

a. Floor area in square feet per occupant.

Reason: Codes and Standards International originally proposed the 300 gross OLF for Information Technology Equipment Facilities (ITEF) in the last code development cycle using atmospherically derived methodology. Subsequent to our ability to modify the value we heard from ITEF designers that the industry designs ITEFs using a 500 gross OLF. Given the very large size of many of these facilities the lower OLF creates a substantial design and cost burden for no real increase in occupant safety. The occupant load of an ITEF is much more like that of a warehouse than any other use, except that it will typically see even less traffic, being only occasionally occupied for maintenance of the information technology equipment.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

The estimated immediate cost savings of the proposal is this:

Assume a data center of 195,000 square feet.

@1 occupant per 500 sf the means of egress system must accommodate 390 occupants which requires 2 exits.

@ 1 occupant per 300 sf the means of egress system must accommodate 650 occupants which requires 3 exits.

The cost of a steel security exit/entrance door with hardware is estimated at $2,500 (Grainger.com). The average cost of installation of a steel security door is $1,136. (Angi.com). The cost of an exterior commercial grade camera to monitor the door is estimated to be $2,050. ((ALLHDD.com). The average cost to install a commercial security camera is $1,189 (bwfiresecurity.com). The cost of a lighted exit sign with emergency lights is $300 (compliancesigns.com). The cost to install the exit sign is estimated at $450 (safetnose.com).

The total estimated cost saved by not providing an additional exit door is $2,500 + $1,136 + $2,050 + $1,189 + $300 + $450 = **$7,625.**

Estimated Immediate Cost Impact Justification (methodology and variables):

This would reduced expense for unneeded egress system components and would be a subtraction of components no longer needed.

E9-24

E10-24

IBC: TABLE 1004.5; IFC: [BE] TABLE 1004.5

Proponents: Eirene Knott, BRR Architecture, Metropolitan Kansas City Chapter of the ICC (eirene.knott@brrarch.com)

2024 International Building Code

Revise as follows:

TABLE 1004.5 MAXIMUM FLOOR AREA ALLOWANCES PER OCCUPANT

FUNCTION OF SPACE	OCCUPANT LOAD FACTOR[a]
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Assembly without fixed seats	
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Standing space	5 net
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Day care	35 net
Dormitories	50 gross
Educational	
Classroom area	20 net
Shops and other vocational room areas	50 net
Exercise rooms	50 gross
Group H-5 fabrication and manufacturing areas	200 gross
Industrial areas	100 gross
Information technology equipment facilities	300 gross
Institutional areas	
Inpatient treatment areas	240 gross
Outpatient areas	100 gross
Sleeping areas	120 gross
Kitchens, commercial	200 gross
Library	
Reading rooms	50 net
Stack area	100 gross
Locker rooms	50 gross
Mall buildings—covered and open	See Section 402.8.2
Mercantile	60 gross
Storage, stock, shipping areas	300 gross
<u>Motor Vehicle Repair Garages</u>	
<u>Commercial Motor Vehicle (CMV)</u>	<u>500 gross</u>
<u>Non CMV</u>	<u>200 gross</u>
Parking garages	200 gross
Residential	200 gross
Skating rinks, swimming pools	
Rink and pool	50 gross
Decks	15 gross
Stages and platforms	15 net
Warehouses	500 gross

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m^2.

a. Floor area in square feet per occupant.

2024 International Fire Code

Revise as follows:

[BE] TABLE 1004.5 MAXIMUM FLOOR AREA ALLOWANCES PER OCCUPANT

FUNCTION OF SPACE	OCCUPANT LOAD FACTOR[a]
Accessory storage areas, mechanical equipment room	300 gross
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Exercise rooms	50 gross
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Information technology equipment facilities	300 gross
Institutional areas	
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Outpatient areas	100 gross
Sleeping areas	120 gross
Kitchens, commercial	200 gross
Library	
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Stack area	100 gross
Locker rooms	50 gross
Mall buildings—covered and open	See Section 402.8.2 of the International Building Code
Mercantile	60 gross
Motor Vehicle Repair Garages	
Commercial Motor Vehicle (CMV)	500 gross
Non CMV	200 gross
Storage, stock, shipping areas	300 gross
Parking garages	200 gross
Residential	200 gross
Skating rinks, swimming pools	
Rink and pool	50 gross
Decks	15 gross
Stages and platforms	15 net
Warehouses	500 gross

For SI: 1 square foot = 0.0929 m^2, 1 foot = 304.8 mm.

a. Floor area in square feet per occupant.

Reason: Most motor vehicle repair garages will never have an occupant load as high as one would be calculated for by using the industrial occupant load factor of 100 gross square feet per person. On average, most vehicle repair garages will average closer to 500 square feet per person in terms of actual employees on a given shift. Even if a change in shifts is occurring, the occupant load would still not be anywhere near the 100 square feet per person load factor. What I have tried to provide is two different load factors, as commercial vehicles will take up much more space in a repair garage than the typical passenger vehicles. The term "Commercial Motor Vehicle (CMV)" is a term recognized by the Department of Transportation and applies to vehicles whose weight is more than 10,000 pounds. All other vehicles would then be non-CMV, which would include passenger vehicles. The smaller proposed occupant load factor would apply to these facilities. This would recognize there is more space available for smaller vehicles and thus the potential for an increased occupant load. While this proposed occupant load factor for the CMV is the same as a warehouse, I did not want to add this to the warehouse classification as that should stand on its own.

To give an example, we have a client that builds truck repair garages for CMV's across the country. On average, one of their facilities will be 14,000 square feet. At any given point during the day, the most workers they will have in the building is ten, which would yield an occupant load factor of 1,400, which is not reasonable. By the time one takes into account the space the equipment occupies, the 500 square feet per person is a reasonable occupant load factor for this specific application.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

If anything this would reduce costs as the number of occupants would reduce the number of plumbing fixtures required.

E10-24

E11-24

IBC: TABLE 1004.5; IFC: [BE] TABLE 1004.5

Proponents: Ronald Geren, RLGA Technical Services, LLC, Self (ron@specsandcodes.com)

2024 International Building Code

Revise as follows:

TABLE 1004.5 MAXIMUM FLOOR AREA ALLOWANCES PER OCCUPANT

FUNCTION OF SPACE	OCCUPANT LOAD FACTOR[a]
Accessory storage areas, mechanical equipment room	300 gross
Agricultural building	300 gross
Aircraft hangars	500 gross
Airport terminal	
Baggage claim	20 gross
Baggage handling	300 gross
Concourse	100 gross
Waiting areas	15 gross
Assembly	
Gaming floors (keno, slots, etc.)	11 gross
Exhibit gallery and museum	30 net
Assembly with fixed seats	See Section 1004.6
Assembly without fixed seats	
Concentrated (chairs only—not fixed)	7 net
Standing space	5 net
Unconcentrated (tables and chairs)	15 net
Bowling centers, allow 5 persons for each lane including 15 feet of runway, and for additional areas	7 net
Business areas	150 gross
Concentrated business use areas	See Section 1004.8
Courtrooms—other than fixed seating areas	40 net
Day care	35 net
Dormitories	50 gross
Educational	
Classroom area	20 net
Shops and other vocational room areas	50 net
Exercise rooms	50 gross
Group H-5 fabrication and manufacturing areas	200 gross
Industrial areas	100 gross
Information technology equipment facilities	300 gross
Institutional areas	
Inpatient treatment areas	240 gross
Outpatient areas	100 gross
Sleeping areas	120 gross
Kitchens, commercial	200 gross
Library	
Reading rooms	50 net
Stack area	100 gross
Locker rooms	50 gross
Mall buildings—covered and open	See Section 402.8.2
Mercantile	60 gross
Storage, stock, shipping areas	300 gross
Parking garages	200 gross
Residential	200 gross
Skating rinks, swimming pools	
Rink and pool	50 gross
Decks	15 gross
Stages and platforms	15 net
Warehouses, self storage facilities	500 gross

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m^2.

a. Floor area in square feet per occupant.

2024 International Fire Code

Revise as follows:

[BE] TABLE 1004.5 MAXIMUM FLOOR AREA ALLOWANCES PER OCCUPANT

FUNCTION OF SPACE	OCCUPANT LOAD FACTOR[a]
Accessory storage areas, mechanical equipment room	300 gross
Agricultural building	300 gross
Aircraft hangars	500 gross
Airport terminal	
Baggage claim	20 gross
Baggage handling	300 gross
Concourse	100 gross
Waiting areas	15 gross
Assembly	
Gaming floors (keno, slots, etc.)	11 gross
Exhibit gallery and museum	30 net
Assembly with fixed seats	See Section 1004.6
Assembly without fixed seats	
Concentrated (chairs only—not fixed)	7 net
Standing space	5 net
Unconcentrated (tables and chairs)	15 net
Bowling centers, allow 5 persons for each lane including 15 feet of runway, and for additional areas	7 net
Business areas	150 gross
Concentrated business use areas	See Section 1004.8
Courtrooms—other than fixed seating areas	40 net
Day care	35 net
Dormitories	50 gross
Educational	
Classroom area	20 net
Shops and other vocational room areas	50 net
Exercise rooms	50 gross
Group H-5 fabrication and manufacturing areas	200 gross
Industrial areas	100 gross
Information technology equipment facilities	300 gross
Institutional areas	
Inpatient treatment areas	240 gross
Outpatient areas	100 gross
Sleeping areas	120 gross
Kitchens, commercial	200 gross
Library	
Reading rooms	50 net
Stack area	100 gross
Locker rooms	50 gross
Mall buildings—covered and open	See Section 402.8.2 of the International Building Code
Mercantile	60 gross
Storage, stock, shipping areas	300 gross
Parking garages	200 gross
Residential	200 gross
Skating rinks, swimming pools	
Rink and pool	50 gross
Decks	15 gross
Stages and platforms	15 net
Warehouses, self storage facilities	500 gross

For SI: 1 square foot = 0.0929 m^2, 1 foot = 304.8 mm.

a. Floor area in square feet per occupant.

Reason: There is confusion in the self storage industry regarding the occupant loads associated with self storage facilities. Two occupant load factors for storage could be applicable: 300 gsf (Accessory Storage) and 500 gsf (Warehouses).

According to the Self Storage Association (SSA), the size of a facility can range from 10,000 to 100,000 square feet, with an average size of 56,900 square feet. That amounts to approximately 546 units per facility. Per SSA's "Self Storage Standards and the Modern Community," there is an average of 6.82 trips per day for every 100 units. At 546 units, that would be 30.4 trips per day.

Assuming four occupants per trip, that would total 122 visitors daily. Most self storage facilities operate from 6:00 AM to 10:00 PM (16 hours), which means the average occupancy at any one time is 7.6 occupants, plus 3.5 employees (per SSA statistics), for a total occupant load of 11, or 5,173 sq. ft. per occupant using the average size self storage facility. However, each trip may not be a unique visit, but several trips by the same visitors. Thus, the total number of unique visitors would likely be less than 122.

Since this does not account for peak periods, the occupant load factor for warehouses of 500 sq. ft. per occupant would provide an occupant load of 114 occupants, which is less than the total number of daily visitors, but reasonable for peak periods of occupancy, since the average of 122 visitors is not expected to be present at any one time. Jurisdictions may be reluctant to allow the use of the warehouse occupant load factor since a self storage facility does not conform to the commonly used definition of a warehouse, which is "a structure or room for the storage or merchandise or commodities" (Merriam-Webster.com). Rarely are self storage facilities used for the storage of "merchandise and commodities."

In many cases, the designers of these facilities have to justify their occupant loads for each jurisdiction and, sometimes, for each project in the same jurisdiction. Therefore, the addition of self storage facilities to Table 1004.5 will eliminate the confusion and provide consistency from jurisdiction to jurisdiction.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

If the accessory storage occupant load factor were used for a slightly larger-than-average self storage facility, around 60,600 sq. ft., the occupant load would be 202 occupants, or 101 males and 101 females. Using the storage plumbing fixture ratios in Table 2902.1 (i.e., 1:100 for water closets and 1:100 for lavatories), two fixtures of each type for each sex would be required. However, if the warehouse occupant load factor was used, the occupant load would drop to 122, or 61 males and 61 females. Thus, only one fixture of each type for each sex would be required.The reduced number of fixtures can reduce the floor area dedicated to restrooms by a third when considering multi-user restrooms or by one-half if single-user restrooms were considered. The SSA indicates a facility of 60,000 net rentable sq. ft. has a construction cost of $45 to $65 per square foot, not including land costs. A single-user restroom will have a floor area of approximately 50 sq. ft. This can save $2,250 minimum per restroom, or add one to four additional revenue-generating storage units.

Estimated Immediate Cost Impact Justification (methodology and variables):

The cost impact would likely decrease due to two reasons:

1. Designers' fees may be reduced since the designers' time and efforts to obtain approvals for reduced occupant loads from jurisdictions would no longer be necessary.
2. Since occupant loads will be lower, the number of plumbing fixtures required may also be lower, thus decreasing the cost of construction by one or more plumbing fixtures.

E11-24

E12-24

IBC: 1004.7; IFC: [BE] 1004.7

Proponents: David Renn, PE, SE, City and County of Denver, Colorado Chapter Code Development Committee (david.renn@denvergov.org)

2024 International Building Code

Revise as follows:

1004.7 Outdoor areas.
Yards, patios, ~~*occupiable roofs* ,~~ *courts* and similar outdoor areas <u>that are not located on the *building* and are</u> accessible to and usable by the *building* occupants shall be provided with *means of egress* as required by this chapter. The *occupant load* of such outdoor areas shall be assigned by the *building official* in accordance with the anticipated use. Where outdoor areas are to be used by *persons* in addition to the occupants of the *building*, and the path of egress travel from the outdoor areas passes through the *building*, *means of egress* requirements for the *building* shall be based on the sum of the *occupant loads* of the *building* plus the outdoor areas.

Exceptions:

1. Outdoor areas used exclusively for service of the building need only have one *means of egress*.
2. Both outdoor areas associated with Group R-3 and individual *dwelling units* of Group R-2.

2024 International Fire Code

Revise as follows:

[BE] 1004.7 Outdoor areas. *Yards*, patios, ~~*occupiable roofs* ,~~ *courts* and similar outdoor areas <u>that are not located on the *building* and are</u> accessible to and usable by the *building* occupants shall be provided with *means of egress* as required by this chapter. The *occupant load* of such outdoor areas shall be assigned by the *building official* in accordance with the anticipated use. Where outdoor areas are to be used by *persons* in addition to the occupants of the *building*, and the path of egress travel from the outdoor areas passes through the *building*, *means of egress* requirements for the *building* shall be based on the sum of the *occupant loads* of the *building* plus the outdoor areas.

Exceptions:

1. Outdoor areas used exclusively for service of the building need only have one *means of egress*.
2. Both outdoor areas associated with Group R-3 and individual *dwelling units* of Group R-2.

Reason: The section on outdoor areas was historically intended to be for areas that are not part of the building but are accessible and useable by the building occupants. Prior to the 2018 IBC, this section applied to “Yards, patios, courts and similar outdoor areas”, all of which are areas that are not part of the building. The section intends for these areas to have a means of egress and, if this means of egress goes through the building, the occupant load is added to the occupant loads of the building. The section also indicates that the occupant load of the outdoor area shall be assigned by the building official in accordance with anticipated use – this sentence is needed since the occupant load provisions in 1004 are for means of egress for a building or structure and don’t directly apply to outdoor areas that are not part of the building (per definition, “means of egress” is for a building or structure only).

In the 2018 IBC, occupied roofs (now occupiable roofs) were added to the scoping of this section with the good intention of clarifying that occupied roofs need to meet means of egress requirements. However, this change, along with recent changes in the code for occupiable roofs, results in the following issues:

1. Most significantly, by adding occupiable roofs the “similar outdoor areas” part of the scoping is expanded. Previously this would have been an area that is not part of the building to be similar to yards, patios or courts. Since occupiable roofs are part of the building, “similar outdoor areas” is expanded to include balconies of residential units (and other balconies). The result is that Exception 2 for outdoor areas associated with Group R-3 and individual dwelling units of Group R-2 exempts balconies (or occupiable roofs for these cases) from ALL means of egress requirements since this is a blanket exception for 1004.7, which requires a means of egress in the first sentence. Designers have used this exception to significantly add to the common path of travel from an R-2 dwelling unit since the

balcony would not have to be included, creating a non-conservative and potentially dangerous situation. Designers have also argued they can access an occupiable roof above an individual unit with a ladder, since the roof is exempt from means of egress requirements. Balcony doors would also have no size requirements due to this exception.

2. This section requires the occupant load of an occupiable roof to be assigned by the building official in accordance with the anticipated use. This is in direct conflict with IBC 1004.5 that has specific occupant loads based on the function of the space (Table 1004.5). Where an intended function is not listed in Table 1004.5, Section 1004.5 requires the building official to establish a function based on a listed function that most nearly resembles the intended function. The wording in 1004.7 conflicts with this since it requires the building official to assign an occupant load in all cases and gives no guidelines on how to assign this occupant load since it doesn't have to relate to functions listed in Table 1004.5.

3. It is not necessary for this section to indicate that occupiable roofs must be provided with a means of egress since IBC Section 1006 specifically addresses the number of exits for occupiable roofs. Also, the definition of "means of egress" includes egress from occupied portions of a building or structure, which includes an occupiable roof. Furthermore, the definition of "occupiable roof" indicates that it is an exterior space on a roof that is equipped with a means of egress system meeting the requirements of the code.

Since occupiable roofs are already covered in the means of egress requirements (Item 3 above), and to resolve the issues identified in Items 1 and 2 above, this proposal removes "occupiable roofs" from the outdoor areas section. Language is also added to clarify that this section is for outdoor areas that are not located on the building. This brings this section back to its original intent of regulating outdoor areas that are not part of the building.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal clarifies the intent of the code and resolves conflicts in the code, so there will be no cost impact.

E12-24

E13-24

IBC: 1004.7; IFC: [BE] 1004.7

Proponents: Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org)

2024 International Building Code

Revise as follows:

1004.7 Outdoor areas.
Yards, patios, *occupiable roofs* , *courts* and similar outdoor areas accessible to and usable by the *building* occupants shall be provided with *means of egress* as required by this chapter. The *occupant load* of such outdoor areas shall be assigned by the *building official* in accordance with the anticipated use. Where outdoor areas are to be used by *persons* in addition to the occupants of the *building*, and the path of egress travel from the outdoor areas passes through the *building*, *means of egress* requirements for the *building* shall be based on the sum of the *occupant loads* of the *building* plus the outdoor areas.

Exceptions:

1. Outdoor areas used exclusively for service <u>or maintenance</u> of the building need only have one *means of egress*.
2. Both outdoor areas associated with Group R-3 and individual *dwelling units* of Group R-2.

2024 International Fire Code

Revise as follows:

[BE] 1004.7 Outdoor areas. *Yards*, patios, *occupiable roofs*, *courts* and similar outdoor areas accessible to and usable by the building occupants shall be provided with *means of egress* as required by this chapter. The *occupant load* of such outdoor areas shall be assigned by the *fire code official* in accordance with the anticipated use. Where outdoor areas are to be used by persons in addition to the occupants of the building, and the path of egress travel from the outdoor areas passes through the building, *means of egress* requirements for the building shall be based on the sum of the *occupant loads* of the building plus the outdoor areas.

Exceptions:

1. Outdoor areas used exclusively for service <u>or maintenance</u> of the building need only have one *means of egress*.
2. Both outdoor areas associated with Group R-3 and individual *dwelling units* of Group R-2.

Reason: Service could be understood to be limited to reading a gas meter. Maintenance could be replacing or repairing a piece of equipment. Both are limited personnel, so addition MOE is not warranted.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).
BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC webpage.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is a clarification of current allowances for means of egress for outdoor spaces with limited occupants.

E13-24

E14-24

IBC: 1004.8; IFC: [BE] 1004.8

Proponents: Jeanne Rice, NYS DOS, NYS DOS (jeanne.rice@dos.ny.gov); Chad Sievers, NYS, NYS DOS (chad.sievers@dos.ny.gov); Kevin Duerr-Clark, NYS DOS, NYS DOS (kevin.duerr-clark@dos.ny.gov); China Clarke, New York State Dept of State, Manager Technical Support Unit (china.clarke@dos.ny.gov)

2024 International Building Code

Revise as follows:

1004.8 Concentrated business use areas.
The *occupant load* factor for concentrated business use shall be applied to telephone call centers, trading floors, electronic data entry and similar business use areas with a higher density of occupants than would normally be expected in a typical business occupancy environment. ~~Where *approved* by the *building official*, the~~ The *occupant load* for concentrated business use areas shall be the actual *occupant load* as *approved*, but not less than one occupant per 50 square feet (4.65 m^2) of gross occupiable floor space.

2024 International Fire Code

Revise as follows:

[BE] 1004.8 Concentrated business use areas. The *occupant load* factor for concentrated business use shall be applied to telephone call centers, trading floors, electronic data entry and similar business use areas with a higher density of occupants than would normally be expected in a typical business occupancy environment. ~~Where *approved* by the *building official*, the~~ The *occupant load* for concentrated business use areas shall be the actual *occupant load* as *approved*, but not less than one occupant per 50 square feet (4.65 m^2) of gross occupiable floor space.

Reason: Code officials have noted some confusion in applying the provisions of section 1004.8 regarding concentrated business live loads. As the section is currently worded, it is unclear if using the actual occupant load is optional, subject to the discretion of the building official. The proposed change restructures the last sentence to clarify that the use of a concentrated load is not optional, but that said concentrated load must be approved by the building official.

The definition of approved is "**[A] APPROVED.** Acceptable to the *building official*." so 'building official' is already include in the definition and is therefore redundant here.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposed change is merely editorial, changing how one sentence is phrased so as to provide additional clarity. Code provisions are unchanged.

E14-24

E15-24

IBC: 1005.3, 1030.6; IFC: [BE] 1005.3, [BE] 1030.6

Proponents: Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org)

2024 International Building Code

Revise as follows:

1005.3 Required capacity based on occupant load.
The required capacity, in inches (mm), of the *means of egress* for any room, area, space or *story* shall be not less than that determined in accordance with Sections 1005.3.1 and 1005.3.2.
The capacity, in inches, of means of egress stairways between stories or mezzanines that also serve as a stepped aisle for tiered platforms used for seating shall be the aggregate of both of the following:

1. The occupant load served by the stairway from the story or mezzanine in accordance with Sections 1005.3.1.
2. The occupant load of the tiered platforms used for seating determined in accordance with Section 1030.6.

1030.6 Capacity of aisle for assembly.
The required capacity of aisles shall be not less than that determined in accordance with Section 1030.6.1 where *smoke-protected assembly seating* is not provided, Section 1030.6.2 where *smoke-protected assembly seating* is provided and Section 1030.6.3 where *open-air assembly seating* is provided.
The capacity, in inches, of means of egress stairways between stories or mezzanines that also serve as a stepped aisle for tiered platforms used for seating shall be the aggregate of both of the following:

1. The occupant load served by the stairway from the story or mezzanine in accordance with Sections 1005.3.1.
2. The occupant load of the tiered platforms used for seating determined in accordance with Section 1030.6.

2024 International Fire Code

Revise as follows:

[BE] 1005.3 Required capacity based on occupant load.
The required capacity, in inches (mm), of the *means of egress* for any room, area, space or story shall be not less than that determined in accordance with Sections 1005.3.1 and 1005.3.2.
The capacity, in inches, of means of egress stairways between stories or mezzanines that also serve as a stepped aisle for tiered platforms used for seating shall be the aggregate of both of the following:

1. The occupant load served by the stairway from the story or mezzanine in accordance with Sections 1005.3.1.
2. The occupant load of the tiered platforms used for seating determined in accordance with Section 1030.6.

[BE] 1030.6 Capacity of aisle for assembly.
The required capacity of *aisles* shall be not less than that determined in accordance with Section 1030.6.1 where *smoke-protected assembly seating* is not provided, with Section 1030.6.2 where *smoke-protected assembly seating* is provided, and with Section 1030.6.3 where open-air assembly seating is provided.
The capacity, in inches, of means of egress stairways between stories or mezzanines that also serve as a stepped aisle for tiered platforms used for seating shall be the aggregate of both of the following:

1. The occupant load served by the stairway from the story or mezzanine in accordance with Sections 1005.3.1.
2. The occupant load of the tiered platforms used for seating determined in accordance with Section 1030.6.

Reason: E106-18 added criteria to 1030.16 to address social stairways.

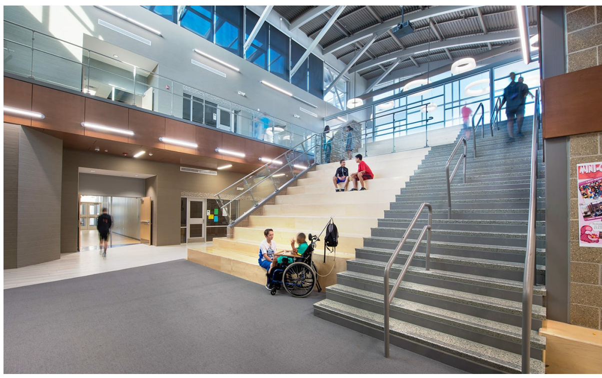
"Where stepped aisles have seating on one side and the aisle width is 74 inches (1880 mm) or greater, two handrails are required.

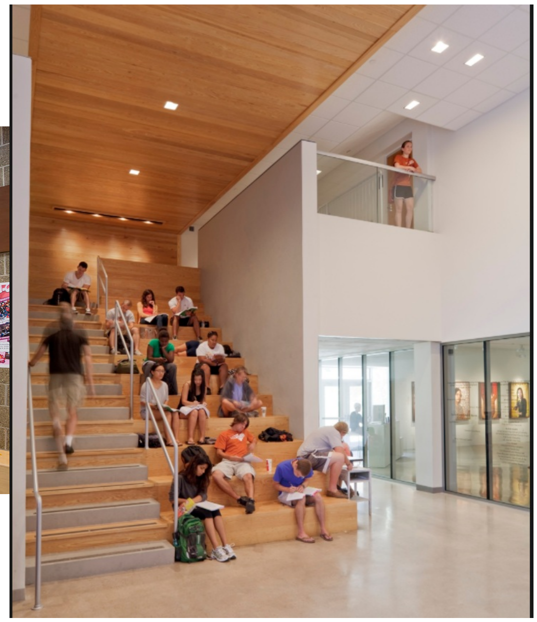
Where two handrails are required, one of the handrails shall be within 30 inches (762 mm) horizontally of the stepped aisle.”

The question at this point is where there is this type assembly seating immediately adjacent to the egress from the upper floor – how should the capacity of the combined stairway/stepped aisle be calculated? We feel that the proposed language would clarify this issue.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC webpage.





Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is a clarification of requirements to calculate width for the stairway/stepped aisle. There are no change to construction requirements.

E15-24

E16-24

IBC: TABLE 1006.2.1, 1006.2.2.6; IFC: [BE] TABLE 1006.2.1, [BE] 1006.2.2.6

Proponents: Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org)

2024 International Building Code

1006.2.1 Egress based on occupant load and common path of egress travel distance.
Two *exits* or *exit access doorways* from any space shall be provided where the design *occupant load* or the *common path of egress* travel distance exceeds the values *listed* in Table 1006.2.1. The cumulative *occupant load* from adjacent rooms, areas or spaces shall be determined in accordance with Section 1004.2.

Exceptions:

1. The number of *exits* from foyers, lobbies, vestibules or similar spaces need not be based on cumulative *occupant loads* for areas discharging through such spaces, but the capacity of the *exits* from such spaces shall be based on applicable cumulative *occupant loads* .
2. *Care suites* in Group I-2 occupancies complying with Section 407.4.
3. Unoccupied mechanical rooms and *penthouses* are not required to comply with the common path of egress travel distance measurement.

Revise as follows:

TABLE 1006.2.1 SPACES WITH ONE EXIT OR EXIT ACCESS DOORWAY

		MAXIMUM COMMON PATH OF EGRESS TRAVEL DISTANCE (feet)				
		Without Automatic Sprinkler System (feet) NS		With Automatic Sprinkler System (feet)		
		Occupant Load				
OCCUPANCY	MAXIMUM OCCUPANT LOAD OF SPACE	OL ≤ 30	OL > 30	S	S13R	S13D
A[b~~e~~], E, M	49	75	75	75[~~a~~]	NP	NP
B	49	100	75	100[~~a~~]	NP	NP
F	49	75	75	100[~~a~~]	NP	NP
H-1, H-2, H-3	3	NP	NP	25[~~ab~~]	NP	NP
H-4, H-5	10	NP	NP	75[~~ab~~]	NP	NP
I-1, I-2[c~~d~~], I-4	10	NP	NP	75[~~a~~]	NP	NP
I-3	10	NP	NP	100[~~a~~]	NP	NP
R-1	10	NP	NP	75[~~a~~]	75	NP
R-2	20	NP	NP	125[~~a~~]	125	125
R-3[d~~e~~]	20	NP	NP	125[~~a, g~~]	125	125
R-4[d~~e~~]	20	NP	NP	125[~~a, g~~]	125	75
S[e~~f~~]	29	100	75	100[~~a~~]	NP	NP
U	49	100	75	75[~~a~~]	NP	NP

For SI: 1 foot = 304.8 mm.

NP = Not Permitted.

NS = Buildings not equipped throughout with an automatic sprinkler system; S = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1; S13R = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.2; S13D = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Sections 903.2.8 and 903.3.1.3.

~~a. Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2. See Section 903 for occupancies where automatic sprinkler systems are permitted in accordance with Section 903.3.1.2.~~

a~~b~~. Group H occupancies equipped throughout with an automatic sprinkler system in accordance with Section 903.2.5.

b~~c~~. For a room or space used for assembly purposes having fixed seating, see Section 1030.8.

c~~d~~. For the travel distance limitations in Group I-2, see Section 407.4.

d~~e~~. The common path of egress travel distance shall only apply in a Group R-3 and Group R-4 occupancy located in a mixed occupancy building.

e~~f~~. The length of common path of egress travel distance in a Group S-2 open parking garage shall be not more than 100 feet.

~~g.~~ ~~For the travel distance limitations in Groups R-3 and R-4 equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.3, see Section 1006.2.2.6.~~

Delete without substitution:

~~**1006.2.2.6 Groups R-3 and R-4.**~~
~~Where Group R-3 occupancies are permitted by Section 903.2.8 to be protected by an *automatic sprinkler system* installed in accordance with Section 903.3.1.3, the *exit access* travel distance for Group R-3 shall be not more than 125 feet (38 100 mm). Where Group R-4 occupancies are permitted by Section 903.2.8 to be protected by an *automatic sprinkler system* installed in accordance with Section 903.3.1.3, the *exit access* travel distance for Group R-4 shall be not more than 75 feet (22 860 mm).~~

2024 International Fire Code

[BE] 1006.2.1 Egress based on occupant load and common path of egress travel distance.
Two *exits* or *exit access doorways* from any space shall be provided where the design *occupant load* or the *common path of egress travel* distance exceeds the values listed in Table 1006.2.1. The cumulative *occupant load* from adjacent rooms, areas or spaces shall be determined in accordance with Section 1004.2.

Exceptions:

1. The number of *exits* from foyers, lobbies, vestibules or similar spaces need not be based on cumulative *occupant loads* for areas discharging through such spaces, but the capacity of the *exits* from such spaces shall be based on applicable cumulative *occupant loads*.
2. Care suites in Group I-2 occupancies complying with Section 407.4 of the International Building Code.
3. Unoccupied mechanical rooms and penthouses are not required to comply with the *common path of egress travel* distance measurement.

Revise as follows:

[BE] TABLE 1006.2.1 SPACES WITH ONE EXIT OR EXIT ACCESS DOORWAY

OCCUPANCY	MAXIMUM OCCUPANT LOAD OF SPACE	MAXIMUM COMMON PATH OF EGRESS TRAVEL DISTANCE (feet)				
		Without Automatic Sprinkler System (feet) NS		With Automatic Sprinkler System (feet)		
		Occupant Load				
		OL ≤ 30	OL > 30	S	S13R	S13D
A[b~~c~~], E, M	49	75	75	75[~~a~~]	NP	NP
B	49	100	75	100[~~a~~]	NP	NP
F	49	75	75	100[~~a~~]	NP	NP
H-1, H-2, H-3	3	NP	NP	25[a~~b~~]	NP	NP
H-4, H-5	10	NP	NP	75[a~~b~~]	NP	NP
I-1, I-2[c~~d~~], I-4	10	NP	NP	75[~~a~~]	NP	NP

		MAXIMUM COMMON PATH OF EGRESS TRAVEL DISTANCE (feet)				
		Without Automatic Sprinkler System (feet) NS		With Automatic Sprinkler System (feet)		
		Occupant Load				
OCCUPANCY	MAXIMUM OCCUPANT LOAD OF SPACE	OL ≤ 30	OL > 30	S	S13R	S13D
I-3	10	NP	NP	100~~[a]~~	NP	NP
R-1	10	NP	NP	75~~[a]~~	75	NP
R-2	20	NP	NP	125~~[a]~~	125	125
R-3[d~~e~~]	20	NP	NP	125~~[a, g]~~	125	125
R-4[d~~e~~]	20	NP	NP	125~~[a, g]~~	125	75
S[e~~f~~]	29	100	75	100~~[a]~~	NP	NP
U	49	100	75	75~~[a]~~	NP	NP

For SI: 1 foot = 304.8 mm.

NP = Not Permitted.

NS = Buildings not equipped throughout with an automatic sprinkler system; S = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1; S13R = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.2; S13D = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Sections 903.2.8 and 903.3.1.3.

~~a.~~ ~~Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2. See Section 903 for occupancies where automatic sprinkler systems are permitted in accordance with Section 903.3.1.2~~

a~~b~~. Group H occupancies equipped throughout with an automatic sprinkler system in accordance with Section 903.2.5.

b~~c~~. For a room or space used for assembly purposes having fixed seating, see Section 1030.8.

c~~d~~. For the travel distance limitations in Group I-2, see Section 407.4 of the International Building Code.

d~~e~~. The common path of egress travel distance shall apply only in a Group R-3 occupancy located in a mixed occupancy building or within a Group R-3 or R-4 congregate living facility.

e~~f~~. The length of common path of egress travel distance in a Group S-2 open parking garage shall be not more than 100 feet.

~~g.~~ ~~For the travel distance limitations in Groups R-3 and R-4 equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.3, see Section 1006.2.2.6.~~

Delete without substitution:

~~**[BE] 1006.2.2.6 Groups R-3 and R-4.**~~
~~Where Group R-3 occupancies are permitted by Section 903.2.8 to be protected by an *automatic sprinkler system* installed in accordance with Section 903.3.1.3, the *exit access* travel distance for Group R-3 shall be not more than 125 feet (38 100 mm). Where Group R-4 occupancies are permitted by Section 903.2.8 to be protected by an *automatic sprinkler system* installed in accordance with Section 903.3.1.3, the *exit access* travel distance for Group R-4 shall be not more than 75 feet (22 860 mm).~~

Reason: The intent of this group of proposal is to make the tables in Chapter 8 and 10 consistent with the revisions to Table 504.3, 504.4, 506.2 – using S13, S13R, S13D and NP for sprinkler requirement. This would clarify what happens when an NFPA 13D sprinkler system is used. This is not intent to change current allowances; just to clarify what requirements are applicable for an NFPA13D system.

Discussion during the BCAC calls has indicated that it is needed to identifying specific code sections so that everyone has the same understanding.

Group R-4 requirements do not always have to be stated as Section 310.5 states “Group R-4 occupancies shall meet the requirements for construction as defined for Group R-3, except as otherwise provided for in this code.” However, since a lot of people miss that, we are including R-4 in the proposed applicable footnotes.

Townhouses are defined as attached dwelling units that extend from foundation to grade and are open on at least two sides. If a townhouse is 3 stories or less, it can choose to comply with the IBC or IRC (Section 101.2). The IRC Section P2904 is similar to an NFPA 13D system. If the IBC is used, townhouses subdivide by firewalls into 1 or 2 units per building is a Group R-3 (Section 310.4) and townhouses subdivided by fire partitions (Section 420.2) are a Group R-2 (Section 310.3). This is important to clarify because all townhouses can use a 13D sprinkler system: Section 903.2.8 references 903.3, and 903.1.3.3 specifically stating that “Automatic sprinkler systems installed in … and townhouses shall be permitted to be installed throughout in accordance with NFPA 13D.” To make this obvious in the tables, a reference to 903.2.8 and 903.1.3.3 are added in the footnote.

Specifics for this change –

- adds the S13, S13R, S13D and NS in the table titles and footnotes with the section references for sprinklers.
- columns are added for each of the three sprinkler systems.
- Footnote a with the sprinkler reference is redundant and deleted.
- The requirements in Section 1006.2.2.6 are moved into the table, so footnote g and Section 1006.2.2.6 are redundant and deleted.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).
BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC webpage.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is a clarification of requirements for Group R where an NFPA13D system is permitted. There are no changes to construction requirements.

E16-24

E17-24

IBC: 1006.2.1, TABLE 1006.2.1, 1006.2.2 (New), (New); IFC: [BE] 1006.2.1, [BE] TABLE 1006.2.1, 1006.2.2 (New), TABLE 1006.2.2 (New)

Proponents: Homer Maiel, PE, CBO, HM Associates, Inc., Representig self (hmaiel@gmail.com)

2024 International Building Code

Revise as follows:

1006.2.1 Egress based on occupant load ~~and common path of egress travel distance~~.
Two *exits* or *exit access doorways* from any space shall be provided where the design *occupant load* ~~or the *common path of egress travel distance*~~ exceeds the values *listed* in Table 1006.2.1. The cumulative *occupant load* from adjacent rooms, areas or spaces shall be determined in accordance with Section 1004.2.

Exceptions:

1. The number of *exits* from foyers, lobbies, vestibules or similar spaces need not be based on cumulative *occupant loads* for areas discharging through such spaces, but the capacity of the *exits* from such spaces shall be based on applicable cumulative *occupant loads*.
2. *Care suites* in Group I-2 occupancies complying with Section 407.4.
3. Unoccupied mechanical rooms and *penthouses* are not required to comply with the common path of egress travel distance measurement.

TABLE 1006.2.1 SPACES WITH ONE EXIT OR EXIT ACCESS DOORWAY

OCCUPANCY	MAXIMUM OCCUPANT LOAD OF SPACE	~~MAXIMUM COMMON PATH OF EGRESS TRAVEL DISTANCE (feet)~~		
		~~Without Automatic Sprinkler System (feet)~~		~~With AutomaticSprinkler System (feet)~~
		~~Occupant Load~~		
		~~OL ≤ 30~~	~~OL > 30~~	
A[~~e~~a], E, M	49	~~75~~	~~75~~	~~75[a]~~
B	49	~~100~~	~~75~~	~~100[a]~~
F	49	~~75~~	~~75~~	~~100[a]~~
H-1, H-2, H-3	3	~~NP~~	~~NP~~	~~25[b]~~
H-4, H-5	10	~~NP~~	~~NP~~	~~75[b]~~
I-1, I-2[~~d~~b], I-4	10	~~NP~~	~~NP~~	~~75[a]~~
I-3	10	~~NP~~	~~NP~~	~~100[a]~~
R-1	10	~~NP~~	~~NP~~	~~75[a]~~
R-2	20	~~NP~~	~~NP~~	~~125[a]~~
R-3[~~e~~]	20	~~NP~~	~~NP~~	~~125[a, g]~~
R-4[~~e~~]	20	~~NP~~	~~NP~~	~~125[a, g]~~
S[~~f~~]	29	~~100~~	~~75~~	~~100[a]~~
U	49	~~100~~	~~75~~	~~75[a]~~

~~For SI: 1 foot = 304.8 mm.~~

~~NP = Not Permitted.~~

~~a.~~ ~~Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2. See Section 903 for occupancies where automatic sprinkler systems are permitted in accordance with Section 903.3.1.2.~~

~~b.~~ ~~Group H occupancies equipped throughout with an automatic sprinkler system in accordance with Section 903.2.5.~~

~~c~~a. For a room or space used for assembly purposes having fixed seating, see Section 1030.8.

~~d~~b. For the travel distance limitations in Group I-2, see Section 407.4.

~~e.~~ ~~The common path of egress travel distance shall only apply in a Group R-3 occupancy located in a mixed occupancy building.~~

~~f.~~ ~~The length of common path of egress travel distance in a Group S-2 open parking garage shall be not more than 100 feet.~~

~~g. For the travel distance limitations in Groups R-3 and R-4 equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.3, see Section 1006.2.2.6.~~

1006.2.1.1 Three or more exits or exit access doorways.
Three *exits* or *exit access doorways* shall be provided from any space with an *occupant load* of 501 to 1,000. Four *exits* or *exit access doorways* shall be provided from any space with an *occupant load* greater than 1,000.

Add new text as follows:

1006.2.2 Common path of egress travel distance. Where two or more exits or exit access doorways are required by Section 1006.2.1, common path of egress travel shall not exceed the values listed in Table 1006.2.2.

Revise as follows:

TABLE 1006.2.2 MAXIMUM COMMON PATH OF EGRESS TRAVEL DISTANCE

OCCUPANCY	Without Sprinkler System (feet) Occupant Load		With Sprinkler System (feet)
	OL ≤ 30	OL > 30	
A[c], E, M	75	75	75[a]
B	100	75	100[a]
F	75	75	100[a]
H-1. H-2, H-3	NP	NP	25[b]
H-4, H-5	NP	NP	75[b]
I-1, I-2[d], I-4	NP	NP	75[a]
I-3	NP	NP	100[a]
R-1	NP	NP	75[a]
R-2	NP	NP	125[a]
R-3[e]	NP	NP	125[a,g]
R-4[e]	NP	NP	125[a,g]
S[f]	100	75	100[a]
U	100	75	75[a]

NP = Not Permitted

a. Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1or 903.3.1.2. See Section 903 for occupancies where automatic sprinkler systems are permitted in accordance with Section 903.3.1.2.

b. Group H occupancies equipped throughout with an automatic sprinkler system in accordance with Section 903.2.5.

c. For a room or space used for assembly purposes having fixed seating, see Section 1030.8.

d. For the travel distance limitations in Group I-2. see Section 407.4.

e. The common path of egress travel distance shall only apply in Group R-3 occupancy located in a mixed occupancy building.

f. The length of common path of egress travel distance in Group S-2 open parking garage shall be not more than 100 feet.

g. For the travel distance limitations in Group R-3 and R-4 equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.3, see Section 1006.2.2.6.

2024 International Fire Code

Revise as follows:

[BE] 1006.2.1 Egress based on occupant load ~~and common path of egress travel distance~~.

Two *exits* or *exit access doorways* from any space shall be provided where the design *occupant load* ~~or the *common path of egress* travel distance~~ exceeds the values *listed* in Table 1006.2.1. The cumulative *occupant load* from adjacent rooms, areas or spaces shall be determined in accordance with Section 1004.2.

Exceptions:

1. The number of *exits* from foyers, lobbies, vestibules or similar spaces need not be based on cumulative *occupant loads* for areas discharging through such spaces, but the capacity of the *exits* from such spaces shall be based on applicable cumulative *occupant loads*.
2. Care suites in Group I-2 occupancies complying with Section 407.4 of the International Building Code.
3. Unoccupied mechanical rooms and penthouses are not required to comply with the *common path of egress travel* distance measurement.

[BE] TABLE 1006.2.1 SPACES WITH ONE EXIT OR EXIT ACCESS DOORWAY

OCCUPANCY	MAXIMUM OCCUPANT LOAD OF SPACE	~~MAXIMUM COMMON PATH OF EGRESS TRAVEL DISTANCE (feet)~~		
		~~Without Automatic Sprinkler System (feet)~~		~~With Automatic Sprinkler System (feet)~~
		~~Occupant Load~~		
		~~OL ≤ 30~~	~~OL > 30~~	
A[a~~e~~], E, M	49	~~75~~	~~75~~	~~75[a]~~
B	49	~~100~~	~~75~~	~~100[a]~~
F	49	~~75~~	~~75~~	~~100[a]~~
H-1, H-2, H-3	3	~~NP~~	~~NP~~	~~25[b]~~
H-4, H-5	10	~~NP~~	~~NP~~	~~75[b]~~
I-1, I-2[b~~d~~], I-4	10	~~NP~~	~~NP~~	~~75[a]~~
I-3	10	~~NP~~	~~NP~~	~~100[a]~~
R-1	10	~~NP~~	~~NP~~	~~75[a]~~
R-2	20	~~NP~~	~~NP~~	~~125[a]~~
R-3~~[e]~~	20	~~NP~~	~~NP~~	~~125[a, g]~~
R-4~~[e]~~	20	~~NP~~	~~NP~~	~~125[a, g]~~
S~~[f]~~	29	~~100~~	~~75~~	~~100[a]~~
U	49	~~100~~	~~75~~	~~75[a]~~

~~For SI: 1 foot = 304.8 mm.~~

~~NP = Not Permitted.~~

~~a. Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2. See Section 903 for occupancies where automatic sprinkler systems are permitted in accordance with Section 903.3.1.2~~

~~b. Group H occupancies equipped throughout with an automatic sprinkler system in accordance with Section 903.2.5.~~

a~~c~~. For a room or space used for assembly purposes having fixed seating, see Section 1030.8.

b~~d~~. For the travel distance limitations in Group I-2, see Section 407.4 of the International Building Code.

~~e. The common path of egress travel distance shall apply only in a Group R-3 occupancy located in a mixed occupancy building or within a Group R-3 or R-4 congregate living facility.~~

~~f. The length of common path of egress travel distance in a Group S-2 open parking garage shall be not more than 100 feet.~~

~~g. For the travel distance limitations in Groups R-3 and R-4 equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.3, see Section 1006.2.2.6.~~

[BE] 1006.2.1.1 Three or more exits or exit access doorways. Three *exits* or *exit access doorways* shall be provided from any space with an *occupant load* of 501 to 1,000. Four *exits* or *exit access doorways* shall be provided from any space with an *occupant load* greater than 1,000.

Add new text as follows:

1006.2.2 Common path of egress travel distance. Where two or more exits or exit access doorways are required by Section 1006.2.1, common path of egress travel shall not exceed the values listed in Table 1006.2.2.

TABLE 1006.2.2 MAXIMUM COMMON PATH OF EGRESS TRAVEL DISTANCE

OCCUPANCY	Without Sprinkler System (feet)		With Sprinkler System (feet)
	Occupant Load		
	OL ≤ 30	OL > 30	
A[c], E, M	75	75	75[a]
B	100	75	100[a]
F	75	75	100[a]
H-1. H-2, H-3	NP	NP	25[b]
H-4, H-5	NP	NP	75[b]
I-1, I-2[d], I-4	NP	NP	75[a]
I-3	NP	NP	100[a]
R-1	NP	NP	75[a]
R-2	NP	NP	125[a]
R-3[e]	NP	NP	125 [a,g]
R-4[e]	NP	NP	125 [a,g]
S[f]	100	75	100[a]
U	100	75	75[a]

For SI: 1 foot=304.8

NP = Not Permitted

a. Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1or 903.3.1.2. See Section 903 for occupancies where automatic sprinkler systems are permitted in accordance with Section 903.3.1.2.

b. Group H occupancies equipped throughout with an automatic sprinkler system in accordance with Section 903.2.5.

c. For a room or space used for assembly purposes having fixed seating, see Section 1030.8.

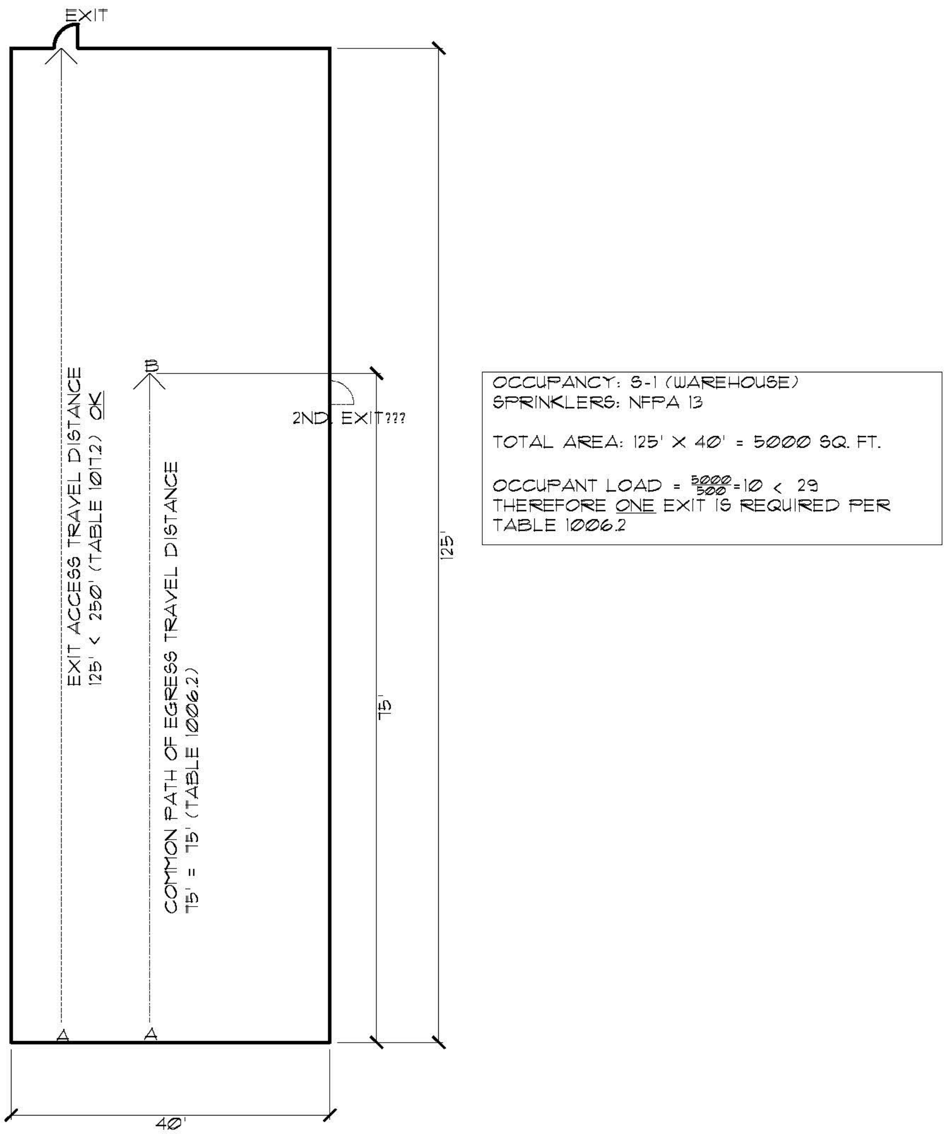
d. For the travel distance limitations in Group I-2. see Section 407.4 of the International Building Code.

e. The common path of egress travel distance shall only apply in Group R-3 occupancy located in a mixed occupancy building.

f. The length of common path of egress travel distance in Group S-2 open parking garage shall be not more than 100 feet.

g. For the travel distance limitations in Group R-3 and R-4 equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.3, see Section 1006.2.2.6.

Reason: Ever since the maximum common path of egress travel distance (CPETD) was merged with maximum occupant load (MOL), confusion was created. If one applies the exisying Table 1006.2.1, he/she will see that CPETD will always trump MOL. The intend of CPET has always been that it should apply to spaces that ALREADY require 2 or more exits. The current Table will, for most parts, trigger the second exit no matter how low the MOL is. In fact, even IBC Commentary to Section 1006.2.1 states" the distance limitation are applicable to all path of travel that lead out of a space or building where 2 exits are required". One should always calculate MOL and check Exit Access Travel Distance (EATD) (Table 1017.2). If any of these two trigger the second exit, THEN CPETD should come into play. The CPETD should not trigger the second exit. See the example provide herein.In this example the space is an S-1 occupancy (wearhouse). It is fully sprinklered and total area is 5000 sq. feet. The depth of this space is 125'. The MOL is only 10. When one travels from point A toward the exit, he/she will have to travel 125' to reach the exit. Since this is less than 250' (EATD) then second exit is not required. If you check the MOL (10 in this case) you will see that it does not exceed 29 (Table 1006.2.1). So again second exit is not require. However, traveling from point A toward the exit, 75' (CPETD) feet later you will reach point B which is way short of the exit. Now I have to create the second exit only because of CPETD!!!! By breaking up this current table into two and creating new Table for CPETD, this problem will be solved.



Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is just splitting a table and would have no change to cost.

E17-24

E18-24

IBC: 1006.2.2.5; IFC: [BE] 1006.2.2.5

Proponents: Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org)

2024 International Building Code

Revise as follows:

1006.2.2.5 Vehicular ramps.
Vehicular ramps intended only for vehicle traffic shall not be considered as an *exit access ramp* ~~unless pedestrian *facilities* are~~ except where a walkway used exclusively as a pedestrian trafficway is provided.

2024 International Fire Code

Revise as follows:

[BE] 1006.2.2.5 Vehicular ramps. Vehicular ramps intended only for vehicle traffic shall not be considered as an *exit access ramp* ~~unless pedestrian *facilities* are~~ except where a walkway used exclusively as a pedestrian trafficway is provided.

Reason: Are vehicular ramps the driveways and crossovers for cars only with no parking on either side; or are they wherever a car drives in a parking garage. Pedestrian walkways are used for bridges between buildings in Chapter 31, so we did not want to use the defined term, but the words in the defined term would add clarity to this requirement. The term "pedestrian facilities" is not defined and is not clear.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC webpage.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is a clarification of requirements for pedestrians on vehicular ramps. There are no changes to construction requirements.

E18-24

E19-24

IBC: 1006.2.2, 1006.2.2.7 (New); IFC: [BE] 1006.2.2, 1006.2.2.7 (New)

Proponents: Adam Henson, U.S. Chemical Safety and Hazard Investigation Board (adam.henson@csb.gov)

2024 International Building Code

Revise as follows:

1006.2.2 Egress based on use.
The numbers, configuration and types of components of *exits* or access to *exits* shall be provided in the uses described in Sections 1006.2.2.1 through ~~1006.2.2.6~~ 1006.2.2.7.

Add new text as follows:

1006.2.2.7 Equipment Platforms. Equipment platforms in Group H-1, H-2, H-3 and H-4 occupancies, and equipment platforms located outside servicing industrial processes, storing or using hazardous materials in excess of the maximum allowable quantity per control area specified in Tables 5003.1.1 (3) or 5003.1.1(4) of the *International Fire Code*, shall have at least two exits or exit access doorways.

> **Exception:** Equipment platforms with less than 4 occupants and with an exit access travel distance less than 200 feet (61 m) shall be permitted to have a single exit or exit access doorway.

2024 International Fire Code

Revise as follows:

[BE] 1006.2.2 Egress based on use.
The numbers, configurations, and types of components of exits or access to exits shall be provided in the uses described in Sections 1006.2.2.1 through ~~1006.2.2.6~~ 1006.2.2.7

Add new text as follows:

1006.2.2.7 Equipment Platforms. Equipment platforms in Group H-1, H-2, H-3 and H-4 occupancies, and equipment platforms located outside servicing industrial processes, storing or using hazardous materials in excess of the maximum allowable quantity per control area specified in Tables 5003.1.1 (3) or 5003.1.1(4), shall have at least two exits or exit access doorways.

> **Exception:** Equipment platforms with less than 4 occupants and with an exit access travel distance less than 200 feet (61 m) shall be permitted to have a single exit or exit access doorway.

Reason: On November 13, 2020, hydrogen chloride gas, which is corrosive and toxic, was released from an industrial chemical process at the Wacker Polysilicon North America (Wacker) facility in Charleston, TN. The release occurred when excessive torque was applied to the bolts of the graphite heat exchanger in the unit. The release occurred on the fifth floor of an equipment platform located outdoors. At the time of the release, there were seven workers on the fifth floor of the equipment platform some in chemical resistant suits and others not.

Four of the workers remained in place during the release. Three of the workers who were not wearing chemical resistant suits attempted to escape by climbing over the edge of the equipment platform approximately 70 feet above the ground and climbing down piping on the side of the structure. During the climb down all three workers fell fatally injuring one and seriously injuring the other two. One of the employees who remained in place suffered chemical burns when their chemical resistant suit ripped. In addition to the human toll of this incident damages of $214,000 were reported by the facility.

Access to/egress from the fourth and fifth floors of the equipment platform was provided by a single staircase. The release cut off the employees from the staircase. In the months immediately preceding the incident Wacker identified this area having a single means of egress as a hazard during a process hazard analysis. At the time of the incident, Wacker had not followed up on this PHA recommendation. In response to concerns brought by employees Wacker cited IBC/IFC as justification for the arrangement of the platform's means of egress.

During its investigation the CSB concluded that had an additional means of egress been installed that the workers affected by the release would not have had to climb over the edge of the platform to escape the release and the fatality and serious injuries associated with the falls could have been prevented. The CSB also concludes that current egress requirements, including those found in the IBC/IFC, are insufficient for equipment platforms used for accessing equipment containing hazardous materials.

As part of its investigation into this incident, the CSB reviewed the requirements of the International Building Code (IBC) and the International Fire Code (IFC) and determined that there are no requirements for means of egress from equipment platforms even those serving equipment with hazardous materials under any circumstances.

As the result of the investigation, the CSB issued the following recommendation to the International Code Council:

CSB Recommendation No. 2021-01-I-TN-R9

Amend the International Building Code (IBC) to address conditions that may require multiple means of egress from elevated equipment platforms used for accessing equipment containing materials that pose physical and health hazards, such as the one used at Wacker in this incident. Specify the minimum number of egress points to increase the likelihood of worker escape in the event of a hazardous material release.

The language proposed is intended to satisfactorily implement this recommendation.

Bibliography: U.S. Chemical Safety and Hazard Investigation Board (CSB), "Equipment Fracture and Fatal Hydrogen Chloride Release at Wacker Polysilicon North America," 15 June 2023. [Online]. Available: https://www.csb.gov/file.aspx?DocumentId=6226. [Accessed 30 November 2023].

Cost Impact: Increase

Estimated Immediate Cost Impact:

Between $17,000 and $362,000

Estimated Immediate Cost Impact Justification (methodology and variables):

Recent projects to increase the number of means of egress on elevated equipment platforms were completed, or are underway, at a chemical plant in Tennessee. Addressing the following scenarios resulted in the following final and estimated costs.

Scenario 1: A piece of equipment is kept on the third floor, near the edge of the platform.

Solution:

Ladders were added on each side of the building from the third floor to an adjacent building. Modifications were also made to the rood access door.

Final Cost: $17,000

Scenario 2: The existing finger rack dead-ends.

Solution:

A ladder and platform were installed to connect the finger rack to the adjacent pipe rack.

Final Cost: $24,000

Scenario 3: The existing finger rack dead-end on either side of a process vessel.

Solution:

Ladders and platforms were added on each of the finger racks.

Final Cost: $147,000

Scenario 4: Material from a third-floor skid is piped through upper floors and is located in various vessels on the upper floors. Maintenance and operations personnel frequently access these areas and there is a single means of egress.

Solution:

Ladders are being added from the 6th to 5th floors, 5th to 4th floors, and 4th floor to the roof of the adjacent building.

Estimated Cost: $175,000

Scenario 5: Chemical process equipment is located on the fifth floor of an elevated equipment platform with a single means of egress.

Solution:

A stair tower serving each floor of the elevated equipment platform was constructed.

Final Cost: $362,000

Cost Source:

This information was provided by the chemical company previously mentioned based on their efforts to install secondary means of egress on the existing elevated equipment platforms located throughout their facility. The cost of these items for new construction will likely be less expensive if secondary means of egress for these structures is considered in their original design.

E19-24

E20-24

IBC: 1006.3.2, 1019.1; IFC: [BE] 1006.3.2, [BE] 1019.1

Proponents: Steve Thomas, Shums Coda Associates, Colorado Chapter Code Development Committee (sthomas@coloradocode.net)

2024 International Building Code

Revise as follows:

~~1006.3.2~~ 1017.3.2 Path of ~~egress~~ exit access travel.
The path of ~~egress~~ exit access travel to an *exit* shall not pass through more than one adjacent *story*.

Exception: The path of ~~egress~~ exit access travel to an *exit* shall be permitted to pass through more than one adjacent *story* in any of the following:

1. In Group R-1, R-2 or R-3 occupancies, *exit access stairways* and *ramps* connecting four *stories* or less serving and contained within an individual *dwelling unit*, *sleeping unit* or *live/work unit*.
2. *Exit access stairways* serving and contained within a Group R-3 congregate residence or a Group R-4 *facility*.
3. *Exit access stairways* and *ramps* within an *atrium* complying with Section 404.
4. *Exit access stairways* and *ramps* in *open parking garages* that serve only the parking garage.
5. *Exit access stairways* and *ramps* serving *smoke-protected* assembly seating and *open-air assembly seating* complying with the exit access travel distance requirements of Section 1030.7.
6. *Exit access stairways* and *ramps* between the balcony, gallery or press box and the main assembly floor in occupancies such as theaters, *places of religious worship*, auditoriums and sports *facilities*.
7. Exterior *exit access stairways* and *ramps* between *occupiable roofs* .

1019.1 General. *Exit access stairways* and *ramps* serving as an *exit access* component in a *means of egress* system shall comply with the requirements of this section. The number of *stories* connected by *exit access stairways* and *ramps* shall include *basements*, but not *mezzanines*. Exit access travel distance shall be measured along exit access stairways and ramps in accordance with Section 1017.3.

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Revise as follows:

[BE] ~~1006.3.2~~ 1017.3.2 Path of ~~egress~~ exit access travel.
The path of ~~egress~~ exit access travel to an *exit* shall not pass through more than one adjacent *story*.

Exception: The path of ~~egress~~ exit access travel to an *exit* shall be permitted to pass through more than one adjacent *story* in any of the following:

1. In Group R-1, R-2 or R-3 occupancies, *exit access stairways* and *ramps* connecting four stories or fewer serving and contained within an individual *dwelling unit* or *sleeping unit* or live/work unit.
2. *Exit access stairways* serving and contained within a Group R-3 congregate residence or a Group R-4 facility.
3. *Exit access stairways* and *ramps* within an atrium complying with Section 404 of the *International Building Code*.
4. *Exit access stairways* and *ramps* in open parking garages that serve only the parking garage.
5. *Exit access stairways* and *ramps* serving smoke-protected assembly seating and open-air assembly seating complying with the *exit access* travel distance requirements of Section 1030.7.
6. *Exit access stairways* and *ramps* between the balcony, gallery or press box and the main assembly floor in occupancies such as theaters, *places of religious worship*, auditoriums and sports facilities.
7. Exterior *exit access stairways* and *ramps* between *occupiable roofs*.

[BE] 1019.1 General. *Exit access stairways* and *ramps* serving as an *exit access* component in a *means of egress* system shall comply with the requirements of this section. The number of stories connected by *exit access stairways* and *ramps* shall include *basements*, but not *mezzanines*. <u>Exit access travel distance shall be measured along exit access stairways and ramps in accordance with Section 1017.3.</u>

Reason: There seems to be some confusion about the path of travel to an exit. The first part of the proposal is to relocate Section 1006.3.2 to Section 1017.3.2. Section 1006.3 regulates the number of exits from stories or occupiable roofs. The language regarding the path of travel has nothing to do with the number of exits that are required. We believe that a better location is in the exit access travel distance since that section regulates the path of travel.

The second part is adding a cross reference in Section 1019 regarding exit access stairways to refer to the measurement of travel distance in Section 1017.3. There appears to be some confusion about the maximum number of stories that you can pass before you get to an exit. A cross reference will help in clarifying the requirements.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

It is just a clarification of the requirements and relocation of language.

E20-24

E21-24

IBC: 1006.3.4; IFC: [BE] 1006.3.4

Proponents: David Renn, PE, SE, City and County of Denver, Colorado Chapter Code Development Committee (david.renn@denvergov.org)

2024 International Building Code

Revise as follows:

1006.3.4 Single exits.
A single *exit* or access to a single *exit* shall be permitted from any *story* or *occupiable roof* where one of the following conditions exists:

1. The *occupant load*, number of *dwelling units* and exit access travel distance do not exceed the values in Table 1006.3.4(1) or 1006.3.4(2).
2. Rooms, areas and spaces complying with Section 1006.2.1 and located at a *level of exit discharge*, with *exits* that discharge directly to the exterior ~~at the *level of exit discharge*~~, are permitted to have one *exit* or access to a single *exit*.
3. Parking garages where vehicles are mechanically parked shall be permitted to have one *exit* or access to a single *exit*.
4. Group R-3 and R-4 occupancies shall be permitted to have one *exit* or access to a single *exit*.
5. Individual single-story or multistory *dwelling units* shall be permitted to have a single *exit* or access to a single *exit* from the *dwelling unit* provided that both of the following criteria are met:
   5.1. The *dwelling unit* complies with Section 1006.2.1 as a space with one *means of egress*.
   5.2. Either the exit from the *dwelling unit* discharges directly to the exterior at the *level of exit discharge*, or the *exit access* outside the *dwelling unit's* entrance door provides access to not less than two *approved* independent *exits*.

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Revise as follows:

[BE] 1006.3.4 Single exits.
A single *exit* or access to a single *exit* shall be permitted from any story or *occupiable roof*, where one of the following conditions exists:

1. The *occupant load*, number of *dwelling units* and *exit access* travel distance do not exceed the values in Table 1006.3.4(1) or 1006.3.4(2).
2. Rooms, areas and spaces complying with Section 1006.2.1 and located at a *level of exit discharge*, with *exits* that discharge directly to the exterior ~~at the *level of exit discharge*~~, are permitted to have one *exit* or access to a single *exit*.
3. Parking garages where vehicles are mechanically parked shall be permitted to have one *exit* or access to a single *exit*.
4. Group R-3 and R-4 occupancies shall be permitted to have one *exit* or access to a single *exit*.
5. Individual single-story or multistory *dwelling units* shall be permitted to have a single *exit* or access to a single *exit* from the *dwelling unit* provided that both of the following criteria are met:
   5.1. The *dwelling unit* complies with Section 1006.2.1 as a space with one means of egress.
   5.2. Either the *exit* from the *dwelling unit* discharges directly to the exterior at the *level of exit discharge*, or the *exit* access outside the *dwelling unit*'s entrance door provides access to not less than two *approved* independent *exits*.

Reason: Item 2 for a single exit story is intended to be for rooms, areas or spaces that comply with 1006.2.1 as a single exit space, are located on the level of exit discharge, and have exits that discharge directly to the exterior. The commentary discusses how vertical travel takes longer than horizontal travel and indicates that if a space can exit directly to the exterior, rather than egress into an interior corridor or exit stairway, a higher level of safety is provided. A common use of this item is for a single-story strip mall where a tenant space complies as a single exit space and has an exit door directly to the exterior.

The current wording for Item 2 does not meet the intent of the item as indicated above since the level of exit discharge requirement is tied to the discharge of the exit instead of the location of the room, area or space. For example, an interior exit stairway is an "exit" by definition and, if the discharge from the interior exit stairway is directly to the exterior, any single exit space that egresses through this stairway would not have to have access to a second exit, regardless of what story the space is on. It is clearly not the intent of the code that a single exit room, area or space on any story or occupiable roof of the building could have access to a single exit as this would directly contradict Tables 1006.3.4(1) and 1006.3.4(2) that have limits on which stories or occupiable roofs can have a single exit. I have reviewed many projects where the architect has tried to use this section to provide a single exit from an occupiable roof above a 3, 4 or 5-story building. I have also seen projects where the architect tried to use this section to provide a single exit for a second-story B occupancy with up to 49 occupants, as allowed by Table 1006.2.1 for a single exit space, which conflicts with Table 1006.3.4(2) that would allow a maximum of 29 occupants instead.

To fix the issue described above, this proposal revises the wording to tie level of exit discharge requirement to the location the room, rather than the location of the discharge from the exit. This change aligns the wording in the code with the intent of the code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal simply revises wording of the code to align with the intent of the code. This item is currently being enforced as written in this proposal, so there is no cost impact.

E21-24

E22-24

IBC: TABLE 1006.3.4(1), TABLE 1006.3.4(2); IFC: [BE] TABLE 1006.3.4(1), [BE] TABLE 1006.3.4(2)

Proponents: Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org)

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1006.3.4 Single exits.

A single *exit* or access to a single *exit* shall be permitted from any *story* or *occupiable roof* where one of the following conditions exists:

1. The *occupant load*, number of *dwelling units* and exit access travel distance do not exceed the values in Table 1006.3.4(1) or 1006.3.4(2).
2. Rooms, areas and spaces complying with Section 1006.2.1 with *exits* that discharge directly to the exterior at the *level of exit discharge*, are permitted to have one *exit* or access to a single *exit*.
3. Parking garages where vehicles are mechanically parked shall be permitted to have one *exit* or access to a single *exit*.
4. Group R-3 and R-4 occupancies shall be permitted to have one *exit* or access to a single *exit*.
5. Individual single-story or multistory *dwelling units* shall be permitted to have a single *exit* or access to a single *exit* from the *dwelling unit* provided that both of the following criteria are met:
   5.1. The *dwelling unit* complies with Section 1006.2.1 as a space with one *means of egress*.
   5.2. Either the exit from the *dwelling unit* discharges directly to the exterior at the *level of exit discharge*, or the *exit access* outside the *dwelling unit's* entrance door provides access to not less than two *approved* independent *exits*.

Revise as follows:

TABLE 1006.3.4(1) STORIES AND OCCUPIABLE ROOFS WITH ONE EXIT OR ACCESS TO ONE EXIT FOR R-2 OCCUPANCIES

STORY OR OCCUPIABLE ROOF	OCCUPANCY	MAXIMUM NUMBER OF DWELLING UNITS	MAXIMUM EXIT ACCESS TRAVEL DISTANCE
Basement, first, second or third story above grade plane and occupiable roofs over the first or second story above grade plane	R-2[a, b, c]	4 dwelling units	125 feet
Fourth story above grade plane and higher	NP	NA	NA

For SI: 1 foot = 304.8 mm.

NP = Not Permitted.

NA = Not Applicable.

a. Buildings classified as Group R-2 equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, ~~or~~ 903.3.1.2 or 903.3.1.3, and provided with emergency escape and rescue openings in accordance with Section 1031.

b. This table is used for Group R-2 occupancies consisting of dwelling units. For Group R-2 occupancies consisting of sleeping units, use Table 1006.3.4(2).

c. This table is for occupiable roofs accessed through and serving individual dwelling units in Group R-2 occupancies. For Group R-2 occupancies with occupiable roofs that are not accessed through and serving individual units, use Table 1006.3.4(2).

TABLE 1006.3.4(2) STORIES AND OCCUPIABLE ROOFS WITH ONE EXIT OR ACCESS TO ONE EXIT FOR OTHER OCCUPANCIES

STORY AND OCCUPIABLE ROOF	OCCUPANCY	MAXIMUM OCCUPANT LOAD PER STORY AND OCCUPIABLE ROOF	MAXIMUM EXIT ACCESS TRAVEL DISTANCE (feet)
First story above or below grade plane and occupiable roofs over the first story above grade plane	A, B[b], E, F[b], M, U	49	75
	H-2, H-3	3	25
	H-4, H-5, I, R-1, R-2[a, c]	10	75
	S[b, d]	29	75
Second story above grade plane	B, F, M, S[d]	29	75

STORY AND OCCUPIABLE ROOF	OCCUPANCY	MAXIMUM OCCUPANT LOAD PER STORY AND OCCUPIABLE ROOF	MAXIMUM EXIT ACCESS TRAVEL DISTANCE (feet)
Third story above grade plane and higher	NP	NA	NA

For SI: 1 foot = 304.8 mm.

NP = Not Permitted.

NA = Not Applicable.

a. Buildings classified as Group R-2 equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, ~~or~~ 903.3.1.2 or 903.3.1.3, and provided with emergency escape and rescue openings in accordance with Section 1031.

b. Group B, F and S occupancies in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or an occupiable roof of such buildings shall have a maximum exit access travel distance of 100 feet.

c. This table is used for Group R-2 occupancies consisting of sleeping units. For Group R-2 occupancies consisting of dwelling units, use Table 1006.3.4(1).

d. The length of exit access travel distance in a Group S-2 open parking garage shall be not more than 100 feet.

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[BE] 1006.3.4 Single exits.

A single *exit* or access to a single *exit* shall be permitted from any story or *occupiable roof*, where one of the following conditions exists:

1. The *occupant load*, number of *dwelling units* and *exit access* travel distance do not exceed the values in Table 1006.3.4(1) or 1006.3.4(2).
2. Rooms, areas and spaces complying with Section 1006.2.1 with *exits* that discharge directly to the exterior at the *level of exit discharge*, are permitted to have one *exit* or access to a single *exit*.
3. Parking garages where vehicles are mechanically parked shall be permitted to have one *exit* or access to a single *exit*.
4. Group R-3 and R-4 occupancies shall be permitted to have one *exit* or access to a single *exit*.
5. Individual single-story or multistory *dwelling units* shall be permitted to have a single *exit* or access to a single *exit* from the *dwelling unit* provided that both of the following criteria are met:
   5.1. The *dwelling unit* complies with Section 1006.2.1 as a space with one means of egress.

   5.2. Either the *exit* from the *dwelling unit* discharges directly to the exterior at the *level of exit discharge*, or the *exit* access outside the *dwelling unit*'s entrance door provides access to not less than two *approved* independent *exits*.

Revise as follows:

[BE] TABLE 1006.3.4(1) STORIES AND OCCUPIABLE ROOFS WITH ONE EXIT OR ACCESS TO ONE EXIT FOR R-2 OCCUPANCIES

STORY OR OCCUPIABLE ROOF	OCCUPANCY	MAXIMUM NUMBER OF DWELLING UNITS	MAXIMUM EXIT ACCESS TRAVEL DISTANCE
Basement, first, second or third story above grade plane and occupiable roofs over the first or second story above grade plane	R-2[a, b, c]	4 dwelling units	125 feet
Fourth story above grade plane and higher	NP	NA	NA

For SI: 1 foot = 304.8 mm.

NP = Not Permitted.

NA = Not Applicable.

a. Buildings classified as Group R-2 equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, or 903.3.1.2 or 903.3.1.3 and provided with emergency escape and rescue openings in accordance with Section 1031.

b. This table is used for Group R-2 occupancies consisting of dwelling units. For Group R-2 occupancies consisting of sleeping units, use Table 1006.3.4(2).

c. This table is for occupiable roofs accessed through and serving individual dwelling units in Group R-2 occupancies. For Group R-2 occupancies with occupiable roofs that are not accessed through and serving individual units, use Table 1006.3.4(2).

[BE] TABLE 1006.3.4(2) STORIES AND OCCUPIABLE ROOFS WITH ONE EXIT OR ACCESS TO ONE EXIT FOR OTHER OCCUPANCIES

STORY AND OCCUPIABLE ROOF	OCCUPANCY	MAXIMUM OCCUPANT LOAD PER STORY AND OCCUPIABLE ROOF	MAXIMUM EXIT ACCESS TRAVEL DISTANCE (feet)
First story above or below grade plane and occupiable roofs over the first story above grade plane	A, B[b], E, F[b], M, U	49	75
	H-2, H-3	3	25
	H-4, H-5, I, R-1, R-2[a, c]	10	75
	S[b, d]	29	75
Second story above grade plane	B, F, M, S[d]	29	75
Third story above grade plane and higher	NP	NA	NA

For SI: 1 foot = 304.8 mm.

NP = Not Permitted.

NA = Not Applicable.

a. Buildings classified as Group R-2 equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, ~~or~~ 903.3.1.2 or 903.3.1.3 and provided with emergency escape and rescue openings in accordance with Section 1031.

b. Group B, F and S occupancies in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or an occupiable roof of such buildings shall have a maximum exit access travel distance of 100 feet.

c. This table is used for Group R-2 occupancies consisting of sleeping units. For Group R-2 occupancies consisting of dwelling units, use Table 1006.3.4(1).

d. The length of exit access travel distance in a Group S-2 open parking garage shall be not more than 100 feet.

Reason: A townhouse can be a Group R-2 and be permitted to use an NFPA13D sprinkler system. Footnote a of Table 1006.3.4(1) and 1006.3.4(2) should include a requirement for townhouses with a single exit to have emergency escape and rescue openings consistent with Group R-2 with an NFPA 13 or NFPA 13R systems.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).
BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC webpage.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is a clarification of requirements for Group R where an NFPA13D system is permitted. There are no changes to construction requirements.

E22-24

E23-24

IBC: TABLE 1006.3.4(1), TABLE 1006.3.4(2), 1006.3.4.1, 1031.2; IFC: [BE] TABLE 1006.3.4(1), [BE] TABLE 1006.3.4(2), [BE] 1006.3.4.1, [BE] 1031.2

Proponents: Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org)

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1006.3.4 Single exits.

A single *exit* or access to a single *exit* shall be permitted from any *story* or *occupiable roof* where one of the following conditions exists:

1. The *occupant load*, number of *dwelling units* and exit access travel distance do not exceed the values in Table 1006.3.4(1) or 1006.3.4(2).
2. Rooms, areas and spaces complying with Section 1006.2.1 with *exits* that discharge directly to the exterior at the *level of exit discharge*, are permitted to have one *exit* or access to a single *exit*.
3. Parking garages where vehicles are mechanically parked shall be permitted to have one *exit* or access to a single *exit*.
4. Group R-3 and R-4 occupancies shall be permitted to have one *exit* or access to a single *exit*.
5. Individual single-story or multistory *dwelling units* shall be permitted to have a single *exit* or access to a single *exit* from the *dwelling unit* provided that both of the following criteria are met:
   5.1. The *dwelling unit* complies with Section 1006.2.1 as a space with one *means of egress*.

   5.2. Either the exit from the *dwelling unit* discharges directly to the exterior at the *level of exit discharge*, or the *exit access* outside the *dwelling unit's* entrance door provides access to not less than two *approved* independent *exits*.

Revise as follows:

TABLE 1006.3.4(1) STORIES AND OCCUPIABLE ROOFS WITH ONE EXIT OR ACCESS TO ONE EXIT FOR R-2 OCCUPANCIES [a,b]

STORY OR OCCUPIABLE ROOF	OCCUPANCY	MAXIMUM NUMBER ~~OF DWELLING UNITS~~	MAXIMUM EXIT ACCESS TRAVEL DISTANCE
Basement, first, second or third story above grade plane and occupiable roofs over the first or second story above grade plane	R-2~~[a, b, c]~~ consisting of dwelling units	4 dwelling units	125 feet
	R-2 consisting of sleeping units	20 occupants	125 feet
Fourth story above grade plane and higher	NP	NA	NA

For SI: 1 foot = 304.8 mm.

NP = Not Permitted.

NA = Not Applicable.

a. Buildings classified as Group R-2 equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 and provided with emergency escape and rescue openings in accordance with Section 1031.

~~b. This table is used for Group R-2 occupancies consisting of dwelling units. For Group R-2 occupancies consisting of sleeping units, use Table 1006.3.4(2).~~

~~c.~~b. This table is for occupiable roofs accessed through and serving individual dwelling units or sleeping units in Group R-2 occupancies. For Group R-2 occupancies with occupiable roofs that are not accessed through and serving individual dwelling units or sleeping units, use Table 1006.3.4(2).

TABLE 1006.3.4(2) STORIES AND OCCUPIABLE ROOFS WITH ONE EXIT OR ACCESS TO ONE EXIT FOR OTHER OCCUPANCIES

STORY AND OCCUPIABLE ROOF	OCCUPANCY	MAXIMUM OCCUPANT LOAD PER STORY AND OCCUPIABLE ROOF	MAXIMUM EXIT ACCESS TRAVEL DISTANCE (feet)
First story above or below grade plane and occupiable roofs over the first story above grade plane	A, B~~[ab]~~[a], E, F[a]~~[b]~~, M, U	49	75
	H-2, H-3	3	25

STORY AND OCCUPIABLE ROOF	OCCUPANCY	MAXIMUM OCCUPANT LOAD PER STORY AND OCCUPIABLE ROOF	MAXIMUM EXIT ACCESS TRAVEL DISTANCE (feet)
	H-4, H-5, I, R-1~~, R-2~~~~[a, c]~~	10	75
	S[a,b]~~, d~~	29	75
Second story above grade plane	B, F, M, S[b]~~d~~	29	75
Third story above grade plane and higher	NP	NA	NA

For SI: 1 foot = 304.8 mm.

NP = Not Permitted.

NA = Not Applicable.

~~a.~~ ~~Buildings classified as Group R-2 equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 and provided with emergency escape and rescue openings in accordance with Section 1031.~~

~~b.~~a. Group B, F and S occupancies in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or an occupiable roof of such buildings shall have a maximum exit access travel distance of 100 feet.

~~c.~~ ~~This table is used for Group R-2 occupancies consisting of sleeping units. For Group R-2 occupancies consisting of dwelling units, use Table 1006.3.4(1).~~

~~d.~~b. The length of exit access travel distance in a Group S-2 open parking garage shall be not more than 100 feet.

1006.3.4.1 Mixed occupancies.
Where one *exit*, or *exit access stairway* or *ramp*providing access to exits at other *stories*, is permitted to serve individual *stories*, mixed occupancies shall be permitted to be served by single *exits* provided that each individual occupancy complies with the applicable requirements of Table 1006.3.4(1) or 1006.3.4(2) for that occupancy. Where applicable, cumulative *occupant loads* from adjacent occupancies shall be considered to be in accordance with the provisions of Section 1004.1. In each *story* of a mixed occupancy *building*, the maximum number of occupants served by a single exit shall be such that the sum of the ratios of the calculated number of occupants of the space divided by the allowable number of occupants indicated in Table 1006.3.4(1) for Group R-2 sleeping units or Table 1006.3.4(2) for each occupancy does not exceed one. Where Group R-2 *dwelling units* are located on a story with other occupancies, the actual number of *dwelling units* divided by four plus the ratio from the other occupancy does not exceed one.

1031.2 Where required.
In addition to the *means of egress* required by this chapter, *emergency escape and rescue openings* shall be provided in the following occupancies:

1. Group R-2 occupancies located in *stories* with only one *exit* or access to only one *exit* as permitted by ~~Tables~~ Table 1006.3.4(1) ~~and 1006.3.4(2)~~.
2. Group R-3 and R-4 occupancies.

Basements and sleeping rooms below the fourth *story above grade plane* shall have not fewer than one *emergency escape and rescue opening* in accordance with this section. Where *basements* contain one or more sleeping rooms, an *emergency escape and rescue opening* shall be required in each sleeping room, but shall not be required in adjoining areas of the *basement*. Such openings shall open directly into a *public way* or to a *yard* or *court* that opens to a *public way, or to an egress balcony that leads to a public way* .

Exceptions:

1. *Basements* with a ceiling height of less than 80 inches (2032 mm) shall not be required to have *emergency escape and rescue openings*.
2. *Emergency escape and rescue openings* are not required from *basements* or sleeping rooms that have an *exit* door or *exit access* door that opens directly into a *public way* or to a *yard*, *court* or exterior egress balcony that leads to a *public way*.
3. *Basements* without *habitable spaces* and having not more than 200 square feet (18.6 m^2) in floor area shall not be required to have *emergency escape and rescue openings*.
4. *Storm shelters* are not required to comply with this section where the shelter is constructed in accordance with ICC 500.

5. Within individual *dwelling* and *sleeping units* in Groups R-2 and R-3, where the *building* is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3, *sleeping rooms* in *basements* shall not be required to have *emergency escape and rescue openings* provided that the *basement* has one of the following:
   5.1. One *means of egress* and one *emergency escape and rescue opening*.
   5.2. Two *means of egress*.

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[BE] 1006.3.4 Single exits.

A single *exit* or access to a single *exit* shall be permitted from any story or *occupiable roof*, where one of the following conditions exists:

1. The *occupant load*, number of *dwelling units* and *exit access* travel distance do not exceed the values in Table 1006.3.4(1) or 1006.3.4(2).
2. Rooms, areas and spaces complying with Section 1006.2.1 with *exits* that discharge directly to the exterior at the *level of exit discharge*, are permitted to have one *exit* or access to a single *exit*.
3. Parking garages where vehicles are mechanically parked shall be permitted to have one *exit* or access to a single *exit*.
4. Group R-3 and R-4 occupancies shall be permitted to have one *exit* or access to a single *exit*.
5. Individual single-story or multistory *dwelling units* shall be permitted to have a single *exit* or access to a single *exit* from the *dwelling unit* provided that both of the following criteria are met:
   5.1. The *dwelling unit* complies with Section 1006.2.1 as a space with one means of egress.
   5.2. Either the *exit* from the *dwelling unit* discharges directly to the exterior at the *level of exit discharge*, or the *exit* access outside the *dwelling unit*'s entrance door provides access to not less than two *approved* independent *exits*.

Revise as follows:

[BE] TABLE 1006.3.4(1) STORIES AND OCCUPIABLE ROOFS WITH ONE EXIT OR ACCESS TO ONE EXIT FOR R-2 OCCUPANCIES a,b

STORY OR OCCUPIABLE ROOF	OCCUPANCY	MAXIMUM NUMBER ~~OF DWELLING UNITS~~	MAXIMUM EXIT ACCESS TRAVEL DISTANCE
Basement, first, second or third story above grade plane and occupiable roofs over the first or second story above grade plane	R-2~~[a, b, c]~~ consisting of dwellint units	4 dwelling units	125 feet
	R-2 consisting of sleeping units	20 occupants	125 feet
Fourth story above grade plane and higher	NP	NA	NA

For SI: 1 foot = 304.8 mm.

NP = Not Permitted.

NA = Not Applicable.

a. Buildings classified as Group R-2 equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 and provided with emergency escape and rescue openings in accordance with Section 1031.

~~b. This table is used for Group R-2 occupancies consisting of dwelling units. For Group R-2 occupancies consisting of sleeping units, use Table 1006.3.4(2).~~

~~c.~~b. This table is for occupiable roofs accessed through and serving individual dwelling units or sleeping units in Group R-2 occupancies. For Group R-2 occupancies with occupiable roofs that are not accessed through and serving individual dwelling or sleeping units, use Table 1006.3.4(2).

[BE] TABLE 1006.3.4(2) STORIES AND OCCUPIABLE ROOFS WITH ONE EXIT OR ACCESS TO ONE EXIT FOR OTHER OCCUPANCIES

STORY AND OCCUPIABLE ROOF	OCCUPANCY	MAXIMUM OCCUPANT LOAD PER STORY AND OCCUPIABLE ROOF	MAXIMUM EXIT ACCESS TRAVEL DISTANCE (feet)
First story above or below grade plane and occupiable roofs over the first story above grade plane	A, B[a~~b~~], E, F[a~~b~~], M, U	49	75
	H-2, H-3	3	25
	H-4, H-5, I, ~~R-1, R-2~~[~~a, c~~]	10	75
	S[a, ~~b, d~~]	29	75
Second story above grade plane	B, F, M, S[~~bd~~]	29	75
Third story above grade plane and higher	NP	NA	NA

For SI: 1 foot = 304.8 mm.

NP = Not Permitted.

NA = Not Applicable.

~~a.~~ ~~Buildings classified as Group R-2 equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 and provided with emergency escape and rescue openings in accordance with Section 1031.~~

~~b.~~a. Group B, F and S occupancies in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or an occupiable roof of such buildings shall have a maximum exit access travel distance of 100 feet.

~~c.~~ ~~This table is used for Group R-2 occupancies consisting of sleeping units. For Group R-2 occupancies consisting of dwelling units, use Table 1006.3.4(1).~~

~~d.~~b. The length of exit access travel distance in a Group S-2 open parking garage shall be not more than 100 feet.

[BE] 1006.3.4.1 Mixed occupancies.

Where one *exit*, or *exit access stairway* or *ramp* providing access to *exits* at other stories, is permitted to serve individual stories, mixed occupancies shall be permitted to be served by single *exits* provided that each individual occupancy complies with the applicable requirements of Table 1006.3.4(1) or 1006.3.4(2) for that occupancy. Where applicable, cumulative *occupant loads* from adjacent occupancies shall be considered to be in accordance with the provisions of Section 1004.1. In each story of a mixed occupancy building, the maximum number of occupants served by a single *exit* shall be such that the sum of the ratios of the calculated number of occupants ~~of the~~ indicated in Table 1006.3.4(1) for Group R-2 sleeping units or Table 1006.3.4(2) for each occupancy does not exceed one. Where *dwelling units* are located on a story with other occupancies, the actual number of Group R-2 *dwelling units* divided by four plus the ratio from the other occupancy does not exceed one.

[BE] 1031.2 Where required.

In addition to the *means of egress* required by this chapter, *emergency escape and rescue openings* shall be provided in the following occupancies:

1. Group R-2 occupancies located in stories with only one *exit* or access to only one *exit* as permitted by ~~Tables~~ Table 1006.3.4(1) ~~and 1006.3.4(2)~~.
2. Group R-3 and R-4 occupancies.

Basements and sleeping rooms below the fourth *story above grade plane* shall have not fewer than one *emergency escape and rescue opening* in accordance with this section. Where *basements* contain one or more sleeping rooms, an *emergency escape and rescue opening* shall be required in each sleeping room, but shall not be required in adjoining areas of the *basement*. Such openings shall open directly into a *public way* or to a *yard* or *court* that opens to a *public way* , or to an egress balcony that leads to a *public way* .

Exceptions:

1. *Basements* with a ceiling height of less than 80 inches (2032 mm) shall not be required to have *emergency escape and rescue openings*.

2. *Emergency escape and rescue openings* are not required from *basements* or sleeping rooms that have an *exit* door or *exit access* door that opens directly into a *public way* or to a *yard*, *court* or exterior egress balcony that leads to a *public way*.
3. *Basements* without *habitable spaces* and having not more than 200 square feet (18.6 m^2) in floor area shall not be required to have *emergency escape and rescue openings*.
4. *Storm shelters* are not required to comply with this section where the shelter is constructed in accordance with ICC 500.
5. Within individual *dwelling* and *sleeping units* in Groups R-2 and R-3, where the building is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3, sleeping rooms in *basements* shall not be required to have *emergency escape and rescue openings* provided that the *basement* has one of the following:
   5.1. One *means of egress* and one *emergency escape and rescue opening*.
   5.2. Two *means of egress*.

Reason: The purpose of this code change is to coordinate and consolidate requirements for R-2 units in Tables 1006.2.1 (single exit space), 1006.3.4(1) and 1006.3.4(2) (singe exit buildings).

Proposal E17-15 increased the maximum occupant load for R-2 Occupancies from 10 to 20 occupants for single exit spaces stating that it's appropriate since Group R-2 occupancies require sprinkler protection per Section 903.3.1.1 or 903.3.1.2. and that the exit access travel distance is 125' in both Table 1006.2.1 and 1006.3.4(1). There is no logic for a unit on the 1st floor of single exit building to have a lower occupant load or a shorter travel distance. In addition, if 4 single exit dwelling units are permitted on the 2nd and 3rd floor of a Group R-2 building, why is a single exit dwelling not permitted at the 2nd floor of a mixed-use building? Please note that emergency escape and rescue openings would be required in the single exit building.The change to Sections 1006.3.4.1 and 1031.2 are editorial to recognize that R-2 is only in one table.

This proposal is submitted by the ICC Building Code Action Committee (BCAC) .

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC webpage.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0 - This will eliminate the need for a 2nd exterior door, and will allow for more efficient floor plan design. The options in floor plans is so wide ranging, it is not possible to determine costs.

Estimated Immediate Cost Impact Justification (methodology and variables):

This will only affect dwelling units on the basement, 1st or 2nd floor of a mixed-use building. This will most likely be no change in units less than 2,000 sq. ft. This will allow for a single exit in some apartments between 2,000 and 4,000 sq. ft., provided they can meet the exit access travel distance and provide EEROs.

E23-24

E24-24

IBC: 1006.3.4, 1006.3.5 (New), 1006.3.5.1 (New), 1006.3.5.2 (New), 1006.3.5.3 (New), 1006.3.5.4 (New), 1006.3.5.5 (New), 1006.3.5.6 (New), 1023.12, 1031.2; IFC: [BE] 1006.3.4, 1006.3.5 (New), 1006.3.5.1 (New), 1006.3.5.2 (New), 1006.3.5.3 (New), 1006.3.5.4 (New), 1006.3.5.5 (New), 1006.3.5.6 (New), [BE] 1023.12, [BE] 1031.2

Proponents: Stephen Smith, Center for Building in North America, Center for Building in North America (stephen@centerforbuilding.org); Scott Brody, Self (sbrody96@gmail.com); Trevor Acorn, PE SE, Myself (tjacorn@gmail.com)

2024 International Building Code

Revise as follows:

1006.3.4 Single exits.
A single *exit* or access to a single *exit* shall be permitted from any *story* or *occupiable roof* where one of the following conditions exists:

1. The *occupant load*, number of *dwelling units* and exit access travel distance do not exceed the values in Table 1006.3.4(1) or 1006.3.4(2).
2. Group R-2 occupancies complying with Section 1006.3.5.
3. ~~2~~3. Rooms, areas and spaces complying with Section 1006.2.1 with *exits* that discharge directly to the exterior at the *level of exit discharge*, are permitted to have one *exit* or access to a single *exit*.
4. ~~3~~4. Parking garages where vehicles are mechanically parked shall be permitted to have one *exit* or access to a single *exit*.
5. ~~4~~5. Group R-3 and R-4 occupancies shall be permitted to have one *exit* or access to a single *exit*.
6. ~~5~~6. Individual single-story or multistory *dwelling units* shall be permitted to have a single *exit* or access to a single *exit* from the *dwelling unit* provided that both of the following criteria are met:
   - ~~5.1~~ 6.1. The *dwelling unit* complies with Section 1006.2.1 as a space with one *means of egress*.
   - ~~5.2~~ 6.2. Either the exit from the *dwelling unit* discharges directly to the exterior at the *level of exit discharge*, or the *exit access* outside the *dwelling unit's* entrance door provides access to not less than two *approved* independent *exits*.

TABLE 1006.3.4(1) STORIES AND OCCUPIABLE ROOFS WITH ONE EXIT OR ACCESS TO ONE EXIT FOR R-2 OCCUPANCIES

STORY	OCCUPANCY	MAXIMUM NUMBER OF DWELLING UNITS	MAXIMUM EXIT ACCESS TRAVEL DISTANCE
Basement, first, second or third story above grade plane and occupiable roofs over the first or second story above grade plane	R-2[a, b, c]	4 dwelling units	125 feet
Fourth story above grade plane and higher	NP	NA	NA

For SI: 1 foot = 304.8 mm.

NP = Not Permitted.

NA = Not Applicable.

a. Buildings classified as Group R-2 equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 and provided with emergency escape and rescue openings in accordance with Section 1031.

b. This table is used for Group R-2 occupancies consisting of dwelling units. For Group R-2 occupancies consisting of sleeping units, use Table 1006.3.4(2).

c. This table is for occupiable roofs accessed through and serving individual dwelling units in Group R-2 occupancies. For Group R-2 occupancies with occupiable roofs that are not accessed through and serving individual units, use Table 1006.3.4(2).

TABLE 1006.3.4(2) STORIES AND OCCUPIABLE ROOFS WITH ONE EXIT OR ACCESS TO ONE EXIT FOR OTHER OCCUPANCIES

STORY AND OCCUPIABLE ROOF	OCCUPANCY	MAXIMUM OCCUPANT LOAD PER STORY AND OCCUPIABLE ROOF	MAXIMUM EXIT ACCESS TRAVEL DISTANCE (feet)
First story above or below grade plane and occupiable roofs over the first story above grade plane	A, B[b], E, F[b], M, U	49	75
	H-2, H-3	3	25
	H-4, H-5, I, R-1, R-2[a, c]	10	75
	S[b, d]	29	75
Second story above grade plane	B, F, M, S[d]	29	75
Third story above grade plane and higher	NP	NA	NA

For SI: 1 foot = 304.8 mm.

NP = Not Permitted.

NA = Not Applicable.

a. Buildings classified as Group R-2 equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 and provided with emergency escape and rescue openings in accordance with Section 1031.

b. Group B, F and S occupancies in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or an occupiable roof of such buildings shall have a maximum exit access travel distance of 100 feet.

c. This table is used for Group R-2 occupancies consisting of sleeping units. For Group R-2 occupancies consisting of dwelling units, use Table 1006.3.4(1).

d. The length of exit access travel distance in a Group S-2 open parking garage shall be not more than 100 feet.

1006.3.4.1 Mixed occupancies.
Where one *exit*, or *exit access stairway* or *ramp*providing access to exits at other *stories*, is permitted to serve individual *stories*, mixed occupancies shall be permitted to be served by single *exits* provided that each individual occupancy complies with the applicable requirements of Table 1006.3.4(1) or 1006.3.4(2) for that occupancy. Where applicable, cumulative *occupant loads*from adjacent occupancies shall be considered to be in accordance with the provisions of Section 1004.1. In each *story* of a mixed occupancy *building*, the maximum number of occupants served by a single exit shall be such that the sum of the ratios of the calculated number of occupants of the space divided by the allowable number of occupants indicated in Table 1006.3.4(2) for each occupancy does not exceed one. Where *dwelling units* are located on a story with other occupancies, the actual number of *dwelling units* divided by four plus the ratio from the other occupancy does not exceed one.

Add new text as follows:

1006.3.5 Group R-2 occupancies. In Group R-2 occupancies, a single exit shall be permitted from any story or occupiable roof where the number of dwelling units served per exit at each story comply with one of the following:

1. The basement and first through sixth story above grade plane with a maximum of 4 dwelling units served per exit on each story.
2. The basement and first through third story above grade plane with a maximum of 6 dwelling units served per exit on each story.

Such building shall comply with Sections 1006.3.5.1 through 1006.3.5.6.

1006.3.5.1 Construction type. The building is Type IA, IB, IIA, or IV construction.

1006.3.5.2 Corridors. Dwelling units that do not open directly into an exterior exit stairway shall exit directly to a corridor complying with Section 1020.

1006.3.5.3 Travel distance. Maximum exit access travel distance shall be not more than 125 feet (38.1 m). Travel distance from the exit access door of the unit to the exit door for the stairway shall be not more than 25 feet (7.62 m).

1006.3.5.4 Exit stairways. Means of egress shall be provided from each story above the level of exit discharge by an interior exit stairway or exterior exit stairway. Exit stairways shall be protected with 2-hour fire barriers in accordance with Section 707 or a 2-hour horizontal assemblies in accordance with Section 711. An interior exit stairway shall be a smokeproof enclosure in accordance with with

Section 909.20.

1006.3.5.5 Emergency escape and rescue openings. Emergency escape and rescue openings shall be provided in accordance with Section 1031.

1006.3.5.6 Mixed occupancies. Mixed occupancies shall be permitted at and below the level of exit discharge. Other occupancies shall not have direct access to the Group R-2 occupancy portion of the building or to the exit stairway serving the Group R-2 occupancy.

Exception: Parking garages and occupied roofs that serve the Group R-2 occupancy shall be permitted to have direct access to the exit stairway.

Revise as follows:

1023.12 Smokeproof enclosures.
Where required by Section 403.5.4, 405.7.2~~, or~~ 412.2.2.1 or 1006.3.5.4, interior exit *stairways* and *ramps* shall be *smokeproof enclosures* in accordance with Section 909.20.

1031.2 Where required.
In addition to the *means of egress* required by this chapter, *emergency escape and rescue openings* shall be provided in the following occupancies:

1. Group R-2 occupancies located in *stories* with only one *exit* or access to only one *exit* as permitted by Tables 1006.3.4(1) and 1006.3.4(2) and Section 1006.3.5.5.
2. Group R-3 and R-4 occupancies.

Basements and sleeping rooms below the fourth *story above grade plane* shall have not fewer than one *emergency escape and rescue opening* in accordance with this section. Where *basements* contain one or more sleeping rooms, an *emergency escape and rescue opening* shall be required in each sleeping room, but shall not be required in adjoining areas of the *basement*. Such openings shall open directly into a *public way* or to a *yard* or *court* that opens to a *public way, or to an egress balcony that leads to a public way*.

Exceptions:

1. *Basements* with a ceiling height of less than 80 inches (2032 mm) shall not be required to have *emergency escape and rescue openings*.
2. *Emergency escape and rescue openings* are not required from *basements* or sleeping rooms that have an *exit* door or *exit access* door that opens directly into a *public way* or to a *yard*, *court* or exterior egress balcony that leads to a *public way*.
3. *Basements* without *habitable spaces* and having not more than 200 square feet (18.6 m^2) in floor area shall not be required to have *emergency escape and rescue openings*.
4. *Storm shelters* are not required to comply with this section where the shelter is constructed in accordance with ICC 500.
5. Within individual *dwelling* and *sleeping units* in Groups R-2 and R-3, where the *building* is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3, *sleeping rooms* in *basements* shall not be required to have *emergency escape and rescue openings* provided that the *basement* has one of the following:
   5.1. One *means of egress* and one *emergency escape and rescue opening*.
   5.2. Two *means of egress*.

2024 International Fire Code

Revise as follows:

[BE] 1006.3.4 Single exits.
A single *exit* or access to a single *exit* shall be permitted from any story or *occupiable roof*, where one of the following conditions exists:

1. The *occupant load*, number of *dwelling units* and exit access travel distance do not exceed the values in Table 1006.3.4(1) or 1006.3.4(2).

2. Group R-2 occupancies complying with Section 1006.3.5.

~~2~~3. Rooms, areas and spaces complying with Section 1006.2.1 with *exits* that discharge directly to the exterior at the *level of exit discharge*, are permitted to have one *exit* or access to a single *exit*.

~~3~~4. Parking garages where vehicles are mechanically parked shall be permitted to have one *exit* or access to a single *exit*.

~~4~~5. Group R-3 and R-4 occupancies shall be permitted to have one *exit* or access to a single *exit*.

~~5~~6. Individual single-story or multistory *dwelling units* shall be permitted to have a single *exit* or access to a single *exit* from the *dwelling unit* provided that both of the following criteria are met:

   ~~5.1~~ 6.1. The *dwelling unit* complies with Section 1006.2.1 as a space with one *means of egress*.

   ~~5.2~~ 6.2. Either the exit from the *dwelling unit* discharges directly to the exterior at the *level of exit discharge*, or the *exit access* outside the *dwelling unit's* entrance door provides access to not less than two *approved* independent *exits*.

[BE] TABLE 1006.3.4(1) STORIES AND OCCUPIABLE ROOFS WITH ONE EXIT OR ACCESS TO ONE EXIT FOR R-2 OCCUPANCIES

STORY	OCCUPANCY	MAXIMUM NUMBER OF DWELLING UNITS	MAXIMUM EXIT ACCESS TRAVEL DISTANCE
Basement, first, second or third story above grade plane and occupiable roofs over the first or second story above grade plane	R-2[a, b, c]	4 dwelling units	125 feet
Fourth story above grade plane and higher	NP	NA	NA

For SI: 1 foot = 304.8 mm.

NP = Not Permitted.

NA = Not Applicable.

a. Buildings classified as Group R-2 equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 and provided with emergency escape and rescue openings in accordance with Section 1031.

b. This table is used for Group R-2 occupancies consisting of dwelling units. For Group R-2 occupancies consisting of sleeping units, use Table 1006.3.4(2).

c. This table is for occupiable roofs accessed through and serving individual dwelling units in Group R-2 occupancies. For Group R-2 occupancies with occupiable roofs that are not accessed through and serving individual units, use Table 1006.3.4(2).

[BE] TABLE 1006.3.4(2) STORIES AND OCCUPIABLE ROOFS WITH ONE EXIT OR ACCESS TO ONE EXIT FOR OTHER OCCUPANCIES

STORY AND OCCUPIABLE ROOF	OCCUPANCY	MAXIMUM OCCUPANT LOAD PER STORY AND OCCUPIABLE ROOF	MAXIMUM EXIT ACCESS TRAVEL DISTANCE (feet)
First story above or below grade plane and occupiable roofs over the first story above grade plane	A, B[b], E, F[b], M, U	49	75
	H-2, H-3	3	25
	H-4, H-5, I, R-1, R-2[a, c]	10	75
	S[b, d]	29	75
Second story above grade plane	B, F, M, S[d]	29	75
Third story above grade plane and higher	NP	NA	NA

For SI: 1 foot = 304.8 mm.

NP = Not Permitted.

NA = Not Applicable.

a. Buildings classified as Group R-2 equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 and provided with emergency escape and rescue openings in accordance with Section 1031.

b. Group B, F and S occupancies in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or an occupiable roof of such buildings shall have a maximum exit access travel distance of 100 feet.

c. This table is used for Group R-2 occupancies consisting of sleeping units. For Group R-2 occupancies consisting of dwelling units, use Table 1006.3.4(1).

d. The length of exit access travel distance in a Group S-2 open parking garage shall be not more than 100 feet.

[BE] 1006.3.4.1 Mixed occupancies.
Where one *exit*, or *exit access stairway* or *ramp* providing access to *exits* at other stories, is permitted to serve individual stories, mixed occupancies shall be permitted to be served by single *exits* provided that each individual occupancy complies with the applicable requirements of Table 1006.3.4(1) or 1006.3.4(2) for that occupancy. Where applicable, cumulative *occupant loads* from adjacent occupancies shall be considered to be in accordance with the provisions of Section 1004.1. In each story of a mixed occupancy building, the maximum number of occupants served by a single *exit* shall be such that the sum of the ratios of the calculated number of occupants of the space divided by the allowable number of occupants indicated in Table 1006.3.4(2) for each occupancy does not exceed one. Where *dwelling units* are located on a story with other occupancies, the actual number of *dwelling units* divided by four plus the ratio from the other occupancy does not exceed one.

Add new text as follows:

1006.3.5 Group R-2 occupancies. In Group R-2 occupancies, a single exit shall be permitted from any story or occupiable roof where the number of dwelling units served per exit at each story comply with one of the following:

1. The basement and first through sixth story above grade plane with a maximum of 4 dwelling units served per exit on each story.
2. The basement and first through third story above grade plane with a maximum of 6 dwelling units served per exit on each story.

Such building shall comply with Sections 1006.3.5.1 through 1006.3.5.7.

1006.3.5.1 Construction type.
The building is Type IA, IB, IIA, or IV construction.

1006.3.5.2 Corridors. Dwelling units that do not open directly into an exterior exit stairway shall exit directly to a corridor complying with Section 1020.

1006.3.5.3 Travel distance. Maximum exit access travel distance shall be not more than 125 feet (38.1 m). Travel distance from the exit access door of the unit to the exit door for the stairway shall be not more than 25 feet (7.62 m).

1006.3.5.4 Exit stairways. Means of egress shall be provided from each story above the level of exit discharge by an interior exit stairway or exterior exit stairway. Exit stairways shall be protected with 2-hour fire barriers in accordance with Section 707 or a 2-hour horizontal assemblies in accordance with Section 711. An interior exit stairway shall be a smokeproof enclosure in accordance with with Section 909.20.

1006.3.5.5 Emergency escape and rescue openings. Emergency escape and rescue openings shall be provided in accordance with Section 1031.

1006.3.5.6 Mixed occupancies. Mixed occupancies shall be permitted in the building provided there are no exit access doors into the dwelling units or dwelling unit corridors directly from the other occupancies. Other occupancies shall not communicate with the Group R-2 occupancy portion of the building or with a single-exit stairway.

Exception: Parking garages and occupied roofs that serve the Group R-2 occupancy shall be permitted to communicate with the exit stairway.

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Revise as follows:

[BE] 1023.12 Smokeproof enclosures.
Where required by Section 403.5.4, 405.7.2~~, or~~ 412.2.2.1 or 1006.3.5.4, interior exit *stairways* and *ramps* shall be *smokeproof enclosures* in accordance with Section 909.20.

[BE] 1031.2 Where required.
In addition to the *means of egress* required by this chapter, *emergency escape and rescue openings* shall be provided in the following occupancies:

1. Group R-2 occupancies located in *stories* with only one *exit* or access to only one *exit* as permitted by Tables 1006.3.4(1) and 1006.3.4(2) and Section 1006.3.5.5.
2. Group R-3 and R-4 occupancies.

Basements and sleeping rooms below the fourth *story above grade plane* shall have not fewer than one *emergency escape and rescue opening* in accordance with this section. Where *basements* contain one or more sleeping rooms, an *emergency escape and rescue opening* shall be required in each sleeping room, but shall not be required in adjoining areas of the *basement*. Such openings shall open directly into a *public way* or to a *yard* or *court* that opens to a *public way* , or to an egress balcony that leads to a *public way* .

Exceptions:

1. *Basements* with a ceiling height of less than 80 inches (2032 mm) shall not be required to have *emergency escape and rescue openings*.
2. *Emergency escape and rescue openings* are not required from *basements* or sleeping rooms that have an *exit* door or *exit access* door that opens directly into a *public way* or to a *yard*, *court* or exterior egress balcony that leads to a *public way*.
3. *Basements* without *habitable spaces* and having not more than 200 square feet (18.6 m^2) in floor area shall not be required to have *emergency escape and rescue openings*.
4. *Storm shelters* are not required to comply with this section where the shelter is constructed in accordance with ICC 500.
5. Within individual *dwelling* and *sleeping units* in Groups R-2 and R-3, where the building is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3, sleeping rooms in *basements* shall not be required to have *emergency escape and rescue openings* provided that the *basement* has one of the following:
   5.1. One *means of egress* and one *emergency escape and rescue opening*.
   5.2. Two *means of egress*.

Attached Files

- **Single-stair proposal attachment.pdf**
  https://www.cdpaccess.com/proposal/10412/30836/files/download/4800/

Reason: Please refer to our attachment for an in-depth discussion of life safety and other issues.

The 2024 International Building Code allows buildings up to three stories of R-2 occupancy to have up to four dwelling units at each story served by a single exit. Our proposal acknowledges the rising demand for infill multifamily development and a growing movement across the United States to modify local building codes for this purpose. We recommend enabling a single exit to serve up to six stories of R-2 occupancy above the grade plane, or up to six units per floor in cases of at most three stories.

In return for the increased height or dwelling unit allowance, buildings would adhere to more stringent conditions than a traditional building. The building would be of Type IA, IB, IIA, or IV 1-hour fire resistant construction, dwelling units could not directly access the exit, active or passive smoke control systems would be required in the single exit, and there would be strict limits on travel distances and the number of dwelling units per floor. The whole suite of ordinary fire safety measures contained in the IBC – access to the building by fire apparatus, fire sprinklers, etc. – would also still apply.

Our language is adapted from codes in Seattle, Honolulu, New York City, and Western European countries, collectively forming the most rigorous set of conditions for six-story buildings in the developed world. The limitations and requirements in our proposal match or exceed those in cities, suburbs, and rural areas around the developed world, where fire death rates are at or below the United States median. Within the U.S., Seattle, Honolulu, and New York City have allowed buildings with generally fewer restrictions, to no ill effect or local controversy, and no major fires that we are aware of.

Our proposal is intentionally cautious and may be subject to adjustment in future code cycles based on additional research and experience, expanding possibilities for such construction.

Bibliography: See attached.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

We believe the cost of constructing multifamily buildings on small lots will decrease by roughly 7 percent, in line with the reduction in circulation area required.

Estimated Immediate Cost Impact Justification (methodology and variables):

See attachment for details.

E24-24

E25-24

IBC: 1006.3.4, 1006.3.5 (New), 1006.3.5.1 (New), 1006.3.5.2 (New), 1006.3.5.3 (New), 1006.5.3.4 (New), 1006.3.5.5 (New), 1006.3.5.6 (New), 1006.3.5.7 (New), 1023.12, 1031.2; IFC: [BE] 1006.3.4, 1006.3.5 (New), 1006.3.5.1 (New), 1006.3.5.2 (New), 1006.3.5.3 (New), 1006.5.3.4 (New), 1006.3.5.5 (New), 1006.3.5.6 (New), 1006.3.5.7 (New), [BE] 1023.12, [BE] 1031.2

Proponents: Scott Brody, Self (sbrody96@gmail.com)

2024 International Building Code

Revise as follows:

1006.3.4 Single exits.

A single *exit* or access to a single *exit* shall be permitted from any *story* or *occupiable roof* where one of the following conditions exists:

1. The *occupant load*, number of *dwelling units* and exit access travel distance do not exceed the values in Table 1006.3.4(1) or 1006.3.4(2).

2. Group R-1 and R-2 occupancies complying with Section 1006.3.5.

~~2~~3. Rooms, areas and spaces complying with Section 1006.2.1 with *exits* that discharge directly to the exterior at the *level of exit discharge*, are permitted to have one *exit* or access to a single *exit*.

~~3~~4. Parking garages where vehicles are mechanically parked shall be permitted to have one *exit* or access to a single *exit*.

~~4~~5. Group R-3 and R-4 occupancies shall be permitted to have one *exit* or access to a single *exit*.

~~5~~6. Individual single-story or multistory *dwelling units* shall be permitted to have a single *exit* or access to a single *exit* from the *dwelling unit* provided that both of the following criteria are met:

   ~~5.1~~ 6.1. The *dwelling unit* complies with Section 1006.2.1 as a space with one *means of egress*.

   ~~5.2~~ 6.2. Either the exit from the *dwelling unit* discharges directly to the exterior at the *level of exit discharge*, or the *exit access* outside the *dwelling unit's* entrance door provides access to not less than two *approved* independent *exits*.

TABLE 1006.3.4(1) STORIES AND OCCUPIABLE ROOFS WITH ONE EXIT OR ACCESS TO ONE EXIT FOR R-2 OCCUPANCIES

STORY	OCCUPANCY	MAXIMUM NUMBER OF DWELLING UNITS	MAXIMUM EXIT ACCESS TRAVEL DISTANCE
Basement, first, second or third story above grade plane and occupiable roofs over the first or second story above grade plane	R-2[a, b, c]	4 dwelling units	125 feet
Fourth story above grade plane and higher	NP	NA	NA

For SI: 1 foot = 304.8 mm.

NP = Not Permitted.

NA = Not Applicable.

a. Buildings classified as Group R-2 equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 and provided with emergency escape and rescue openings in accordance with Section 1031.

b. This table is used for Group R-2 occupancies consisting of dwelling units. For Group R-2 occupancies consisting of sleeping units, use Table 1006.3.4(2).

c. This table is for occupiable roofs accessed through and serving individual dwelling units in Group R-2 occupancies. For Group R-2 occupancies with occupiable roofs that are not accessed through and serving individual units, use Table 1006.3.4(2).

TABLE 1006.3.4(2) STORIES AND OCCUPIABLE ROOFS WITH ONE EXIT OR ACCESS TO ONE EXIT FOR OTHER OCCUPANCIES

STORY AND OCCUPIABLE ROOF	OCCUPANCY	MAXIMUM OCCUPANT LOAD PER STORY AND OCCUPIABLE ROOF	MAXIMUM EXIT ACCESS TRAVEL DISTANCE (feet)
First story above or below grade plane and occupiable roofs over the first story	A, B[b], E, F[b], M, U	49	75

above grade plane STORY AND OCCUPIABLE ROOF	OCCUPANCY	MAXIMUM OCCUPANT LOAD PER STORY AND OCCUPIABLE ROOF	MAXIMUM EXIT ACCESS TRAVEL DISTANCE (feet)
	H-2, H-3	3	25
	H-4, H-5, I, R-1, R-2[a, c]	10	75
	S[b, d]	29	75
Second story above grade plane	B, F, M, S[d]	29	75
Third story above grade plane and higher	NP	NA	NA

For SI: 1 foot = 304.8 mm.

NP = Not Permitted.

NA = Not Applicable.

a. Buildings classified as Group R-2 equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 and provided with emergency escape and rescue openings in accordance with Section 1031.

b. Group B, F and S occupancies in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or an occupiable roof of such buildings shall have a maximum exit access travel distance of 100 feet.

c. This table is used for Group R-2 occupancies consisting of sleeping units. For Group R-2 occupancies consisting of dwelling units, use Table 1006.3.4(1).

d. The length of exit access travel distance in a Group S-2 open parking garage shall be not more than 100 feet.

1006.3.4.1 Mixed occupancies.
Where one *exit*, or *exit access stairway* or *ramp* providing access to exits at other *stories*, is permitted to serve individual *stories* , mixed occupancies shall be permitted to be served by single *exits* provided that each individual occupancy complies with the applicable requirements of Table 1006.3.4(1) or 1006.3.4(2) for that occupancy. Where applicable, cumulative *occupant loads* from adjacent occupancies shall be considered to be in accordance with the provisions of Section 1004.1. In each *story* of a mixed occupancy *building*, the maximum number of occupants served by a single exit shall be such that the sum of the ratios of the calculated number of occupants of the space divided by the allowable number of occupants indicated in Table 1006.3.4(2) for each occupancy does not exceed one. Where *dwelling units* are located on a story with other occupancies, the actual number of *dwelling units* divided by four plus the ratio from the other occupancy does not exceed one.

Add new text as follows:

1006.3.5 Group R-1 and R-2 occupancies. In Group R-1 and R-2 occupancies, a single exit shall be permitted from any story or occupiable roof where the number of dwelling units served per exit at each story comply with one of the following:

1. The basement and first through sixth story above grade plane with a maximum of 4 dwelling units or sleeping units per story.
2. The basement and first through third story above grade plane with a maximum of 6 dwelling units or sleeping units per story.

Such building shall comply with Sections 1006.3.5.1 through 1006.3.5.7.

1006.3.5.1 Construction type. The building is Type IA, IB, IIA, or IV construction.

1006.3.5.2 Automatic sprinkler system. An automatic sprinkler system shall be installed throughout in accordance with Section 903.3.1.1.

1006.3.5.3 Corridors. Dwelling units or sleeping units that do not open directly into an exterior exit stairway shall exit directly to a corridor complying with Section 1020.

1006.5.3.4 Travel distance. For Group R-1, the maximum exit access travel distance shall be not more than 75 feet (22.9 m). For Group R-2, the maximum exit access travel distance shall be not more than 125 feet (38.1 m). Travel distance from the exit access door of the unit to the exit door for the stairway shall be not more than 25 feet (7.62 m).

<u>1006.3.5.5</u> <u>Exit stairways</u>. <u>Means of egress shall be provided from each story above the level of exit discharge by an interior exit stairway or exterior exit stairway. Exit stairways shall be protected with 2-hour fire barriers in accordance with Section 707 or a 2-hour horizontal assemblies in accordance with Section 711. An interior exit stairway shall be a smokeproof enclosure in accordance with with Section 909.20.</u>

<u>1006.3.5.6</u> <u>Emergency escape and rescue openings</u>. <u>Emergency escape and rescue openings shall be provided in accordance with Section 1031.</u>

<u>1006.3.5.7</u> <u>Mixed occupancies</u>. <u>Mixed occupancies shall be permitted at and below the level of exit discharge. Other occupancies shall not have direct access to the Group R-1 and R-2 occupancy portion of the building or to the exit stairway serving the Group R-1 and R-2 occupancy.</u>

<u>**Exception:** Parking garages and occupied roofs that serve the Group R-1 and R-2 occupancy shall be permitted to have direct access to the exit stairway.</u>

Revise as follows:

1023.12 Smokeproof enclosures.

Where required by Section 403.5.4, 405.7.2<u>,</u> ~~or~~ 412.2.2.1 <u>or 1006.3.5.5</u>, interior exit *stairways* and *ramps* shall be *smokeproof enclosures* in accordance with Section 909.20.

1031.2 Where required.

In addition to the *means of egress* required by this chapter, *emergency escape and rescue openings* shall be provided in the following occupancies:

1. Group R-2 occupancies located in *stories* with only one *exit* or access to only one *exit* as permitted by Tables 1006.3.4(1) and 1006.3.4(2).
2. Group R-3 and R-4 occupancies.
3. <u>Group R-1 and R-2 occupancies located in stories with one one exit as permitted by Section 1006.3.5.</u>

Basements and sleeping rooms below the fourth *story above grade plane* shall have not fewer than one *emergency escape and rescue opening* in accordance with this section. Where *basements* contain one or more sleeping rooms, an *emergency escape and rescue opening* shall be required in each sleeping room, but shall not be required in adjoining areas of the *basement*. Such openings shall open directly into a *public way* or to a *yard* or *court* that opens to a *public way, or to an egress balcony that leads to a public way* .

Exceptions:

1. *Basements* with a ceiling height of less than 80 inches (2032 mm) shall not be required to have *emergency escape and rescue openings*.
2. *Emergency escape and rescue openings* are not required from *basements* or sleeping rooms that have an *exit* door or *exit access* door that opens directly into a *public way* or to a *yard*, *court* or exterior egress balcony that leads to a *public way*.
3. *Basements* without *habitable spaces* and having not more than 200 square feet (18.6 m^2) in floor area shall not be required to have *emergency escape and rescue openings*.
4. *Storm shelters* are not required to comply with this section where the shelter is constructed in accordance with ICC 500.
5. Within individual *dwelling* and *sleeping units* in Groups R-2 and R-3, where the *building* is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3, *sleeping rooms* in *basements* shall not be required to have *emergency escape and rescue openings* provided that the *basement* has one of the following:
   5.1. One *means of egress* and one *emergency escape and rescue opening*.
   5.2. Two *means of egress*.

2024 International Fire Code

Revise as follows:

[BE] 1006.3.4 Single exits.

A single *exit* or access to a single *exit* shall be permitted from any story or *occupiable roof*, where one of the following conditions exists:

1. The *occupant load*, number of *dwelling units* and exit access travel distance do not exceed the values in Table 1006.3.4(1) or 1006.3.4(2).
2. Group R-1 and R-2 occupancies complying with Section 1006.3.5.
3. ~~2~~3. Rooms, areas and spaces complying with Section 1006.2.1 with *exits* that discharge directly to the exterior at the *level of exit discharge*, are permitted to have one *exit* or access to a single *exit*.
4. ~~3~~4. Parking garages where vehicles are mechanically parked shall be permitted to have one *exit* or access to a single *exit*.
5. ~~4~~5. Group R-3 and R-4 occupancies shall be permitted to have one *exit* or access to a single *exit*.
6. ~~5~~6. Individual single-story or multistory *dwelling units* shall be permitted to have a single *exit* or access to a single *exit* from the *dwelling unit* provided that both of the following criteria are met:
    - ~~5.1~~ 6.1. The *dwelling unit* complies with Section 1006.2.1 as a space with one *means of egress*.
    - ~~5.2~~ 6.2. Either the exit from the *dwelling unit* discharges directly to the exterior at the *level of exit discharge*, or the *exit access* outside the *dwelling unit's* entrance door provides access to not less than two *approved* independent *exits*.

[BE] TABLE 1006.3.4(1) STORIES AND OCCUPIABLE ROOFS WITH ONE EXIT OR ACCESS TO ONE EXIT FOR R-2 OCCUPANCIES

STORY	OCCUPANCY	MAXIMUM NUMBER OF DWELLING UNITS	MAXIMUM EXIT ACCESS TRAVEL DISTANCE
Basement, first, second or third story above grade plane and occupiable roofs over the first or second story above grade plane	R-2[a, b, c]	4 dwelling units	125 feet
Fourth story above grade plane and higher	NP	NA	NA

For SI: 1 foot = 304.8 mm.

NP = Not Permitted.

NA = Not Applicable.

a. Buildings classified as Group R-2 equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 and provided with emergency escape and rescue openings in accordance with Section 1031.

b. This table is used for Group R-2 occupancies consisting of dwelling units. For Group R-2 occupancies consisting of sleeping units, use Table 1006.3.4(2).

c. This table is for occupiable roofs accessed through and serving individual dwelling units in Group R-2 occupancies. For Group R-2 occupancies with occupiable roofs that are not accessed through and serving individual units, use Table 1006.3.4(2).

[BE] TABLE 1006.3.4(2) STORIES AND OCCUPIABLE ROOFS WITH ONE EXIT OR ACCESS TO ONE EXIT FOR OTHER OCCUPANCIES

STORY AND OCCUPIABLE ROOF	OCCUPANCY	MAXIMUM OCCUPANT LOAD PER STORY AND OCCUPIABLE ROOF	MAXIMUM EXIT ACCESS TRAVEL DISTANCE (feet)
First story above or below grade plane and occupiable roofs over the first story above grade plane	A, B[b], E, F[b], M, U	49	75
	H-2, H-3	3	25
	H-4, H-5, I, R-1, R-2[a, c]	10	75
	S[b, d]	29	75
Second story above grade plane	B, F, M, S[d]	29	75
Third story above grade plane and higher	NP	NA	NA

For SI: 1 foot = 304.8 mm.

NP = Not Permitted.

NA = Not Applicable.

a. Buildings classified as Group R-2 equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 and provided with emergency escape and rescue openings in accordance with Section 1031.

b. Group B, F and S occupancies in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or an occupiable roof of such buildings shall have a maximum exit access travel distance of 100 feet.

c. This table is used for Group R-2 occupancies consisting of sleeping units. For Group R-2 occupancies consisting of dwelling units, use Table 1006.3.4(1).

d. The length of exit access travel distance in a Group S-2 open parking garage shall be not more than 100 feet.

[BE] 1006.3.4.1 Mixed occupancies.
Where one *exit*, or *exit access stairway* or *ramp* providing access to *exits* at other stories, is permitted to serve individual stories, mixed occupancies shall be permitted to be served by single *exits* provided that each individual occupancy complies with the applicable requirements of Table 1006.3.4(1) or 1006.3.4(2) for that occupancy. Where applicable, cumulative *occupant loads* from adjacent occupancies shall be considered to be in accordance with the provisions of Section 1004.1. In each story of a mixed occupancy building, the maximum number of occupants served by a single *exit* shall be such that the sum of the ratios of the calculated number of occupants of the space divided by the allowable number of occupants indicated in Table 1006.3.4(2) for each occupancy does not exceed one. Where *dwelling units* are located on a story with other occupancies, the actual number of *dwelling units* divided by four plus the ratio from the other occupancy does not exceed one.

Add new text as follows:

1006.3.5 Group R-1 and R-2 occupancies. In Group R-1 and R-2 occupancies, a single exit shall be permitted from any story or occupiable roof where the number of dwelling units served per exit at each story comply with one of the following:

1. The basement and first through sixth story above grade plane with a maximum of 4 dwelling units or sleeping units per story.
2. The basement and first through third story above grade plane with a maximum of 6 dwelling units or sleeping units per story.

Such building shall comply with Sections 1006.3.5.1 through 1006.3.5.7.

1006.3.5.1 Construction type. The building is Type IA, IB, IIA, or IV construction.

1006.3.5.2 Automatic sprinkler system. An automatic sprinkler system shall be installed throughout in accordance with Section 903.3.1.1.

1006.3.5.3 Corridors. Dwelling units or sleeping units that do not open directly into an exterior exit stairway shall exit directly to a corridor complying with Section 1020.

1006.5.3.4 Travel distance. For Group R-1, the maximum exit access travel distance shall be not more than 75 feet (22.9 m). For Group R-2, the maximum exit access travel distance shall be not more than 125 feet (38.1 m). Travel distance from the exit access door of the unit to the exit door for the stairway shall be not more than 25 feet (7.62 m).

1006.3.5.5 Exit stairways. Means of egress shall be provided from each story above the level of exit discharge by an interior exit stairway or exterior exit stairway. Exit stairways shall be protected with 2-hour fire barriers in accordance with Section 707 or a 2-hour horizontal assemblies in accordance with Section 711. An interior exit stairway shall be a smokeproof enclosure in accordance with with Section 909.20.

1006.3.5.6 Emergency escape and rescue openings. Emergency escape and rescue openings shall be provided in accordance with

Section 1031.

1006.3.5.7 Mixed occupancies. Mixed occupancies shall be permitted at and below the level of exit discharge. Other occupancies shall not have direct access to the Group R-1 and R-2 occupancy portion of the building or to the exit stairway serving the Group R-1 and R-2 occupancy.

Exception: Parking garages and occupied roofs that serve the Group R-1 and R-2 occupancy shall be permitted to have direct access to the exit stairway.

Revise as follows:

[BE] 1023.12 Smokeproof enclosures.
Where required by Section 403.5.4, 405.7.2, ~~or~~ 412.2.2.1 or 1006.3.5.5, interior exit *stairways* and *ramps* shall be *smokeproof enclosures* in accordance with Section 909.20.

[BE] 1031.2 Where required.
In addition to the *means of egress* required by this chapter, *emergency escape and rescue openings* shall be provided in the following occupancies:

1. Group R-2 occupancies located in stories with only one *exit* or access to only one *exit* as permitted by Tables 1006.3.4(1) and 1006.3.4(2).
2. Group R-3 and R-4 occupancies.
3. Group R-1 and R-2 occupancies located in stories with one one exit as permitted by Section 1006.3.5.

Basements and sleeping rooms below the fourth *story above grade plane* shall have not fewer than one *emergency escape and rescue opening* in accordance with this section. Where *basements* contain one or more sleeping rooms, an *emergency escape and rescue opening* shall be required in each sleeping room, but shall not be required in adjoining areas of the *basement*. Such openings shall open directly into a *public way* or to a *yard* or *court* that opens to a *public way* , or to an egress balcony that leads to a *public way* .

Exceptions:

1. *Basements* with a ceiling height of less than 80 inches (2032 mm) shall not be required to have *emergency escape and rescue openings*.
2. *Emergency escape and rescue openings* are not required from *basements* or sleeping rooms that have an *exit* door or *exit access* door that opens directly into a *public way* or to a *yard*, *court* or exterior egress balcony that leads to a *public way*.
3. *Basements* without *habitable spaces* and having not more than 200 square feet (18.6 m^2) in floor area shall not be required to have *emergency escape and rescue openings*.
4. *Storm shelters* are not required to comply with this section where the shelter is constructed in accordance with ICC 500.
5. Within individual *dwelling* and *sleeping units* in Groups R-2 and R-3, where the building is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3, sleeping rooms in *basements* shall not be required to have *emergency escape and rescue openings* provided that the *basement* has one of the following:
   5.1. One *means of egress* and one *emergency escape and rescue opening*.
   5.2. Two *means of egress*.

Attached Files

- **Single-stair proposal attachment (2).pdf**
  https://www.cdpaccess.com/proposal/9653/28764/files/download/4799/

Reason: Many years ago, fire officials drafted codes based on their intuition of what's safest. These codes saved lives, but not all rules remain consistent with evidence. Hundreds of thousands of fires occur annually, resulting in several thousand deaths a year. There is further a huge amount of evidence internationally. Therefore, even if past performance cannot predict every single possibility, there is enough data to say past performance closely reflects the level of risk. Old assumptions from before the Internet age, and before the advent of more modern fire-safety technologies, warrant fresh reexamination. I am accordingly proposing a new code section, because the existing requirements appear based on the following erroneous assumptions:

1) Bigger buildings with more staircases are safer than smaller buildings with fewer staircases.

2) Redundant staircases are so beneficial that it is safer to provide two nearby staircases without smoke control than a single staircase which resists smoke contamination via elements such as being open air, having a smoke-resistant vestibule with automatic opening windows, or being protected with a pressurization system.

3) Transient occupancies like hotels are more dangerous than ordinary dwellings, even when accounting for the additional protective features this construction type is typically required to follow.

All these assumptions are challenged by data. Therefore, it is imperative that the code be updated to provide fair treatment based on risk.

Previously, I assisted two other individuals to support a code change proposal in R-2 (non-transient) single exit cases. That proposal (10412) contains a reason statement, based on citations, that explains why small single exit buildings with enhanced protectives experience satisfactory safety performance. Please accept that proposal's reason statement here as well. Please additionally accept the following reasoning in support of extending allowances to hotels:

Per NFPA's latest Home Structure Fires Report, 49% of fires involve cooking. Cooking is much less likely to occur in hotel/motel occupancies because many rooms don't include kitchens. Even a room does include a kitchen or kitchenette, it may be less utilized if the hotel offers breakfast, people receive other meals at events like conferences or weddings, or they choose to use limited vacation time to go to restaurants vs shopping for ingredients and cooking themselves.

The second highest fatality generator is heating equipment, such as space heaters. These fires cause 13% of deaths. I don't have data on this, but reasonably believe people don't commonly travel to hotels with space heaters. If they come on an airplane, carrying heaters would waste baggage space and consume unnecessary weight allowance.

The final point on the NFPA list I will note is smoking materials. These are the 5th largest cause of fatal fires, generating 5% of deaths. Since many hotels are smoke-free, this is also less of a risk in this case.

In all, since potentially close to 2/3rds of the fire causes are eliminated, it is unjust for hotels to face stricter stairway requirements than similarly sized non-transient occupancies.

This risk argument is further supported by the 2010 US Fire Administration report on hotel fires. This shows hotels/motels experience less than half the number of fatalities per 1000 fires. Though injuries are slightly higher, since this is from 2005-2007 data, I wouldn't be surprised if the injury rate is now also lower in hotels, considering the proportion of new hotels fitted with sprinklers vs new single-family homes. On the subject of exit knowledge, since we are talking such small corridors, the hazard of people getting lost is extremely low. Further, research has linked central stair placement with huge increases in utilization of the stairs vs elevator. We can therefore expect more people to be familiar with the stair location in a small single stairway case vs the other scenario. If we are still concerned about wayfinding, this proposal could be amended to require low level egress path markers compliant with UL 1994, to reinforce the exit location.

Across the US and world, there are many small-scale hotels centered around an ornate central staircase. Some operate as bed and breakfasts. In the US, these buildings are often allowed due to their historic nature or are illegal conversions rented online. Given the demand for home-like transient buildings, the fire code should provide more options for this. Doing so will encourage more people to act under the purview of regulators, vs under-the-table operations.

As a final note, if the code committee is not comfortable going up to 6 stories single stair in this case, I believe they should at least raise the R1 single stair allowance to 3 or 4 stories. This would better reflect the level of risk in R1 vs R2 cases.

Bibliography: 1. Hall, S. Home Structure Fires Report. *National Fire Protection Association*. 2023. https://www.nfpa.org/education-and-research/research/nfpa-research/fire-statistical-reports/home-structure-fires

2. Hotel and Motel Fires. Topical Fire Report Series. Volume 10, Issue 4 / January 2010. US Fire

Administration. https://apps.usfa.fema.gov/downloads/pdf/statistics/v10i4.pdf

3. Bassett DR, Browning R, Conger SA, Wolff DL, Flynn JI. Architectural design and physical activity: an observational study of staircase and elevator use in different buildings. J Phys Act Health. 2013 May;10(4):556-62. https://doi.org/10.1123/jpah.10.4.556

SEE ADDITIONAL SOURCES IN Proposal 10412

Cost Impact: Decrease

Estimated Immediate Cost Impact:

Since this allows for a new type of construction not currently allowed, there are no immediate cost impacts.

Compared with an existing allowed building, we expect a 7% new construction cost decrease. This is based on additional floor area not consumed by stairwells and inefficient corridors. The actual usable area would increase closer to 9%, but we assume some savings would be offset by investments in more advanced protectives such as smoke control systems. Thus, for a $2,000,000 small hotel, the costs would fall by $14,000.

Estimated Immediate Cost Impact Justification (methodology and variables):

See Proposal 10412 attachment for additional cost details.

Estimated Life Cycle Cost Impact:

Estimated to be similar to the initial cost savings (7%), mainly due to lower HVAC costs, less maintenance of materials, and more leasable area.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

See Proposal 10412 attachment for additional cost details.

E25-24

E26-24

IBC: 1007.1.1.1, 1017.3; IFC: [BE] 1007.1.1.1, [BE] 1017.3

Proponents: Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org)

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Revise as follows:

1007.1.1.1 Measurement point.
The separation distance required in Section 1007.1.1 shall be measured in accordance with the following:

1. The separation distance to *exit* or *exit access doorways* shall be measured to any point along the width of the doorway.
2. The separation distance to *exit access stairways* shall be measured to the closest riser.
3. The separation distance to *exit access ramps* shall be measured to the start of the ramp run.
4. Where an exterior exit stairway or ramp connects to an open-ended corridor or an egress balcony, the separation distance shall be measured to the closest riser or start of the ramp run.

1017.3 Measurement.
Exit access travel distance shall be measured from the most remote point of each room, area or space along the natural and unobstructed path of horizontal and vertical egress travel to the entrance to an *exit*. Where more than one exit is required, *exit* access travel distance shall be measured to the nearest exit.

Exceptions:

1. In *open parking garages*, *exit access* travel distance is permitted to be measured to the closest riser of an *exit access stairway* or the closest slope of an *exit access ramp*.
2. In *smoke protected seating* and *open air assembly seating*, exit access travel distance shall be measured in accordance with Section 1030.7.
3. Where an exterior exit stairway or ramp serves an open-ended corridor or an egress balcony, the exit access travel distance shall be measured to the closest riser or start of the ramp run.

2024 International Fire Code

Revise as follows:

[BE] 1007.1.1.1 Measurement point.
The separation distance required in Section 1007.1.1 shall be measured in accordance with the following:

1. The separation distance to *exit* or *exit access doorways* shall be measured to any point along the width of the doorway.
2. The separation distance to *exit access stairways* shall be measured to the closest riser.
3. The separation distance to *exit access ramps* shall be measured to the start of the *ramp* run.
4. Where an exterior exit stairway or ramp connects to an open-ended corridor or an egress balcony, the separation distance shall be measured to the closest riser or start of the ramp run.

[BE] 1017.3 Measurement.
Exit access travel distance shall be measured from the most remote point of each room, area or space along the natural and unobstructed path of horizontal and vertical egress travel to the entrance to an *exit*. Where more than one *exit* is required, *exit access* travel distance shall be measured to the nearest *exit*.

Exceptions:

1. In open parking garages, exit access travel distance is permitted to be measured to the closest riser of an *exit access stairway* or the closest slope of an *exit access ramp*.

2. In smoke-protected seating and open-air assembly seating, *exit access* travel distance shall be measured in accordance with Section 1030.7.
3. Where an exterior exit stairway or ramp serves an open-ended corridor or an egress balcony, the exit access travel distance shall be measured to the closest riser or start of the ramp run.

Reason: There is not a clear location for separation or travel distance measurement for exit stairway and ramps permitted where exterior exit stairways or ramps connected to open ended corridors and egress balconies. The added language would address those situations and is consistent with open exit access stairways and ramps.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).
BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC webpage.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is a clarification of current requirements for how to measure exterior exit stairways or ramps where there is not an exit enclosure.

E26-24

E27-24

IBC: 1007.1.2; IFC: [BE] 1007.1.2

Proponents: Ray Steadward, Town of Enfield CT, CT Code Development (rsteadward@enfield.org)

2024 International Building Code

Revise as follows:

1007.1.2 Three or more exits or exit access doorways. Where access to three or more *exits* is required, not less than two *exit* or *exit access doorways* shall be arranged in accordance with the provisions of Section 1007.1.1. Additional required *exit* or *exit access doorways* shall ~~be arranged a reasonable distance apart so that if one becomes blocked, the others will be available.~~ have a separation distance of not less than one-quarter of the length of the maximum overall diagonal dimension of the area served from any other required exit unless approved.

2024 International Fire Code

Revise as follows:

[BE] 1007.1.2 Three or more exits or exit access doorways.
Where access to three or more *exits* is required, not less than two *exit* or *exit access doorways* shall be arranged in accordance with the provisions of Section 1007.1.1. Additional required *exit* or *exit access doorways* shall ~~be arranged a reasonable distance apart so that if one becomes blocked, the others will be available.~~ have a separation distance of not less than one-quarter of the length of the maximum overall diagonal dimension of the area served from any other required exit unless approved.

Reason: The term “reasonable distance” is very subjective. A minimum identifier needs to be added to eliminate the ambiguity.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This will not increase the cost of construction, it provides direction on the intent of the code.

E27-24

E28-24

IBC: 1008.2.1, 1011.3, 1011.6, 1011.7.1, 1011.13, 1023.9, 1027.5, 2406.4.6; IFC: [BE] 1008.2.1, [BE] 1011.3, [BE] 1011.6, [BE] 1011.7.1, [BE] 1011.13, [BE] 1023.9, [BE] 1027.5

Proponents: David Cooper, Stair Manufacturing and Design Consultants, Stairbuilders and Manufacturers Association, SMA (coderep@stairways.org)

2024 International Building Code

Revise as follows:

1008.2.1 Illumination level under normal power.
The *means of egress* illumination level shall be not less than 1 footcandle (11 lux) at the walking surface. Along *exit access stairways*, and exit stairways ~~and at their required landings~~, the illumination level shall not be less than 10 footcandles (108 lux) at the walking surface when the *stairway* is in use.

Exception: For auditoriums, theaters, concert or opera halls and similar assembly occupancies, the illumination at the walking surface is permitted to be reduced during performances by one of the following methods provided that the required illumination is automatically restored upon activation of a premises' *fire alarm system*:

1. Externally illuminated walking surfaces shall be permitted to be illuminated to not less than 0.2 footcandle (2.15 lux).
2. Steps, landings and the sides of *ramps* shall be permitted to be marked with *self-luminous* materials in accordance with Sections 1025.2.1, 1025.2.2 and 1025.2.4 by systems *listed* in accordance with UL 1994.

1011.3 Headroom.
Stairways shall have a headroom clearance of not less than 80 inches (2032 mm) measured vertically from a line connecting the *nosings*. Such headroom shall be continuous above the *stairway* to the point where the line intersects the landing below, one tread depth beyond the bottom riser. The minimum clearance shall be maintained the full width of the *stairway* ~~and landing~~.

Exceptions:

1. *Spiral stairways* complying with Section 1011.10 are permitted a 78-inch (1981 mm) headroom clearance.
2. In Group R-3 occupancies; within *dwelling units* in Group R-2 occupancies; and in Group U occupancies that are accessory to a Group R-3 occupancy or accessory to individual *dwelling units* in Group R-2 occupancies; where the *nosings* of treads at the side of a *flight* extend under the edge of a floor opening through which the *stair* passes, the floor opening shall be allowed to project horizontally into the required headroom not more than $4^3/_4$ inches (121 mm).

1011.6 Stairway landings.
There shall be a floor or landing at the top and bottom of each ~~*stairway*~~ *flight*. The width of landings, measured perpendicularly to the direction of travel, shall be not less than the width of *stairways* served. Every landing shall have a minimum depth, measured parallel to the direction of travel, equal to the width of the *stairway* or 48 inches (1219 mm), whichever is less. Doors opening onto a landing shall not reduce the landing to less than one-half the required width. When fully open, the door shall not project more than 7 inches (178 mm) into the required width of a landing. Where *wheelchair spaces* are required on the *stairway* landing in accordance with Section 1009.6.3, the *wheelchair space* shall not be located in the required width of the landing and doors shall not swing over the *wheelchair spaces*.

Exceptions:

1. Where *stairways* connect stepped *aisles* to cross *aisles* or concourses, *stairway* landings are not required at the transition between *stairways* and stepped *aisles* constructed in accordance with Section 1030.
2. Where curved *stairways* of constant radius have intermediate landings, the landing depth shall be measured horizontally between the intersection of the walkline of the lower *flight* at the landing *nosing* and the intersection of the walkline of the upper *flight* at the *nosing* of the lowest tread of the upper *flight*.
3. Where a landing turns 90 degrees (1.57 rad) or more, the minimum landing depth in accordance with this section shall not be required where the landing provided is not less than that described by an arc with a radius equal to the width of the *flight* served.

1011.7.1 Stairway walking surface. The walking <u>surfaces</u> ~~surface of treads and landings~~ of a *stairway* shall not be sloped steeper than one unit vertical in 48 units horizontal (2-percent slope) in any direction. *Stairway* treads and landings shall have a solid surface. Finish floor surfaces shall be securely attached.

Exceptions:

1. Openings in *stair* walking surfaces shall be a size that does not permit the passage of $^1/_2$-inch-diameter (12.7 mm) sphere. Elongated openings shall be placed so that the long dimension is perpendicular to the direction of travel.
2. In Group F, H and S occupancies, other than areas of parking *structures* accessible to the public, openings in treads and landings shall not be prohibited provided that a sphere with a diameter of $1^1/_8$ inches (29 mm) cannot pass through the opening.

1011.13 Guards.

Guards shall be provided along *stairways* ~~and landings~~ where required by Section 1015 and shall be constructed in accordance with Section 1015. Where the roof hatch opening providing the required access is located within 10 feet (3049 mm) of the roof edge, such roof access or roof edge shall be protected by *guards* installed in accordance with Section 1015.

1023.9 Stairway identification signs.

A sign shall be provided at each floor <u>level</u> landing in an *interior exit stairway* and *ramp*connecting more than three *stories* designating the floor level, the terminus of the top and bottom of the *interior exit stairway* and *ramp*and the identification of the *stairway* or *ramp.* The signage shall state the story of and direction to the *exit discharge,* and the availability of roof access from the *interior exit stairway* and *ramp*for the fire department. The bottom of the sign shall be located not less than 5 feet (1524 mm) above the floor <u>level</u> landing in a position that is readily visible when the doors are in the open and closed positions.

1027.5 Location.

Exterior exit stairways and *ramps* shall have a minimum *fire separation distance* of 10 feet (3048 mm) measured at right angles from the exterior edge of the *stairway* or <u>*ramp*</u> ~~*ramps*~~, including <u>the ramp landing</u> ~~landings~~, to:

1. Adjacent *lot lines*.
2. Other portions of the *building*.
3. Other buildings on the same lot unless the adjacent building *exterior walls* and openings are protected in accordance with Section 705 based on *fire separation distance*.

For the purposes of this section, other portions of the building shall be treated as separate *buildings*.

Exception: *Exterior exit stairways* and *ramps* serving individual *dwelling units* of Group R-3 shall have a minimum *fire separation distance* of 5 feet (1525 mm).

2406.4.6 Glazing adjacent to stairways and ramps.

Glazing where the bottom exposed edge of the glazing is less than 60 inches (1524 mm) above the plane of the adjacent walking surface of *stairways*, ~~landings between *flights* of *stairs* and~~ *ramps* <u>and ramp landings</u> shall be considered to be a hazardous location.

Exceptions:

1. The side of a *stairway*, ~~landing~~ <u>ramp</u> or *ramp* <u>landing</u> that has a *guard* complying with the provisions of Sections 1015 and 1607.9, and the plane of the glass is greater than 18 inches (457 mm) from the railing.
2. Glazing 36 inches (914 mm) or more measured horizontally from the walking surface.

2024 International Fire Code

Revise as follows:

[BE] 1008.2.1 Illumination level under normal power. The *means of egress* illumination level shall be not less than 1 footcandle (11 lux) at the walking surface. Along *exit access stairways*, <u>and</u> exit stairways ~~and at their required landings~~, the illumination level shall not be less than 10 footcandles (108 lux) at the walking surface when the *stairway* is in use.

Exception: For auditoriums, theaters, concert or opera halls and similar assembly occupancies, the illumination at the walking surface is permitted to be reduced during performances by one of the following methods provided that the required illumination is automatically restored upon activation of a premises' *fire alarm system*:

1. Externally illuminated walking surfaces shall be permitted to be illuminated to not less than 0.2 footcandle (2.15 lux).
2. Steps, landings and the sides of *ramps* shall be permitted to be marked with self-luminous materials in accordance with Sections 1025.2.1, 1025.2.2 and 1025.2.4 by systems *listed* in accordance with UL 1994.

[BE] 1011.3 Headroom. *Stairways* shall have a headroom clearance of not less than 80 inches (2032 mm) measured vertically from a line connecting the *nosings*. Such headroom shall be continuous above the *stairway* to the point where the line intersects the landing below, one tread depth beyond the bottom riser. The minimum clearance shall be maintained the full width of the *stairway* ~~and landing~~.

Exceptions:

1. *Spiral stairways* complying with Section 1011.10 are permitted a 78-inch (1981 mm) headroom clearance.
2. In Group R-3 occupancies; within *dwelling units* in Group R-2 occupancies; and in Group U occupancies that are accessory to a Group R-3 occupancy or accessory to individual *dwelling units* in Group R-2 occupancies; where the *nosings* of treads at the side of a *flight* extend under the edge of a floor opening through which the *stair* passes, the floor opening shall be allowed to project horizontally into the required headroom not more than $4^3/_4$ inches (121 mm).

[BE] 1011.6 Stairway landings.

There shall be a floor or landing at the top and bottom of each ~~*stairway*~~ *flight*. The width of landings, measured perpendicularly to the direction of travel, shall be not less than the width of *stairways* served. Every landing shall have a minimum depth, measured parallel to the direction of travel, equal to the width of the *stairway* or 48 inches (1219 mm), whichever is less. Doors opening onto a landing shall not reduce the landing to less than one-half the required width. When fully open, the door shall not project more than 7 inches (178 mm) into the required width of a landing. Where wheelchair spaces are required on the stairway landing in accordance with Section 1009.6.3, the wheelchair space shall not be located in the required width of the landing and doors shall not swing over the wheelchair spaces.

Exceptions:

1. Where *stairways* connect stepped *aisles* to cross *aisles* or concourses, *stairway* landings are not required at the transition between *stairways* and stepped *aisles* constructed in accordance with Section 1030.
2. Where curved *stairways* of constant radius have intermediate landings, the landing depth shall be measured horizontally between the intersection of the walkline of the lower *flight* at the landing *nosing*and the intersection of the walkline of the upper *flight* at the *nosing*of the lowest tread of the upper *flight*.
3. Where a landing turns 90 degrees (1.57 rad) or more, the minimum landing depth in accordance with this section shall not be required where the landing provided is not less than that described by an arc with a radius equal to the width of the *flight* served.

[BE] 1011.7.1 Stairway walking surface. The walking surfaces ~~surface of treads and landings~~ of a *stairway* shall not be sloped steeper than one unit vertical in 48 units horizontal (2-percent slope) in any direction. *Stairway* treads and landings shall have a solid surface. Finish floor surfaces shall be securely attached.

Exceptions:

1. Openings in *stair* walking surfaces shall be a size that does not permit the passage of $^1/_2$-inch-diameter (12.7 mm) sphere. Elongated openings shall be placed so that the long dimension is perpendicular to the direction of travel.
2. In Group F, H and S occupancies, other than areas of parking structures accessible to the public, openings in treads and landings shall not be prohibited provided that a sphere with a diameter of $1^1/_8$ inches (29 mm) cannot pass through the opening.

[BE] 1011.13 Guards.

Guards shall be provided along *stairways* ~~and landings~~ where required by Section 1015 and shall be constructed in accordance with Section 1015. Where the roof hatch opening providing the required access is located within 10 feet (3049 mm) of the roof edge, such roof access or roof edge shall be protected by *guards* installed in accordance with Section 1015.

[BE] 1023.9 Stairway identification signs.

A sign shall be provided at each floor <u>level</u> landing in an *interior exit stairway* and *ramp* connecting more than three stories designating the floor level, the terminus of the top and bottom of the *interior exit stairway* and *ramp* and the identification of the *stairway* or *ramp*. The signage shall state the story of, and the direction to, the *exit discharge* and the availability of roof access from the *interior exit stairway* and *ramp* for the fire department. The bottom of the sign shall be located not less than 5 feet (1524 mm) above the floor <u>level</u> landing in a position that is readily visible when the doors are in the open and closed positions.

[BE] 1027.5 Location.

Exterior exit stairways and *ramps* shall have a minimum *fire separation distance* of 10 feet (3048 mm) measured at right angles from the exterior edge of the *stairway* or *ramps*, including landings, to:

1. Adjacent lot lines.
2. Other portions of the building.
3. Other buildings on the same lot unless the adjacent building *exterior walls* and openings are protected in accordance with Section 705 of the International Building Code based on *fire separation distance*.

For the purposes of this section, other portions of the building shall be treated as separate buildings.

Exception: *Exterior exit stairways* and *ramps* serving individual *dwelling units* of Group R-3 shall have a *fire separation distance* of not less than 5 feet (1524 mm).

Reason: Stairway is a defined term and as such stairways have two basic components landings and flights. Flight is also a defined term and as such do not include landings. The same definitions appear in both the IBC and IRC is:

> **Stairway.** One or more flights of stairs, either exterior or interior, **with the necessary landings** and platforms connecting them, to form a continuous and uninterrupted passage from one level to another.

> **Flight.** A continuous run of rectangular treads, winders or combination thereof from one landing to another.

Landings are currently only required at the top and bottom of stairways. Landings and flights of stairs are the elements of a stairway. The current text is incorrect because landings are used between flights within a stairway to change direction or stride or to offer a rest not just at the top and bottom of a stairway. To correct this, we have deleted “stairway” and substituted “flight” in **1011.6 Stairway landings** and searched the code for further necessary changes related to the term landing.

In **1011.3 Headroom** and **1011.3 Guards**, we have deleted "and landings" because a stairway includes the landings by definition.

In **1011.7.1 Stairway walking surface**, we have deleted "treads and landings" as these terms are superfluous and understood as the defined components of the stairway.

In **1023.9 Stairway identification signs**, we have inserted "level" in two locations to more specifically describe that the landings where the required signs are to be located are at the floor levels.

In **1027.5 Location** we corrected the plurality of stairway and inserted "ramp" before landing because landings are part of a stairway but are not part of a ramp. We made similar changes in **2406.4.6 Glazing adjacent to stairways and ramps** and in **1008.2.1 Illumination level under normal power,** and also deleted "landings between flights of stairs and", "and at their required landings" respectively. The text was deleted because landings are defined as part of a stairway and the language is redundant.These corrections assure that landings are required at between flights of stairs as well as at the the top and bottom of stairways and provide for the correct use of the term stairway as defined in the code. Comprehensive changes have been made in each of the related IBC requirements relating to landings for both stairways and ramps to assure consistency throughout the code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The changes in the text provide for clarification and consistent use of terms defined in the code and have no effect upon the cost of construction.

E29-24

IBC: 1008.2.1; IFC: [BE] 1008.2.1

Proponents: Jack Bailey, One Lux Studio LLC, International Association of Lighting Designers (jbailey@oneluxstudio.com); Harold Jepsen, Legrand (harold.jepsen@legrand.us); Marsha Mazz, United Spinal Association, United Spinal Association (mmazz@accessibility-services.com); Koni Sims, ACB Board of Director, American Council of the Blind (ACB), Visually Impaired/Low Vision (koni.l.sims@gmail.com); Nancy Clanton, Clanton & Associates, Inc, Clanton & Associates, Inc. (nancy@clantonassociates.com); Jonathan McHugh, McHugh Energy Consultants Inc., California Investor Owned Utilities (jon@mchughenergy.com)

2024 International Building Code

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The *means of egress* illumination level shall be not less than 1 footcandle (11 lux) at the walking surface. Along ~~*exit access stairways*,~~ interior exit stairways and at their required landings, the illumination level shall not be less than 10 footcandles (108 lux) at the walking surface when the *stairway* is in use.

Exception: For auditoriums, theaters, concert or opera halls and similar assembly occupancies, the illumination at the walking surface is permitted to be reduced during performances by one of the following methods provided that the required illumination is automatically restored upon activation of a premises' *fire alarm system*:

1. Externally illuminated walking surfaces shall be permitted to be illuminated to not less than 0.2 footcandle (2.15 lux).
2. Steps, landings and the sides of *ramps* shall be permitted to be marked with *self-luminous* materials in accordance with Sections 1025.2.1, 1025.2.2 and 1025.2.4 by systems *listed* in accordance with UL 1994.

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2. Steps, landings and the sides of *ramps* shall be permitted to be marked with self-luminous materials in accordance with Sections 1025.2.1, 1025.2.2 and 1025.2.4 by systems *listed* in accordance with UL 1994.

Reason: 1 footcandle minimum was the required illuminance on stairs in all versions of the IBC since its' first publication in 2000 until the 2021 version. In 2021 this was increased to 10 footcandles minimum. We believe this increase should have been limited to interior exit stairs. Please consider the following:

1. 10 footcandles minimum illuminance is extremely bright for an exterior space. For reference, the Illuminating Engineering Society (IES RP-43-22) recommends the following for walkways: a minimum illuminance of 0.1 footcandles, and an average illuminance not to exceed 3 footcandles. 10 footcandles minimum illuminance will take away the "night vision" of anyone with dark-adapted eyes who uses the stair, and could cause safety issues as they proceed to other exterior areas with more "normal" illuminances.

2. Exterior-rated occupancy sensors are not available for most pedestrian-scale lighting, which means that lights on exterior stairs will usually burn all night long, which results in wasted energy and increased light pollution / light trespass.

3. 10 footcandles is far in excess of the light levels found in many interior spaces like restaurants, hotels, and the common spaces in

many residential buildings. Requiring exit access stairs in low-light facilities like these to be lighted to such a high level will actually interfere with operations, and will result in non-compliance. The code shouldn't include requirements which are unreasonable - forcing people to install lights that will never be turned on after the inspection, and leaving them in violation of the IBC / IFC. Please also consider that, in new buildings, people with low vision will have the option of not using exit access stairs, as there will always be a lift or ramp available.

Bibliography: ANSI/ICC 117.1 *Accessible and Usable Buildings and Facilities* 2017 – 4th Version: Sept 2022 International Code Council. Washington, DC

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

By reducing illumination requirements on exterior stairs, this proposal should reduce the cost of construction.

E29-24

E30-24

IBC: 1008.2.1; IFC: [BE] 1008.2.1

Proponents: Jack Bailey, One Lux Studio LLC, International Association of Lighting Designers (jbailey@oneluxstudio.com); Eunice Noell-Waggoner, Center of Design for an Aging Society, IES Lighting for Seniors and the Visually Impaired Committee (eunice@centerofdesign.org); Harold Jepsen, Legrand (harold.jepsen@legrand.us); Marsha Mazz, United Spinal Association, United Spinal Association (mmazz@accessibility-services.com); Koni Sims, ACB Board of Director, American Council of the Blind (ACB), Visually Impaired/Low Vision (koni.l.sims@gmail.com); Nancy Clanton, Clanton & Associates, Inc, Clanton & Associates, Inc. (nancy@clantonassociates.com); Jonathan McHugh, McHugh Energy Consultants Inc., California Investor Owned Utilities (jon@mchughenergy.com)

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Exception: For auditoriums, theaters, concert or opera halls and similar assembly occupancies, the illumination at the walking surface is permitted to be reduced during performances by one of the following methods provided that the required illumination is automatically restored upon activation of a premises' *fire alarm system*:

1. Externally illuminated walking surfaces shall be permitted to be illuminated to not less than 0.2 footcandle (2.15 lux).
2. Steps, landings and the sides of *ramps* shall be permitted to be marked with *self-luminous* materials in accordance with Sections 1025.2.1, 1025.2.2 and 1025.2.4 by systems *listed* in accordance with UL 1994.

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1. Externally illuminated walking surfaces shall be permitted to be illuminated to not less than 0.2 footcandle (2.15 lux).
2. Steps, landings and the sides of *ramps* shall be permitted to be marked with self-luminous materials in accordance with Sections 1025.2.1, 1025.2.2 and 1025.2.4 by systems *listed* in accordance with UL 1994.

Reason: The code change proposal (E27-18) that resulted in stairway illuminance levels being increased from 1 footcandle <u>minimum</u> to 10 footcandles <u>minimum</u> had this reason statement:

The Illuminating Engineering Society (IES) provide recommendations for the foot candle levels to ensure adequate illumination and safety for occupants in common areas to assist in achieving appropriate light levels with the greatest energy efficiency dependent on the occupancy and the level of detailed work. The recommended range for general circulation for average maintained foot candles is 10-30 foot candles. The intent of this provision is to provide the minimum recommended lighting on stairways so that the walking surface is visible. Persons with low vision, or those who are elderly may benefit from higher levels, but that is left for a best design practice.

In discussions with proponents, they have indicated that they had intended for the average illuminance be no less than 10 fc per

Illuminating Engineering Society Standard IES-RP-10, which recommends 10 footcandles average for stairs. But by leaving out the word "average" from the illumination level requirement, Section 1008.2.1 is interpreted to mean that the illumination requirement in stairways is 10 footcandles minimum. This oversight has led to over-lighting of stairways with accompanying glare and wasted energy.

This proposal adds the clarifying term "average" into Section 1008.2.1 "the average illumination level shall not be less than 10 footcandles (108 lux) at the walking surface when the stairway is in use," This proposal aligns with the original proponents' intent and with the illuminance recommendation for stairs in IES-RP-10-20 Errata 2.

Please keep in mind that the general requirement for a minimum of 1 footcandle in means of egress would also still apply here, so that the requirement if this proposal is approved would be for a 10 footcandle average, with minimum at the darkest point of 1 footcandle. This 1 footcandle minimum was considered sufficient for safety in stairs in all versions of the IBC prior to 2021.

Bibliography: IBC Code Change No: E27-18 Section(s): 1008.2.1 (New) Proponents: Dawn Anderson, representing self (gonedawning@yahoo.com); Dan Buuck, representing National Association of Home Builders (dbuuck@nahb.org); David Collins, representing the American Institute of Architects (dcollins@preview-group.com); Marsha Mazz, representing U.S. Access Board (mazz@Access-Board.gov); Dominic Marinelli, representing United Spinal Association (DMarinelli@accessibility-services.com). International Code Council

ANSI/IES RP-10-20 Errata 2 *Lighting Common Applications 2020*. Illuminating Engineering Society. New York.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

By reducing light level requirements this proposal may result in a reduction in construction costs. It will certainly result in reduced cost of energy.

E30-24

E31-24

IBC: 1008.2.1; IFC: [BE] 1008.2.1

Proponents: Jack Bailey, One Lux Studio LLC, International Association of Lighting Designers (jbailey@oneluxstudio.com); Eunice Noell-Waggoner, Center of Design for an Aging Society, IES Lighting for Seniors and the Visually Impaired Committee (eunice@centerofdesign.org); Harold Jepsen, Legrand (harold.jepsen@legrand.us); Marsha Mazz, United Spinal Association, United Spinal Association (mmazz@accessibility-services.com); Koni Sims, ACB Board of Director, American Council of the Blind (ACB), Visually Impaired/Low Vision (koni.l.sims@gmail.com); Nancy Clanton, Clanton & Associates, Inc, Clanton & Associates, Inc. (nancy@clantonassociates.com); Jonathan McHugh, McHugh Energy Consultants Inc., California Investor Owned Utilities (jon@mchughenergy.com)

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Exception: For auditoriums, theaters, concert or opera halls and similar assembly occupancies, the illumination at the walking surface is permitted to be reduced during performances by one of the following methods provided that the required illumination is automatically restored upon activation of a premises' *fire alarm system*:

1. Externally illuminated walking surfaces shall be permitted to be illuminated to not less than 0.2 footcandle (2.15 lux).
2. Steps, landings and the sides of *ramps* shall be permitted to be marked with *self-luminous* materials in accordance with Sections 1025.2.1, 1025.2.2 and 1025.2.4 by systems *listed* in accordance with UL 1994.

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[BE] 1008.2.1 Illumination level under normal power. The *means of egress* illumination level shall be not less than 1 footcandle (11 lux) at the walking surface. Along *exit access stairways*, exit *stairways* and at their required landings, the illumination level shall be not less than 10 footcandles (108 lux) at the walking surface when the *stairway* is in use. <u>Illumination levels on *stairways* shall be measured at the *nosing* of each landing and tread at a horizontal distance 12 inches (305 mm) to 14 inches (356 mm) from the stair side of each *handrail*.</u>

Exception: For auditoriums, theaters, concert or opera halls and similar assembly occupancies, the illumination at the walking surface is permitted to be reduced during performances by one of the following methods provided that the required illumination is automatically restored upon activation of a premises' *fire alarm system*:

1. Externally illuminated walking surfaces shall be permitted to be illuminated to not less than 0.2 footcandle (2.15 lux).
2. Steps, landings and the sides of *ramps* shall be permitted to be marked with self-luminous materials in accordance with Sections 1025.2.1, 1025.2.2 and 1025.2.4 by systems *listed* in accordance with UL 1994.

Reason: 1. To enhance safety by improving the visibility of stairs. Visibility is improved when there is visual contrast between the nosing and the portion of the tread near the riser. With overhead lighting, this contrast is created by (a) contrasting materials, and (b) the shadow created by the riser. If the 10fc minimum is interpreted to be measured in the shadow adjacent to the riser, then lighting will be designed to minimize this shadow and reduce contrast and hence reduce visibility.

2. To provide for greater consistency in application and enforcement of the code by specifying where readings are to be taken. There is a fair amount of disagreement about how far into the darkest corner a light meter should be placed when searching for the point with minimum illuminance.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal could be interpreted to reduce overall light level requirements in stairs, which would reduce costs. This impact is likely minimal. There is no plausible scenario where this would increase costs.

E31-24

E32-24

IBC: SECTION 202 (New), 1008.2.1; IFC: SECTION 202 (New), [BE] 1008.2.1

Proponents: Jack Bailey, One Lux Studio LLC, International Association of Lighting Designers (jbailey@oneluxstudio.com); Eunice Noell-Waggoner, President, Center of Design for an Aging Society, IES Lighting for Seniors and the Visually Impaired Committee (eunice@centerofdesign.org); Harold Jepsen, Legrand (harold.jepsen@legrand.us); Marsha Mazz, United Spinal Association, United Spinal Association (mmazz@accessibility-services.com); Koni Sims, ACB Board of Director, American Council of the Blind (ACB), Visually Impaired/Low Vision (koni.l.sims@gmail.com); Nancy Clanton, Clanton & Associates, Inc, Clanton & Associates, Inc. (nancy@clantonassociates.com); Jonathan McHugh, McHugh Energy Consultants Inc., California Investor Owned Utilities (jon@mchughenergy.com)

2024 International Building Code

Add new definition as follows:

OCCUPANT SENSOR CONTROL. An automatic control device or system that detects the presence or absence of people within an area and causes lighting, equipment, or appliances to be regulated accordingly.

Revise as follows:

1008.2.1 Illumination level under normal power.
The *means of egress* illumination level shall be not less than 1 footcandle (11 lux) at the walking surface. Along *exit access stairways*, exit stairways and at their required landings, the illumination level shall not be less than 10 footcandles (108 lux) at the walking surface when the *stairway* is in use.

~~Exception~~ Exceptions:

1. *Occupant sensor controls* shall be permitted to reduce illumination levels along the *means of egress* serving occupied rooms and spaces where the following conditions are met:
   1.1. When no occupants are present, the illumination level shall not be less than an average of 1 footcandle (11 lux) and a minimum at any point of 0.1 footcandle (1 lux) measured along the path of egress at the walking surface. A maximum-to-minimum illumination uniformity ratio of 40 to 1 shall not be exceeded.

   1.2. Along *stairways*, when an occupant is present on a *landing*, the illumination level shall be automatically restored on that landing and on all *flights* adjacent to that *landing*.

   1.3. Along *stairways*, when an occupant is present on a *flight*, the illumination level shall be automatically restored on that *flight* and on both *landings* adjacent to that *flight*.

   1.4. Along the *means of egress* in rooms and spaces other than *stairways*, the illumination level shall be automatically restored in each *occupant sensor* control zone when occupants are present.

   1.5. After the occupants leave each *occupant sensor* control zone, the illumination level shall be maintained for no less than 15 minutes.

   1.6. In *interior exit stairways*, *interior exit ramps*, and *exit passageways* in buildings with fire alarm systems, the illumination level shall be automatically restored upon activation of the premises' fire alarm system.

2. For auditoriums, theaters, concert or opera halls and similar assembly occupancies, the illumination at the walking surface is permitted to be reduced during performances by one of the following methods provided that the required illumination is automatically restored upon activation of a premises' *fire alarm system*:
   2.1. Externally illuminated walking surfaces shall be permitted to be illuminated to not less than 0.2 footcandle (2.15 lux).

   2.2 Steps, landings and the sides of *ramps* shall be permitted to be marked with *self-luminous* materials in accordance with Sections 1025.2.1, 1025.2.2 and 1025.2.4 by systems *listed* in accordance with UL 1994.

2024 International Fire Code

Add new definition as follows:

OCCUPANT SENSOR CONTROL. An automatic control device or system that detects the presence or absence of people within an area and causes lighting, equipment, or appliances to be regulated accordingly.

Revise as follows:

[BE] 1008.2.1 Illumination level under normal power.
The *means of egress* illumination level shall be not less than 1 footcandle (11 lux) at the walking surface. Along *exit access stairways*, exit *stairways* and at their required landings, the illumination level shall be not less than 10 footcandles (108 lux) at the walking surface when the *stairway* is in use.

~~Exception~~ **Exceptions:**

1. *Occupant sensor controls* shall be permitted to reduce illumination levels along the *means of egress* serving occupied rooms and spaces where the following conditions are met:
   1.1. When no occupants are present, the illumination level shall not be less than an average of 1 footcandle (11 lux) and a minimum at any point of 0.1 footcandle (1 lux) measured along the path of egress at the walking surface. A maximum-to-minimum illumination uniformity ratio of 40 to 1 shall not be exceeded.

   1.2. Along *stairways*, when an occupant is present on a *landing*, the illumination level shall be automatically restored on that landing and on all *flights* adjacent to that *landing.*

   1.3. Along *stairways*, when an occupant is present on a *flight*, the illumination level shall be automatically restored on that *flight* and on both *landings* adjacent to that *flight.*

   1.4. Along the *means of egress* in rooms and spaces other than *stairways*, the illumination level shall be automatically restored in each *occupant sensor* control zone when occupants are present.

   1.5. After the occupants leave each *occupant sensor* control zone, the illumination level shall be maintained for no less than 15 minutes.

   1.6. In *interior exit stairways*, *interior exit ramps*, and *exit passageways* in buildings with fire alarm systems, the illumination level shall be automatically restored upon activation of the premises' fire alarm system.

2. For auditoriums, theaters, concert or opera halls and similar assembly occupancies, the illumination at the walking surface is permitted to be reduced during performances by one of the following methods provided that the required illumination is automatically restored upon activation of a premises' *fire alarm system*:
   2.1. Externally illuminated walking surfaces shall be permitted to be illuminated to not less than 0.2 footcandle (2.15 lux).

   2.2 Steps, landings and the sides of *ramps* shall be permitted to be marked with *self-luminous* materials in accordance with Sections 1025.2.1, 1025.2.2 and 1025.2.4 by systems *listed* in accordance with UL 1994.

Reason: To provide necessary clarity for the safe installation of occupant sensors to conserve energy in unoccupied means of egress.

A lot of energy is wasted operating lights in unoccupied spaces. The IBC currently requires that light levels be maintained at 1 footcandle minimum in many types of unoccupied spaces, provided that those spaces serve other spaces which may be occupied. First, please consider that a 1 footcandle minimum implies an average of 2-5 footcandes with typical uniformity ratios. Second, please consider that there is often no practical way to determine if the "spaces served" are occupied (e.g. a corridor in a residential building serving multiple dwelling units is always assumed to be serving occupied spaces), so the 2-5 footcandle average illumination is maintained 24 hours/day, 365 days/year even with occupant sensors controlling the lights.

This proposal would allow a reduction of light levels to 1 footcandle average in unoccupied means of egress serving occupied spaces. The specified illuminance levels for the unoccupied condition (Exception 1.1) are identical to the illuminance level required while occupied under emergency power (1008.3.2). So these spaces are always maintained at a light level which has been deemed to be safe under all versions of the IBC dating back to 2000, even if the occupant sensors were to fail to raise light levels when an occupant entered.

Energy savings would be quite significant where occupant sensor controls are provided in spaces like corridors, warehouses, and open office areas, where anywhere from 50% to 80% less energy would be required to light unoccupied spaces.

To ensure that safety is not compromised, and to ensure consistent application and enforcement of the code, this proposal adds six requirements for the safe installation and operation of occupant sensors.

1.1 Specifies the illumination level for unoccupied means of egress (as explained above).

1.2 and 1.3 Allow for the most common lighting control strategy in stairways (occupant sensors integrated into fixtures) to be employed, provided that the sensors can detect motion for the full flight leading to each landing. This way occupants are never walking into darkness.

1.4 Requires that sensors automatically raise light levels when an occupant enters (i.e. manual-on “vacancy sensors” are not permitted).

1.5 Requires that occupant sensors keep lights at the occupied level 15 minutes after the last occupant leaves the control zone, to avoid “false offs” (i.e. where illumination levels are reduced while the space is still occupied).

1.6 Requires that critical spaces in the exit automatically rise their occupied level when the fire alarm system is triggered, because occupant sensors are not tested in smoke.

None of these safety requirements are included in the IECC.

Please note that ICC A117.1 includes language permitting the use of occupant sensors which are “equipped for fail-safe operation and evaluated for this purpose” along stairways. But controls manufacturers do not do this, and similar language was removed from NFPA101 in 2015.

Bibliography: ANSI/ICC 117.1 *Accessible and Usable Buildings and Facilities* 2017 – 4th Version: Sept 2022 International Code Council. Washington, DC

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal does not requireusers of the code to do anything. It allowsthem to install occupant sensing lighting controls to save energy.

E32-24

E33-24

IBC: 1008.2.1, 1008.2.3; IFC: [BE] 1008.2.1, [BE] 1008.2.3

Proponents: Jack Bailey, One Lux Studio LLC, International Association of Lighting Designers (jbailey@oneluxstudio.com); Eunice Noell-Waggoner, Center of Design for an Aging Society, IES Lighting for Seniors and the Visually Impaired Committee (eunice@centerofdesign.org); Harold Jepsen, Legrand (harold.jepsen@legrand.us); Marsha K. Mazz, United Spinal Association, United Spinal Association (mmazz@unitedspinal.org); Koni Sims, ACB Board of Director, American Council of the Blind (ACB), Visually Impaired/Low Vision (koni.l.sims@gmail.com); Nancy Clanton, Clanton & Associates, Inc, Clanton & Associates, Inc. (nancy@clantonassociates.com); Jonathan McHugh, McHugh Energy Consultants Inc., California Investor Owned Utilities (jon@mchughenergy.com)

2024 International Building Code

Revise as follows:

1008.2.1 Illumination level under normal power. The interior *means of egress* illumination level shall be not less than 1 footcandle (11 lux) at the walking surface. Along *exit access stairways*, exit stairways and at their required landings, the illumination level shall not be less than 10 footcandles (108 lux) at the walking surface when the *stairway* is in use.

Exception: For auditoriums, theaters, concert or opera halls and similar assembly occupancies, the illumination at the walking surface is permitted to be reduced during performances by one of the following methods provided that the required illumination is automatically restored upon activation of a premises' *fire alarm system*:

1. Externally illuminated walking surfaces shall be permitted to be illuminated to not less than 0.2 footcandle (2.15 lux).
2. Steps, landings and the sides of *ramps* shall be permitted to be marked with *self-luminous* materials in accordance with Sections 1025.2.1, 1025.2.2 and 1025.2.4 by systems *listed* in accordance with UL 1994.

1008.2.3 Exit discharge. Illumination shall be provided along the path of travel for the *exit discharge* from each exit to the *public way*. Illumination levels shall not be less than an average of 1 footcandle (11 lux) and a minimum at any point of 0.1 footcandle (1 lux) measured along the path of egress at the walking surface. A maximum-to-minimum illumination uniformity ratio of 40 to 1 shall not be exceeded.

Exception: Illumination shall not be required where the path of the *exit discharge* meets both of the following requirements:

1. The path of *exit discharge* is illuminated from the exit to a safe dispersal area complying with Section 1028.5.
2. A dispersal area shall be illuminated to a level not less than 1 footcandle (11 lux) at the walking surface.

2024 International Fire Code

Revise as follows:

[BE] 1008.2.1 Illumination level under normal power. The interior *means of egress* illumination level shall be not less than 1 footcandle (11 lux) at the walking surface. Along *exit access stairways*, exit stairways and at their required landings, the illumination level shall not be less than 10 footcandles (108 lux) at the walking surface when the *stairway* is in use.

Exception: For auditoriums, theaters, concert or opera halls and similar assembly occupancies, the illumination at the walking surface is permitted to be reduced during performances by one of the following methods provided that the required illumination is automatically restored upon activation of a premises' *fire alarm system*:

1. Externally illuminated walking surfaces shall be permitted to be illuminated to not less than 0.2 footcandle (2.15 lux).
2. Steps, landings and the sides of *ramps* shall be permitted to be marked with self-luminous materials in accordance with Sections 1025.2.1, 1025.2.2 and 1025.2.4 by systems *listed* in accordance with UL 1994.

[BE] 1008.2.3 Exit discharge.
Illumination shall be provided along the path of travel for the *exit discharge* from each exit to the *public way*. Illumination levels shall not

be less than an average of 1 footcandle (11 lux) and a minimum at any point of 0.1 footcandle (1 lux) measured along the path of egress at the walking surface. A maximum-to-minimum illumination uniformity ratio of 40 to 1 shall not be exceeded.

Exception: Illumination shall not be required where the path of the *exit discharge* meets both of the following requirements:

1. The path of *exit discharge* is illuminated from the exit to a safe dispersal area complying with Section 1028.5.
2. A dispersal area shall be illuminated to a level not less than 1 footcandle (11 lux) at the walking surface.

Reason: To reduce the significant environmental impact that results when exterior spaces are over-lighted. Exterior spaces are rarely illuminated to a minimum of 1 footcandle, and exterior exit discharges lighted to meet current requirements in the IBC are unusually bright. This proposal would ensure that light levels which are currently considered sufficient for emergency conditions (refer to Section 1008.3.2) are maintained at all times, which will reduce energy costs and reduce light pollution.

Exterior occupancy sensors are not available for most pedestrian-scale lighting, which means that exit discharge lights will usually burn all night long.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

By reducing light level requirements this proposal will result in a reduction in construction costs for many projects as fixtures can be spaced further apart. Construction costs will not be increased for any projects.

E33-24

E34-24

IBC: 1008.2.3, IES (New); IFC: [BE] 1008.2.3, IES (New)

Proponents: Nancy Clanton, Clanton & Associates, Inc, Clanton & Associates, Inc. (nancy@clantonassociates.com); Eunice Noell-Waggoner, President, Center of Design for an Aging Society, IES Lighting for Seniors and the Visually Impaired Committee (eunice@centerofdesign.org); Jonathan McHugh, McHugh Energy Consultants Inc., California Investor Owned Utilities (jon@mchughenergy.com); Greg Guarnaccia, International Light Studio, IES Aged and Partially Sighted Committee (greg@ils.lighting); Brittany Lynch, Clanton & Associates, Clanton & Associates (brittany@clantonassociates.com)

2024 International Building Code

Revise as follows:

1008.2.3 Exit discharge.
Illumination shall be provided along the path of travel for the *exit discharge* from each exit to the *public way*. Exterior luminaires illuminating the *exit discharge* shall have glare ratings not greater than G2 as specified in IES TM-15.

Exception: Illumination shall not be required where the path of the *exit discharge* meets both of the following requirements:

1. The path of *exit discharge* is illuminated from the exit to a safe dispersal area complying with Section 1028.5.
2. A dispersal area shall be illuminated to a level not less than 1 footcandle (11 lux) at the walking surface.

Add new standard(s) as follows:

IES ANSI/IES TM-15 - 20. Luminaire Classification Systems for Outdoor Luminaires

2024 International Fire Code

Revise as follows:

[BE] 1008.2.3 Exit discharge.
Illumination shall be provided along the path of travel for the *exit discharge* from each *exit* to the *public way*. Exterior luminaires illuminating the *exit discharge* shall have glare ratings not greater than G2 as specified in IES TM-15.

Exception: Illumination shall not be required where the path of the *exit discharge* meets both of the following requirements:

1. The path of *exit discharge* is illuminated from the exit to a safe dispersal area complying with Section 1028.5.
2. A dispersal area shall be illuminated to a level not less than 1 footcandle (11 lux) at the walking surface.

Add new standard(s) as follows:

IES ANSI/IES TM-15 - 20. Luminaire Classification Systems for Outdoor Luminaires

Staff Analysis: A review of the standard proposed for inclusion in the code, IES ANSI/IES TM-15 - 20 Luminaire Classification Systems for Outdoor Luminaires, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: As described in the IES Publication ANSI/IES LS-8-20 Lighting Science: Vision – Perceptions and Performance, the affect of glare on visibility helps provide the background to why RP-43 has both requirements for recommended average illuminance and glare rating of the distribution of luminaires.
ANSI/IES LS-8-20 Lighting Science: Vision – Perceptions and Performance states:
4.4 Glare is the situation where the eye is unable to adapt to the visual scene. This may occur when the overall light level is too great, or where there is a large difference in the brightness of difference parts of the scene, such as luminaires seen against a dark background…. Glare arising from an excessive luminance range in a visual environment can have two effects: a reduction in visual performance until it

is close to or on the escarpment of visual performance (see Section 5.2) and a feeling of discomfort. These two outcomes are known as disability glare and discomfort glare, respectively. A particular source of glare may lead to one or both of these outcomes.

ANSI/IES RP-43-22 Recommended Practice – Recommended Illuminance Criteria for People in Outdoor Environments describes:
Table A-3: The recommended maximum glare rating of G2 for stairs and ramps for all lighting zones. Luminaire glare ratings of G2 or less are recommended for almost all activities listed in RP-43 and thus are appropriate for the path of travel for the exit discharge from each exit to the public way.
The glare rating definition for exterior luminaires is described in ANSI/IES TM-15-20 Technical Memorandum: Luminaire Classification System for Outdoor Luminaires. TM-15 glare ratings are readily available on specification sheets from exterior luminaire manufacturers.
ANSI/IES RP-28-20 Recommended Practice – Lighting and the Visual Environment for Older Adults and the Visually Impaired address disability and discomfort glare:
2.1.4 Glare. There are two types of glare: disability glare and discomfort glare. Either type of glare may be caused by direct or reflected sources. With a direct source light travels directly from the source to the eye such as from poorly shielded light sources .. Discomfort glare is a sensation of irritation or pain from high luminances in the field of view.

This proposal is assisting visibility through minimizing glare and protecting light to dark adaptation.

Bibliography: ANSI/IES LS-8-20. Lighting Science: Vision – Perceptions and Performance. Illuminating Engineering Society. New York.
ANSI/IES RP-28-20. Recommended Practice: Lighting and the Visual Environment for Older Adults and the Visually Impaired. Illuminating Engineering Society. New York.
ANSI/IES RP-43-22. Recommended Practice: Lighting Exterior Applications. Illuminating Engineering Society. New York.
ANSI/IES TM-15-20. Technical Memorandum: Luminaire Classification System for Outdoor Luminaires. Illuminating Engineering Society. New York.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Exterior luminaires with G2 glare rating or less do not cost more than those with a G3 or G4 rating.

E34-24

E35-24

IBC: 1008.3; IFC: [BE] 1008.3

Proponents: Lucas Pump, City of Cedar Rapids, Self (l.pump@cedar-rapids.org)

2024 International Building Code

Revise as follows:

1008.3 Illumination required by an emergency electrical system. An emergency electrical system shall be provided to automatically illuminate the following areas in the event of a power supply failure:

1. In rooms or spaces that require two or more exits or access to exits:
   1.1. *Aisles*.

   1.2. *Corridors*.

   1.3. *Exit access stairways* and *ramps*.

2. In *buildings* that require two or more exits or access to exits:
   2.1. Interior *exit access stairways* and *ramps*.

   2.2. Interior and *exterior exit stairways* and *ramps*.

   2.3. Exit passageways.

   2.4. Vestibules and areas on the level of discharge used for *exit discharge* in accordance with Section 1028.2.

   2.5. Exterior landings as required by Section 1010.1.5 for exit doorways that lead directly to the *exit discharge*.

3. In other rooms and spaces:
   3.1. Electrical equipment rooms.

   3.2. *Fire command centers*.

   3.3. Fire pump rooms.

   3.4. Generator rooms.

   3.5. Public restrooms ~~with and area greater then 300 square feet (27.87 m^2).~~

2024 International Fire Code

Revise as follows:

[BE] 1008.3 Illumination required by an emergency electrical system.
An emergency electrical system shall be provided to automatically illuminate the following areas in the event of a power supply failure:

1. In rooms or spaces that require two or more *exits* or access to *exits*:
   1.1. *Aisles*.

   1.2. *Corridors*.

   1.3. *Exit access stairways* and *ramps*.

2. In buildings that require two or more *exits* or access to *exits*:
   2.1. *Interior exit access stairways* and *ramps*.
   2.2. *Interior* and *exterior exit stairways* and *ramps*.
   2.3. *Exit passageways*.
   2.4. Vestibules and areas on the level of discharge used for *exit discharge* in accordance with Section 1028.2.
   2.5. Exterior landings as required by Section 1010.1.5 for exit doorways that lead directly to the *exit discharge*.

3. In other rooms and spaces:
   3.1. Electrical equipment rooms.
   3.2. Fire command centers.
   3.3. Fire pump rooms.
   3.4. Generator rooms.
   3.5. Public restrooms ~~with an area greater than 300 square feet (27.87 m^2).~~

Reason: The deleting of this text of the square footage would require emergency lighting in all public restrooms. Public restrooms typically do not contain natural lighting, and when the electrical power goes out, these restrooms become completely black. Furthermore, a public restroom is usually not a familiar place, therefore safely exiting these spaces can be very difficult in an emergency situation.

Cost Impact: Increase

Estimated Immediate Cost Impact:

The cost increase would be negligible because the average emergency light cost is between $20-$60 USD.

Estimated Immediate Cost Impact Justification (methodology and variables):

This would increase the cost of construction as emergency lighting would be required in all public restrooms, although the cost increase would be negligible because the average emergency light cost is between $20-$60 USD.

Estimated Life Cycle Cost Impact:

$20-$60 USD per new public restroom

Estimated Life Cycle Cost Impact Justification (methodology and variables):

Safety of occupants of the building

E35-24

E36-24

IBC: 1008.3; IFC: [BE] 1008.3

Proponents: Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org)

2024 International Building Code

Revise as follows:

1008.3 Illumination required by an emergency electrical system. An emergency electrical system shall be provided to automatically illuminate the following areas in the event of a power supply failure:

1. In rooms or spaces that require two or more exits or access to exits:
    1.1. *Aisles*.

    1.2. *Corridors*.

    1.3. *Exit access stairways* and *ramps*.

2. In *buildings* that require two or more exits or access to exits:
    2.1. Interior *exit access stairways* and *ramps*.

    2.2. Interior and *exterior exit stairways* and *ramps*.

    2.3. Exit passageways.

    2.4. Vestibules and areas on the level of discharge used for *exit discharge* in accordance with Section 1028.2.

    2.5. Exterior landings as required by Section 1010.1.5 for exit doorways that lead directly to the *exit discharge*.

3. In other rooms and spaces:
    3.1. Electrical equipment rooms.

    3.2. *Fire command centers*.

    3.3. Fire pump rooms.

    3.4. Generator rooms.

    3.5. Public restrooms with an area greater than 300 square feet (27.87 m^2).

    3.6. Areas of refuge.

    3.7 Exterior areas for assisted rescue.

2024 International Fire Code

Revise as follows:

[BE] 1008.3 Illumination required by an emergency electrical system.
An emergency electrical system shall be provided to automatically illuminate the following areas in the event of a power supply failure:

1. In rooms or spaces that require two or more *exits* or access to *exits*:
    1.1. *Aisles*.

    1.2. *Corridors*.

    1.3. *Exit access stairways* and *ramps*.

2. In buildings that require two or more *exits* or access to *exits*:
    2.1. *Interior exit access stairways* and *ramps*.
    2.2. *Interior* and *exterior exit stairways* and *ramps*.
    2.3. *Exit passageways*.
    2.4. Vestibules and areas on the level of discharge used for *exit discharge* in accordance with Section 1028.2.
    2.5. Exterior landings as required by Section 1010.1.5 for exit doorways that lead directly to the *exit discharge*.
3. In other rooms and spaces:
    3.1. Electrical equipment rooms.
    3.2. Fire command centers.
    3.3. Fire pump rooms.
    3.4. Generator rooms.
    3.5. Public restrooms with an area greater than 300 square feet (27.87 m^2).
    3.6. Areas of refuge.
    3.7. Exterior areas for assisted rescue.

Reason: Essential portions of the interior egress system must be illuminated. Areas of refuge and exterior areas for assisted rescue are essential portions of the interior egress system and should be illuminated. Lighting at the areas of refuge would also make it easier to read the informational signage required in Section 1009.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC webpage.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This should not require any additional lighting fixtures. Areas of refuge in a stairway would most likely already be on the means of egress path that already had an emergency lighting requirement (Section 1008.3.2 Item 2). Exterior areas for assisted rescue should already have lights as exit discharge landings (Section 1008.3.2 Item 5).

E36-24

E37-24

IBC: 1009.1, 1009.2; IFC: [BE] 1009.1, [BE] 1009.2

Proponents: Matt Lescher, CCI, self (mattl@codeconsultants.com); Jim Safranek, Safranek Group LLC, Self (jim@safranekgroup.com); Gene Boecker, CCI, self (geneb@codeconsultants.com); Marsha Mazz, United Spinal Association, United Spinal Association (mmazz@accessibility-services.com)

2024 International Building Code

1009.1 Accessible means of egress required.
Accessible means of egress shall comply with this section. Accessible spaces shall be provided with not less than one *accessible means of egress*. Where more than one *means of egress* is required by Section 1006.2 or 1006.3 from any accessible space, each accessible portion of the space shall be served by not less than two *accessible means of* egress. <u>Where two accessible means of egress are required from any accessible space, at least two accessible means of egress shall be arranged a reasonable distance apart so that if one becomes blocked, at least one will be available.</u>

Exceptions:

1. One *accessible means of egress* is required from an *accessible mezzanine* level in accordance with Section 1009.3, 1009.4 or 1009.5.
2. In assembly areas with ramped *aisles* or stepped *aisles*, one *accessible means of egress* is permitted where the *common path of egress travel* is accessible and meets the requirements in Section 1030.8.

Revise as follows:

1009.2 Continuity and components.
Each required *accessible means of egress* shall be continuous to a *public way* and shall consist of one or more of the following components:

1. *Accessible routes* complying with Section 1104.
2. *Interior exit stairways* complying with Sections 1009.3 and 1023.
3. *Exit access stairways* complying with Sections 1009.3 and 1019.3 or 1019.4.
4. *Exterior exit stairways* complying with Sections 1009.3 and 1027 and serving levels other than the *level of exit discharge*.
5. Elevators complying with Section 1009.4.
6. Platform lifts complying with Section 1009.5.
7. *Horizontal exits* complying with Section 1026.
8. *Ramps* complying with Section 1012.
9. *Areas of refuge* complying with Section 1009.6.
10. Exterior areas for assisted rescue complying with Section 1009.7 serving *exits* at the *level of exit discharge*.

<u>**Exception:** Where an area of refuge, an exterior area for assisted rescue assistance, or stairway are components of an accessible means of egress, the path from the exit discharge to the public way is not required to be an accessible route.</u>

2024 International Fire Code

Revise as follows:

[BE] 1009.1 Accessible means of egress required.
Accessible means of egress shall comply with this section. Accessible spaces shall be provided with not less than one *accessible means of egress*. Where more than one *means of egress* is required by Section 1006.2 or 1006.3 from any accessible space, each accessible

portion of the space shall be served by not less than two *accessible means of egress*. Where two accessible means of egress are required from any accessible space, at least two accessible means of egress shall be arranged a reasonable distance apart so that if one becomes blocked, at least one will be available.

Exceptions:

1. One *accessible means of egress* is required from an accessible *mezzanine* level in accordance with Section 1009.3, 1009.4 or 1009.5.
2. In assembly areas with ramped *aisles* or stepped *aisles*, one *accessible means of egress* is permitted where the common path of travel is accessible and meets the requirements in Section 1030.8.

[BE] 1009.2 Continuity and components.

Each required *accessible means of egress* shall be continuous to a *public way* and shall consist of one or more of the following components:

1. *Accessible routes* complying with Section 1104 of the International Building Code.
2. *Interior exit stairways* complying with Sections 1009.3 and 1023.
3. *Exit access stairways* complying with Sections 1009.3 and 1019.3 or 1019.4.
4. *Exterior exit stairways* complying with Sections 1009.3 and 1027 and serving levels other than the *level of exit discharge*.
5. Elevators complying with Section 1009.4.
6. Platform lifts complying with Section 1009.5.
7. *Horizontal exits* complying with Section 1026.
8. *Ramps* complying with Section 1012.
9. *Areas of refuge* complying with Section 1009.6.
10. Exterior areas for assisted rescue complying with Section 1009.7 serving *exits* at the *level of exit discharge*.

Exception: Where an area of refuge, an exterior area for assisted rescue assistance, or stairway are components of an accessible means of egress, the path from the exit discharge to the public way is not required to be an accessible route.

Staff Analysis: A question would be if the change to Section 1009.1 would conflict with the requirements for center core buildings in Section 1007.1.1 and fire service access elevators in Section 3007.6.1.

Reason: This proposal attempts to clarify two concepts in Section 1009 for accessible means of egress (AMOE):

1. Where two or more exits are required from an accessible space, the AMOE should also be two separate exits (1009.1).
2. The exception for "continuous to the public way" (1009.2).

This code change proposal is not intended to change the requirements, but only to clarify the code intent, which is also consistent with how we have generally seen 1009 interpreted and enforced.

1009.1

Where two means of egress (MOE) are required, Section 1009.2 requires at least two accessible means of egress (AMOE). The intent of the code has always been to provide people with disabilities at least two choices of exits. That way, in the case of an emergency, if a fire or other hazards block one path, another choice remains. However, as written, there is not a code path to other specific egress "criteria"/provisions (Exit Separation, Travel Distance, etc.) within the accessible means of egress (AME) section (1009). While the 1009 section references the other sections for egress components (Interior Exit Stairways 1009.3, 1023, Horizontal Exits 1026, etc.), it does not reference the egress criteria/provisions. Because of this, it appears that the specific egress criteria/provisions found in other sections within Chapter 10, would not be applicable for AME components. In theory, this isn't an issue, as most egress components are not solely utilized as an AME component but also serve as a "standard" egress component. Given this, it generally results in both standard and AMOE egress components complying with the specific egress criteria/provisions found in Chapter 10.

This becomes an issue for spaces and stories that have multiple exits/exit access (more than 2). The exit separation requirements only require that a minimum of any 2 exits/exit access be "remote" and meet minimum distances for separation. This can unfortunately result in the two AMOE exit/exit access components not meeting this remoteness requirements, whereas the two, "standard" exit/exit access components are meeting the remoteness requirement. This discrepancy in the AMOE provisions of the IBC can result in the placement of AMOE components that potentially present a greater risk to individuals with physical limitations than that posed to ambulatory individuals. Travel distance and CPT are another, issue, similar to that of exit/exit access remoteness, that becomes an issue when there are multiple exit/exit access components.

Taking these ideas into account, previous drafts of this code change proposal attempted to tie the AMOE provisions in Section 1009 to 1007 and 1016. However, this would have required egress calculations to be made for general egress and then calculated again for AMOE, which was felt to be overly complicated. Therefore, the sentence "<u>Where two accessible means of egress are required from any accessible space, at least two accessible means of egress shall be arranged a reasonable distance apart so that if one becomes blocked, at least one will be available,"</u> was added. This language is consistent with the general egress provisions in Section 1007.1.2 which the team felt conveys the idea that where two AMOE are required, they should be two separate paths, the same that would be required under the general means of egress. The language was felt to allow a level of common sense because the main questions to be answered honestly are as follows:, "Are these two AMOE, truly two separate exits? & Would someone need to take the same path in order to get to both exits?"

The proposal does not limit additional AMOE from being provided in addition to the required two AMOE. Most stairway enclosures already meet the AMOE requirements. Therefore, signage required by Section 1112.3 is not required, except in where a stairway serves an accessible space but does not meet the requirements of 1009. This signage would already be required for these stairways under the current IBC langue, so this proposal does not impact the signage requirement. Where two AMOE are required at the level of exit discharge, two common AMOE components are: accessible routes to the public rights of way, and exterior areas for assisted rescue. This proposal would not increase the number of AMOE from the level of exit discharge; a maximum of two would still be required. The difference is that the proposal clarifies that people with disabilities should be given a choice to travel one way for the accessible route and have a different option of travel to the exterior area for assisted rescue. That way, if one path is blocked, a second route is provided for safety.

When considering this proposal, it's important to keep in mind an example of a large assembly space. This space may be required to have 6 exits to provide safety for people without disabilities. That same space is only required to provide two options for people with disabilities—it's not equivalent—but shouldn't we at least ensure that we're actually providing two separate options instead of one?

The proposal is simply clarifying is that the two AMOE should be separated.

1009.2

Section 1009.2 states that the AMOE must be made up of the components listed in Items 1 through 10, and that they shall be continuous to the public way. Under the current IBC language, the part about continuous to the public way is only true when the AMOE does not include assisted rescue from the emergency first responders. The current language leaves the door open for requiring an accessible route at locations between stairs and the public way. This concept does not make sense because stairs are not a component of an accessible route, so an accessible route should not be required for the path after stairs. Further, the concept for areas of refuge and exterior area for assisted rescue is to provide a safe place for people with disabilities to wait until the first responders can pick that person up and move them (assisted rescue). This assisted rescue will require travel down stairways, so again, it does not make sense to require an accessible route from an area that is not accessible.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The code change won't increase the cost of construction as it is in line with the current code intent. If an accessible space requires one MOE, then only one AMOE will be required. Buildings with two or more stories typically require at least two MOE, and will require two AMOE. This can generally be two stairways, when less than 5 stories, or a stairway and an elevator on standby powers, where the building is 5 stories or greater. With this change, the two AMOE can still be either of those options. The stairways would already be separated as required by the general MOE provisions. In this case, all this code change is saying is: where only two AMOE are provided, they cannot both be a stair and an elevator, if they are located right next to each other.

E37-24

E38-24

IBC: 1009.2, 1009.7; IFC: [BE] 1009.2, [BE] 1009.7

Proponents: David Renn, PE, SE, City and County of Denver, Colorado Chapter Code Development Committee (david.renn@denvergov.org)

2024 International Building Code

Revise as follows:

1009.2 Continuity and components.
Each required *accessible means of egress* shall be continuous to a *public way* and shall consist of one or more of the following components:

1. *Accessible routes* complying with Section 1104.
2. *Interior exit stairways* complying with Sections 1009.3 and 1023.
3. *Exit access stairways* complying with Sections 1009.3 and 1019.3 or 1019.4.
4. *Exterior exit stairways* complying with Sections 1009.3 and 1027 and serving levels other than the *level of exit discharge*.
5. Elevators complying with Section 1009.4.
6. Platform lifts complying with Section 1009.5.
7. *Horizontal exits* complying with Section 1026.
8. *Ramps* complying with Section 1012.
9. *Areas of refuge* complying with Section 1009.6.
10. Exterior areas for assisted rescue complying with Section 1009.7 serving *exits* at the *level of exit discharge*.

Exception: An *accessible means of egress* that ends at one of the following components is not required to be continuous to a *public way*:

1. *Area of refuge* complying with Section 1009.6 at the *level of exit discharge* that provides direct access to an exterior *exit* door.
2. Exterior area for assisted rescue complying with Section 1009.7 serving an *exit* at the *level of exit discharge.*

1009.7 Exterior areas for assisted rescue. Exterior areas for assisted rescue shall be accessed by an *accessible route* from the area served, shall be located on the exterior landing adjacent to an *exit*, and shall comply with Sections 1009.7.1 through 1009.7.4. .~~Where the *exit discharge* does not include an *accessible route* from an exit located on the *level of exit discharge* to a *public way*, an exterior area of assisted rescue shall be provided on the exterior landing in accordance with Sections 1009.7.1 through 1009.7.4.~~

2024 International Fire Code

Revise as follows:

[BE] 1009.2 Continuity and components.
Each required *accessible means of egress* shall be continuous to a *public way* and shall consist of one or more of the following components:

1. *Accessible routes* complying with Section 1104 of the International Building Code.
2. *Interior exit stairways* complying with Sections 1009.3 and 1023.
3. *Exit access stairways* complying with Sections 1009.3 and 1019.3 or 1019.4.
4. *Exterior exit stairways* complying with Sections 1009.3 and 1027 and serving levels other than the *level of exit discharge*.
5. Elevators complying with Section 1009.4.

6. Platform lifts complying with Section 1009.5.
7. *Horizontal exits* complying with Section 1026.
8. *Ramps* complying with Section 1012.
9. *Areas of refuge* complying with Section 1009.6.
10. Exterior areas for assisted rescue complying with Section 1009.7 serving *exits* at the *level of exit discharge*.

Exception: An *accessible means of egress* that ends at one of the following components is not required to be continuous to a *public way*:

1. *Area of refuge* complying with Section 1009.6 at the *level of exit discharge* that provides direct access to an exterior *exit* door.
2. Exterior area for assisted rescue complying with Section 1009.7 serving an *exit* at the *level of exit discharge*.

[BE] 1009.7 Exterior areas for assisted rescue. Exterior areas for assisted rescue shall be accessed by an *accessible route* from the area served, shall be located on the exterior landing adjacent to an *exit*, and shall comply with Sections 1009.7.1 through 1009.7.4. ~~.Where the *exit discharge* does not include an *accessible route* from an *exit* located on the *level of exit discharge* to a *public way*, an exterior area of assisted rescue shall be provided on the exterior landing in accordance with Sections 1009.7.1 through 1009.7.4.~~

Reason: Section 1009.7 currently requires an exterior area for assisted rescue where the exit discharge does not include an accessible route from the exit to a public way. This requirement is essentially an exception to 1009.2 that requires an accessible means of egress (AMOE) to be continuous to the public way. Also, the exception to Section 1009.6.2 was added to allow an interior area of refuge at the level of exit discharge to act the same as an exterior area of rescue assistance - both provide a protected space where persons with physical disabilities can wait for an assisted rescue by an emergency responder. The exception to 1009.6.2 doesn't specifically say the AMOE does not need an accessible route to the public way, but that is clearly the intent since there would be no other reason to provide such an area of refuge. Also, the commentary to Section 1009.7 discusses both an exterior area for assisted rescue and an interior area of refuge and indicates they both are an option to not providing an AMOE that is continuous to the public way.

To clarify the continuity requirements for an exterior area for assisted rescue and an interior area of refuge at the level of exit discharge, this proposal adds an exception to the continuity requirement in 1009.2 and deletes the implied exception in 1009.7 since it would be redundant.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal clarifies the intent of the code with regard to continuity requirements for assisted rescue components of the accessible means of egress, so there will be no cost impact.

E38-24

E39-24

IBC: 1009.2.1; IFC: [BE] 1009.2.1

Proponents: Ali Fattah, City of San Diego Development Services Department, San Diego Area Chapter of ICC (afattah@sandiego.gov)

2024 International Building Code

Revise as follows:

1009.2.1 Elevators required. In *buildings* where an ~~a required~~ *accessible* floor is four or more *stories* above ~~or below~~ a *level of exit discharge,* or where an accessible *occupiable roof* is above a *story* that is three or more *stories* above the *level of exit discharge*, or where an accessible floor is four or more *stories* below a *level of exit discharge,* not less than one required *accessible means of egress* shall include an elevator complying with Section 1009.4.

Exceptions:

1. In *buildings* equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, the elevator shall not be required as part of the *accessible means of egress* on floors provided with a *horizontal exit* and located ~~at or~~ above the *levels of exit discharge*.
2. In *buildings* equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, the elevator shall not be required as part of the *accessible means of egress* on floors or *occupiable roofs* provided with a ramp conforming to the provisions of Section 1012.

2024 International Fire Code

Revise as follows:

[BE] 1009.2.1 Elevators required.
In *buildings* where an ~~a required~~ *accessible* floor is four or more *stories* above ~~or below~~ a *level of exit discharge,* or where an accessible *occupiable roof* is above a *story* that is three or more *stories* above the *level of exit discharge*, or where an accessible floor is four or more *stories* below a *level of exit discharge,* not less than one required *accessible means of egress* shall include an elevator complying with Section 1009.4.

Exceptions:

1. In buildings equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, the elevator shall not be required as part of the *accessible means of egress* on floors provided with a *horizontal exit* and located ~~at or~~ above the *levels of exit discharge*.
2. In buildings equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, the elevator shall not be required as part of the *accessible means of egress* on floors or *occupiable roofs* provided with a *ramp* conforming to the provisions of Section 1012.

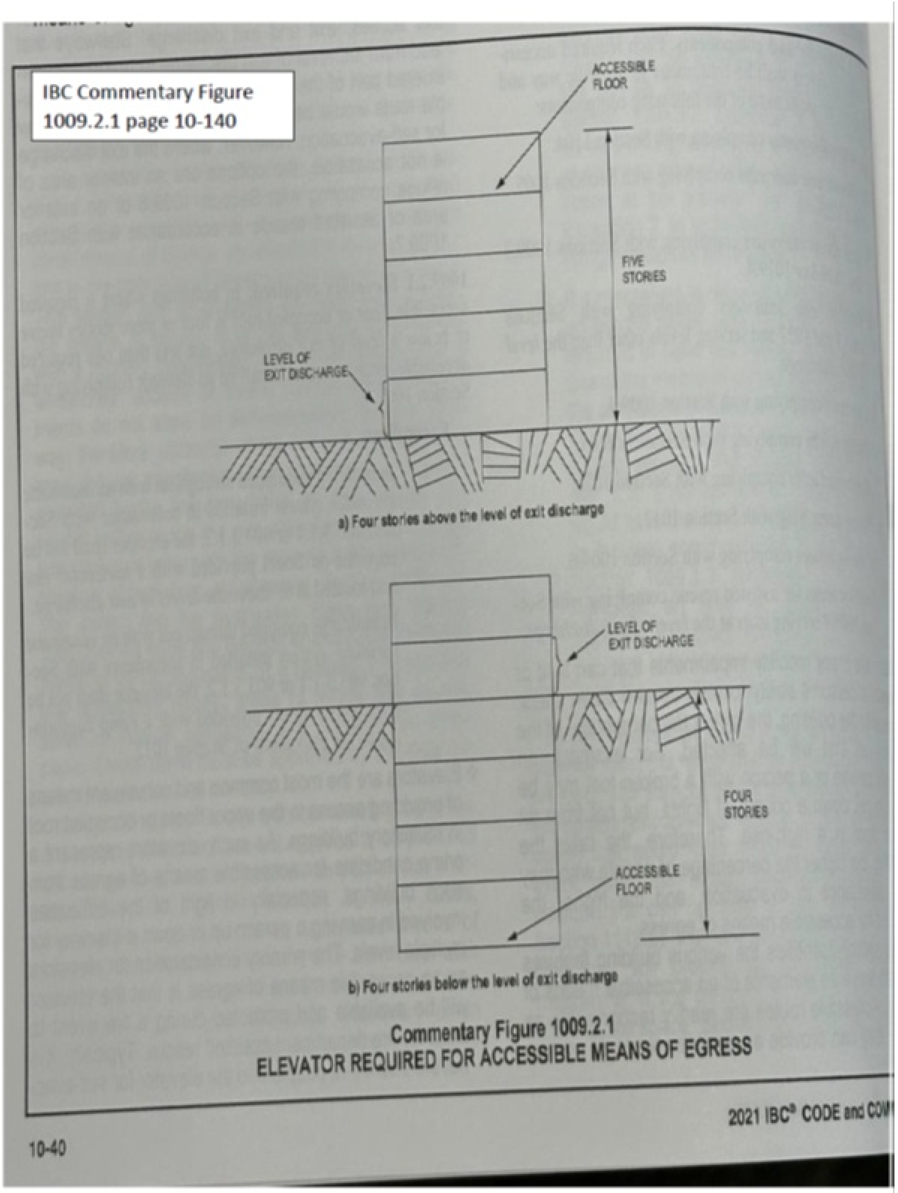
Reason: The proposed code change intends to add clarity when determining whether accessible means of egress via elevator is required. The code change seeks to accomplish the following objectives:

1. Separate determinations for levels above the level of exit discharge from levels below the level of exit discharge. This is consistent with how the IBC commentary depicts code application of the section.
2. Modify exception 1 to exclude the level of exit discharge since Ch 11 requires it to be on an accessible route.

The first proposed change addresses a gray area where a 4-story building that includes 1 story below grade plane can trigger accessible means of egress by elevator or when a building that includes 4 stories below grade plane includes a story above the level of exit discharge thus also triggering accessible means of egress. The IBC commentary includes a figure that appears to guide the code user to consider below grade plane and above grade plane areas separately.

Most buildings include entrances on the level of exit discharge and therefore those levels will be accessible. Additionally accessible means of egress requires accessible spaces to be accessed by at least one accessible means of egress, so it is not clear why a horizontal exit needs to be located on the level of exit discharge. It is not common practice to include a horizontal exit at that level.

The proposed code change is primarily editorial in nature, and it can be argued that excluding the level of exit discharge is also an editorial code change.



Bibliography: 2021 IBC Code and Commentary volume 1 Figure 1009.2.1 page 10-140

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

It can be argued that the cost of construction is reduced since a fire barrier is not required at the level of exit discharge. However, proponent has not seen one required by other Building Officials or review staff.

E39-24

E40-24

IBC: 1009.2.1; IFC: [BE] 1009.2.1

Proponents: Gabriel Levy, incandescence life safety, inc, Colorado Chapter Code Development Committee (glevy@incandescencels.com)

2024 International Building Code

Revise as follows:

1009.2.1 Elevators required. In *buildings* where a required *accessible* floor is four or more *stories* above or below a *level of exit discharge* or where an accessible *occupiable roof* is above a *story* that is three or more *stories* above the *level of exit discharge*, not less than one required *accessible means of egress* from *stories* other than a *level of exit discharge* shall include an elevator complying with Section 1009.4.

Exceptions:

1. In *buildings* equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, the elevator shall not be required as part of the *accessible means of egress* on floors provided with a *horizontal exit* and located at or above the *levels of exit discharge.*
2. In *buildings* equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, the elevator shall not be required as part of the *accessible means of egress* on floors or *occupiable roofs* provided with a ramp conforming to the provisions of Section 1012.

2024 International Fire Code

Revise as follows:

[BE] 1009.2.1 Elevators required. In buildings where a required accessible floor is four or more stories above or below a *level of exit discharge* or where an accessible *occupiable roof* is above a story that is three or more stories above the *level of exit discharge* , not less than one required *accessible means of egress*from *stories* other than a *level of exit discharge* shall include an elevator complying with Section 1009.4.

Exceptions:

1. In buildings equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, the elevator shall not be required as part of the *accessible means of egress* on floors provided with a *horizontal exit* and located at or above the *levels of exit discharge*.
2. In buildings equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, the elevator shall not be required as part of the *accessible means of egress* on floors or *occupiable roofs* provided with a *ramp* conforming to the provisions of Section 1012.

Reason: The existing code language implies that an elevator is required to serve as an accessible means of egress on a level of exit discharge. This is counterintuitive, as the preferred egress path would be directly to the exterior of the building. The use of a horizontal exit in lieu of an accessible elevator is clarified by this amendment such that a horizontal exit would not be required on a level of exit discharge because the elevator requirement is taken out of the base language.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Any cost impact will be through the user of the code understanding the application and intent when reading the provision the first time. The revisions to the text of the code will not increase or decrease the cost of construction as the technical intent and content of the code remains intact and unaltered.

E41-24

IBC: 1009.2.1; IFC: [BE] 1009.2.1

Proponents: Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org)

2024 International Building Code

Revise as follows:

1009.2.1 Elevators required.
In *buildings* where a required *accessible* floor is four or more *stories* above or below a *level of exit discharge* or where an accessible *occupiable roof* is above a *story* that is three or more *stories* above the *level of exit discharge* , not less than one required *accessible means of egress* shall include an elevator complying with Section 1009.4.

Exceptions:

1. ~~In *buildings* equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, the~~The elevator shall not be required as part of the *accessible means of egress* ~~on floors provided with a *horizontal exit* and located at or above the *levels of exit discharge*.~~ where the building complies with all of the following:
    1.1. The building is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.

    1.2. All floors above the level of exit discharge are provided with a horizontal exit.

    1.3. Where there is an occupiable roof, the means of egress serving the occupiable roof is provided by interior exit stairways or ramps complying with Section 1023.

2. In *buildings* equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, the elevator shall not be required as part of the *accessible means of egress* on floors or *occupiable roofs* provided with a ramp conforming to the provisions of Section 1012.

2024 International Fire Code

Revise as follows:

[BE] 1009.2.1 Elevators required.
In buildings where a required accessible floor is four or more stories above or below a *level of exit discharge* or where an accessible *occupiable roof* is above a story that is three or more stories above the *level of exit discharge* , not less than one required *accessible means of egress* shall include an elevator complying with Section 1009.4.

Exceptions:

1. ~~In buildings equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, the~~ The elevator shall not be required as part of the *accessible means of egress* ~~on floors provided with a *horizontal exit* and located at or above the *levels of exit discharge*.~~ where the building complies with all of the following:
    1.1. The building is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.

    1.2. All floors above the level of exit discharge are provided with a horizontal exit.

    1.3. Where there is an occupiable roof, the means of egress serving the occupiable roof is provided by interior exit stairways or ramps complying with Section 1023.

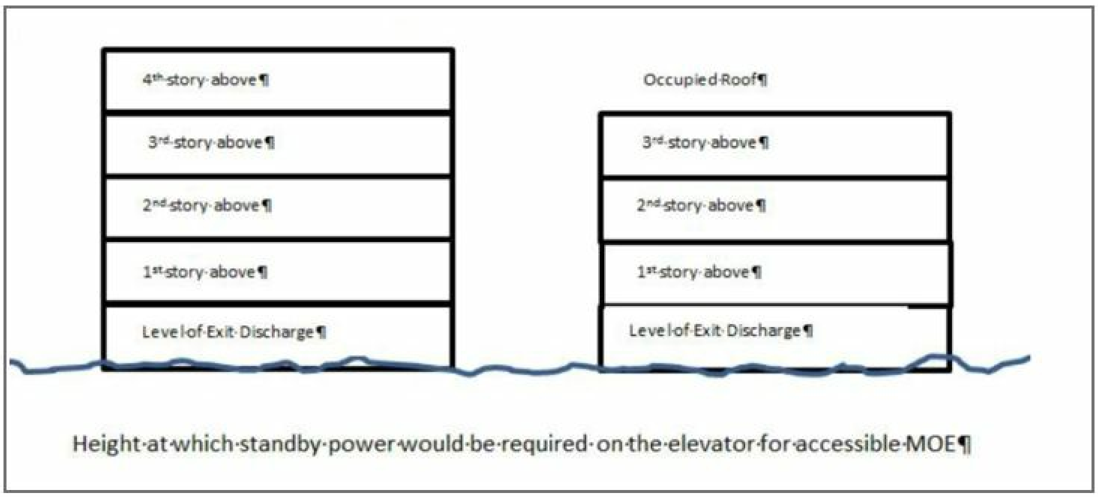
2. In buildings equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, the elevator shall not be required as part of the *accessible means of egress* on floors or *occupiable roofs* provided with a *ramp* conforming to the provisions of Section 1012.

Reason: The intent of this proposal is to address buildings that have an occupiable roof and to allow for those buildings to use the option of elevators with standby power (required in Section 1009.4) or to allow the use of horizontal exits. The reformatting is for ease of use and clarity. The new requirement for occupiable roofs is addressed in 1.3.

Horizontal exits on floors provide protected areas for people to wait for fire department assisted rescue if they need it.

With the addition of 1.3, people on the occupied roofs would be protected from smoke and fumes by being open to the air. If the people enter directly into enclosed exit stairways, they are protected to the level of exit discharge. These are sprinklered buildings, so no interior areas of refuge are required. The horizontal exits below allow for slower evacuation time, so the fire department can have additional time to assist anyone on the roof. Section 1006.3 considers occupiable roofs as a story for means of egress, so there will always be at least two ways off.

The Egress committee (E31-21) raised some concerns last cycle which this proposal addresses . The concern as to the location of the horizontal exit on the level below the occupied roof is immaterial because the occupants will already be within a protected exit enclosure. Following, there is not a concern of an occupant traveling down to the fire side of a horizontal exit on the floor below with the use of an exit access stairway or ramp.



This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC webpage.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Occupiable roofs were added to Section 1009.2 by E30-18. This clarifies an option for accessible means of egress for building with occupiable roofs.

E41-24

E42-24

IBC: 1009.2.1; IFC: [BE] 1009.2.1

Proponents: Gabriel Levy, incandescence life safety, inc, Colorado Chapter Code Development Committee (glevy@incandescencels.com)

2024 International Building Code

Revise as follows:

1009.2.1 Elevators required.
In *buildings* where a required *accessible* floor is four or more *stories* above or below a *level of exit discharge* or where an accessible *occupiable roof* is above a *story* that is three or more *stories* above the *level of exit discharge* , not less than one required *accessible means of egress* shall include an elevator complying with Section 1009.4.

Exceptions:

1. In *buildings* equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, the elevator shall not be required as part of the *accessible means of egress* on floors provided with a *horizontal exit* and located at or above the *levels of exit discharge.*
2. In *buildings* equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, the elevator shall not be required as part of the *accessible means of egress* on floors or *occupiable roofs* provided with a ramp<u>, other than vehicle ramps, </u> conforming to the provisions of Section 1012 <u>and providing means of egress between stories</u>

1012.1 Scope.
The provisions of this section shall apply to *ramps* used as a component of a *means of egress*.

Exceptions:

1. Ramped *aisles* within assembly rooms or spaces shall comply with the provisions in Section 1030.
2. Curb ramps shall comply with ICC A117.1.
3. Vehicle ramps in parking garages for pedestrian *exit access* shall not be required to comply with Sections 1012.3 through 1012.10 where they are not an *accessible* route serving accessible parking spaces, other required accessible elements or part of an *accessible means of egress*.

2024 International Fire Code

Revise as follows:

[BE] 1009.2.1 Elevators required.
In buildings where a required accessible floor is four or more stories above or below a *level of exit discharge* or where an accessible *occupiable roof* is above a story that is three or more stories above the *level of exit discharge* , not less than one required *accessible means of egress* shall include an elevator complying with Section 1009.4.

Exceptions:

1. In buildings equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, the elevator shall not be required as part of the *accessible means of egress* on floors provided with a *horizontal exit* and located at or above the *levels of exit discharge.*
2. In *buildings* equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, the elevator shall not be required as part of the *accessible means of egress* on floors or *occupiable roofs* provided with a ramp<u>, other than vehicle ramps, </u> conforming to the provisions of Section 1012 <u>and providing means of egress between stories</u>.

[BE] 1012.1 Scope.
The provisions of this section shall apply to *ramps* used as a component of a *means of egress*.

Exceptions:

1. Ramped *aisles* within assembly rooms or spaces shall comply with the provisions in Section 1030.
2. Curb *ramps* shall comply with ICC A117.1.
3. Vehicle *ramps* in parking garages for pedestrian *exit access* shall not be required to comply with Sections 1012.3 through 1012.10 where they are not an *accessible route* serving accessible parking spaces, other required accessible elements or part of an *accessible means of egress*.

Reason: A vehicle ramp for pedestrian exit access is not required to meet all ramp requirements, per IBC 1012.1 Exception 3. Although a vehicle ramp can comply with IBC 1012, a ramp without handrails and landings is not an accessible route, it is not intended to serve as an alternative for an elevator with standby power.

The intent of the ramp is to allow occupants to travel to a story with an elevator with standby power or a level of exit discharge.

As Exception 2 is currently written, the code does not explicitly identify that the ramp must travel between stories. A ramp that connects levels on the same story is not intended to replace an accessible means of egress elevator.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Any cost impact will be through the user of the code understanding the application and intent when reading the provision the first time. The revisions to the text of the code will not increase or decrease the cost of construction as the technical intent and content of the code remains intact and unaltered.

E42-24

E43-24

IBC: 1009.2.1, 1012.1; IFC: [BE] 1009.2.1, [BE] 1012.1

Proponents: Ali Fattah, City of San Diego Development Services Department, San Diego Area Chapter of ICC (afattah@sandiego.gov)

2024 International Building Code

Revise as follows:

1009.2.1 Elevators required.
In *buildings* where a required *accessible* floor is four or more *stories* above or below a *level of exit discharge* or where an accessible *occupiable roof* is above a *story* that is three or more *stories* above the *level of exit discharge*, not less than one required *accessible means of egress* shall include an elevator complying with Section 1009.4.

Exceptions:

1. In *buildings* equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, the elevator shall not be required as part of the *accessible means of egress* on floors provided with a *horizontal exit* and located at or above the *levels of exit discharge*.
2. In *buildings* equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, the elevator shall not be required as part of the *accessible means of egress* on floors or *occupiable roofs* provided with a ramp conforming to the provisions of Section 1012.
3. In *buildings* equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, the elevator shall not be required as part of the *accessible means of egress* on floors of parking garages where an area of refuge complying with Section 1009.6 is provided in each stairway serving an accessible floor.

1012.1 Scope.
The provisions of this section shall apply to *ramps* used as a component of a *means of egress*.

Exceptions:

1. Ramped *aisles* within assembly rooms or spaces shall comply with the provisions in Section 1030.
2. Curb ramps shall comply with ICC A117.1.
3. Vehicle ramps in parking garages for pedestrian *exit access* shall not be required to comply with Sections 1012.3 through 1012.10 where they are not an *accessible* route ~~serving accessible parking spaces, other required accessible elements~~ or part of an *accessible means of egress* *serving elements or parking spaces required to be accessible*.

2024 International Fire Code

Revise as follows:

[BE] 1009.2.1 Elevators required.
In buildings where a required accessible floor is four or more stories above or below a *level of exit discharge* or where an accessible *occupiable roof* is above a story that is three or more stories above the *level of exit discharge* , not less than one required *accessible means of egress* shall include an elevator complying with Section 1009.4.

Exceptions:

1. In buildings equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, the elevator shall not be required as part of the *accessible means of egress* on floors provided with a *horizontal exit* and located at or above the *levels of exit discharge*.
2. In buildings equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, the elevator shall not be required as part of the *accessible means of egress* on floors or *occupiable roofs* provided with a *ramp* conforming to the provisions of Section 1012.

3. <u>In *buildings* equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, the elevator shall not be required as part of the *accessible means of egress* on floors of parking garages where an area of refuge complying with Section 1009.6 is provided in each stairway serving an accessible floor.</u>

[BE] 1012.1 Scope.

The provisions of this section shall apply to *ramps* used as a component of a *means of egress*.

Exceptions:

1. Ramped *aisles* within assembly rooms or spaces shall comply with the provisions in Section 1030.
2. Curb ramps shall comply with ICC A117.1.
3. Vehicle ramps in parking garages for pedestrian *exit access* shall not be required to comply with Sections 1012.3 through 1012.10 where they are not an *accessible* route ~~serving accessible parking spaces, other required accessible elements~~ or part of an *accessible means of egress* <u>*serving elements or parking spaces required to be accessible.*</u>

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Reason: The proposed code change addresses a common issue in buildings designed to comply with Section 510.2 where the use of fire walls or fire barriers can exempt elevators from being a required part of the accessible means of egress and the associated standby source of power. It is not practical to bisect a parking garage that is commonly located below the three-hour separation with a fire barrier and associated fire shutters.

This code change provides an option to use a refuge area within a stairway as an alternative. Refuge areas allow for assisted rescue in the event of an emergency and elevators are not operable. We feel that this is a good compromise since the refuge area may be located in one or two basement levels or one or two above grade levels. This part of the code change is not in conflict with Section 1009.3.3 exception 2 and 3 since it is a more specific requirement and is an optional method of compliance to the base requirement. Additionally, the proposed code change only references Section 1009.6 that includes the construction requirements for refuge areas.

Parking garages have sloped floors or ramps so assisted rescue can be through sloped floors without the use of elevators. Additionally building occupants, or wheelchair users using motorized wheelchairs can self-evacuate. It would seem that garages required to be served by an accessible means of egress via elevator should be treated differently since vehicular ramps will be present, and the garages will generally be protected with fire sprinklers. A companion code change to Section 1012.1 also adds a clarification to exception 3 in the ramp section that exempts certain vehicular ramps in parking garages from complying as ramps when they are not an accessible route or a part of an accessible means of egress. This part of the code change rearranges the text a little.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

The cost of fire barriers is approximately $100 per linear foot of wall and the cost of fire shutters is approximately $20,000 each with generally 2 or more shutters required at drive aisles. Standby generators cost $20,000 to install.

The cost of a 42 sq ft refuge area is $12,600, based on $300 per sq ft cost.

Estimated Immediate Cost Impact Justification (methodology and variables):

The construction of fire barriers and including fire shutters or other opening protectives instead of providing standby power for elevators or installing a standby generator powered by natural gas will greatly exceed the cost of space lost due to refuge areas in stairways.

E43-24

E44-24

IBC: 1009.3; IFC: [BE] 1009.3

Proponents: Gene Boecker, CCI, self (geneb@codeconsultants.com); Matt Lescher, CCI, self (mattl@codeconsultants.com); Marsha Mazz, United Spinal Association, United Spinal Association (mmazz@accessibility-services.com)

2024 International Building Code

Revise as follows:

1009.3 Stairways.
In order to be considered part of an *accessible means of egress*, a *stairway* between *stories* shall comply with ICC A117.1 and Sections 1009.3.1 through 1009.3.3.

> **Exception:** Stairways within dwelling units or sleeping units, other than Accessible dwelling or sleeping unit, shall not be required to comply with ICC A117.1.

2024 International Fire Code

Revise as follows:

[BE] 1009.3 Stairways.
In order to be considered part of an *accessible means of egress*, a *stairway* between *stories* shall comply with ICC A117.1 and Sections 1009.3.1 through 1009.3.3.

> **Exception:** Stairways within dwelling units or sleeping units, other than Accessible dwelling or sleeping unit, shall not be required to comply with ICC A117.1.

Staff Analysis: The next edition of the ICC A117.1 is currently under development. There are several proposals in progress that will effect stairway construction, including changes to the striping requirements for every tread and landing.

Reason: While many of the accessibility related provisions of the A117.1 and ADA Standards have been mainstreamed into the IBC, some have not. The IBC includes provisions for stairs assuming the broad population as a whole. The A117.1 looks at these elements for their unique qualities as they relate to people with limited mobility and limited vision capabilities. The A117.1 standards are based on review of ergonomic data and actual fall and accident events as well as a comparison to other accessibility standards around the world. The A117.1 standard is better equipped to address the needs and concerns for people with disabilities.

As most of the requirements are the same and IBC Section 102.4 states that where conflicts exist between the code and a standard, the code shall prevail, the impact will be largely for the visual contrast at stair nosings. Visual contrast is especially important for people with limited vision and for people who are not functioning to their highest mental capability due to medication, intoxication or medical cognition.

The exception acknowledges the fact that the IBC contains a number of exceptions for stairs within dwelling units; and, that many people will not desire some of the A117.1 requirements for stairs within Type A and Type B units, as well as those not required to be Type A or Type B, since the A117.1 includes requirements for handrail extensions, and contrasting stripes. Since Type A and Type B units are adaptable, it seems reasonable that these elements could be added at a time when the occupant requires such features.

When evaluating the differences between the IBC requirements for stairways and the A117.1 requirements, the following table identifies the similarities and differences. Below each item is a notation about which is more restrictive or contains more criteria for compliance.

AMOE Stairways.

Requirement	IBC	A117.1
Riser Height (same)	4” min – 7” max	4” min – 7” max
Tread depth (same)	11” min	11” min
Open Risers (same)	Not required where stair is part of accessible means of egress.	Not Permitted
Tread surface (same)	Max opening of ½”, securely attached, with slope not steeper than 1:48,	Max opening of 1/2”, firm, stable, slip resistant and slope not steeper than 1:48
Tread and Riser uniformity (IBC)	Very Specific criteria for how uniformity is measured to adjacent steps and overall	All must be “uniform”
Nosing profile (A117.1)	9/16” max radius, underside at 30 degrees (no language about beveled nosings)	½” radius, ½” bevel, underside at 30 degrees max to vertical
Nosing depth (IBC)	1-1/4” max	1-1/2” max
Landings (IBC)	Specific criteria	No criteria
Visual contrast (A117.1)	Luminescent marking for high-rise buildings.	One of the following: 1. The leading 1 to 2 inches (25 to 51 mm) of every tread and landing, measured horizontally from the leading edge of the nosing, shall consist of a solid color having visual contrast of dark-on-light or light-on-dark from the remainder of the tread. The contrasting marking shall be durable and shall extend from one side of each tread to the other side of each tread. 2. Durable distinctive warning markings required by the adopted building code or ANSI safety standard.
Handrails (A117.1)	Required on both sides with some exceptions for short stairs and inside dwelling units.	Required on both sides, except for dwelling units NOT required to be Accessible.
Wet conditions (same)	Designed not to allow water accumulation.	Designed not to allow water accumulation.
Maxi. rise between landings (IBC)	12 feet vertical	Not addressed

Requirement	IBC	A117.1
Lighting (IBC)	The means of egress illumination level shall be not less than 1 footcandle (11 lux) at the walking surface. Along exit access stairways, exit stairways and at their required landings, the illumination level shall not be less than 10 footcandles (108 lux) at the walking surface when the stairway is in use.	1. A 1-foot-candle (10.8 lux) minimum illumination at times other than conditions of stair use 2. A 10-foot-candle (108 lux) minimum illumination during conditions of stair use 3. The transition from 1 foot candle (10.8 lux) to 10 foot candle (108 lux) under conditions of stair use shall be permitted to be achieved by automatic, motion sensor-type lighting switches provided the switch controllers comply with all of the following: 3.1 The switch controllers are equipped for fail-safe operation and evaluated for this purpose 3.2 The motion sensor is activated by occupant movement on the stair or stair landings 3.3 The illumination timers are set for a minimum 15-minute duration.
Signage within Stair enclosure (A117.1)	"1023.11 Tactile floor-level signs. Where floor level signs are provided in interior exit stairways and ramps, a floor-level sign identifying the floor level in visual characters, raised characters and braille complying with ICC A117.1 shall be located at each floor-level landing adjacent to the door leading from the interior exit stairway and ramp into the corridor."	"Stair level identification signs in raised characters and braille complying with [A117.1] Sections 703.3 and 703.4 shall be located at each floor level landing in all enclosed stairways adjacent to the door leading from the stairwell into the corridor to identify the floor level. The exit door discharging to the outside or to the level of exit discharge shall have a sign with raised characters and braille stating "EXIT.""
Signage at exits (IBC – includes horizontal exits)	"Where exit signs are provided at an area of refuge with direct access to a stairway, an exterior area for assisted rescue, an exit stairway or ramp, an exit passageway, a horizontal exit and	"A sign stating EXIT in raised characters and Braille and complying with [A117.1] Sections 703.3 and 703.4 shall be provided adjacent to each door to an area of refuge

Requirement	IBC	A117.1
	the exit discharge, a sign stating "EXIT" in visual characters, raised characters and braille and complying with ICC A117.1 shall be provided.”	providing direct access to a stairway, an exterior area for assisted rescue, an exit stairway, an exit ramp, an exit passageway and the exit discharge.”

Bibliography: IBC - 2024

ICC A117.1 - 2017, Supplement

Cost Impact: Increase

Estimated Immediate Cost Impact:

The additional material cost to adding a stripe to the tread can be as little as $0.02 is it involves paint or $0.70 per tread for adhesive-type anti-slip tape applications. For a 4 story building with two exit stairways, the anti-slip application would increase the material cost by less than $100 for the entire project.

Estimated Immediate Cost Impact Justification (methodology and variables):

The cost would be minimal. Most of the differences are in the details which would not affect cost. The only item which would be a cost increase is the visual contrast marking. In many facilities, this is already installed for general safety reasons and is therefore no cost at all.

Estimated Life Cycle Cost Impact:

Depending on the material used the life cycle costs could be $0 or an estimated $100 every 6-10 years.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

Variables include the type of materials originally used for contrast and the types of materials used for maintaining the contrasting stripes as well as teh frequency of maintenance - also dependent on the materials selected.

E44-24

E45-24

IBC: 1010.1.1 (New), 1010.1.1, 1010.1.1.1.1 (New), 1010.1.1.1.2 (New), 1010.1.1.1.3 (New), 1010.1.1.2 (New), 1010.1.1.1; IFC: 1010.1.1 (New), [BE] 1010.1.1, 1010.1.1.1.1 (New), 1010.1.1.1.2 (New), 1010.1.1.1.3 (New), 1010.1.1.2 (New), [BE] 1010.1.1.1

Proponents: John Woestman, Kellen Company, Builders Hardware Manufacturers Association (BHMA) (jwoestman@kellencompany.com)

2024 International Building Code

Add new text as follows:

1010.1.1 Size of doors. Doors in the means of egress shall comply with the minimum clear opening width and minimum height requirements of Sections 1010.1.1.1 and 1010.1.1.2.

Revise as follows:

~~1010.1.1~~1010.1.1.1 ~~Size of doors~~ Minimum width.
The required capacity of each door opening shall be sufficient for the *occupant load* thereof and shall provide a ~~minimum~~ clear opening width of not less than 32 inches (813 mm). ~~The clear opening width of doorways with swinging doors shall be measured between the face of the door and the frame stop, with the door open 90 degrees (1.57 rad). Where this section requires a minimum clear opening width of 32 inches (813 mm) and a door opening includes two door leaves without a mullion, one leaf shall provide a minimum clear opening width of 32 inches (813 mm).~~ In Group I-2, doors serving as means of egress doors where used for the movement of beds shall provide a ~~minimum~~ clear opening width of not less than $41^1/_2$ inches (1054 mm). ~~The minimum clear opening height of doors shall be not less than 80 inches (2032 mm).~~

Exceptions:

1. In Group R-2 and R-3 *dwelling and sleeping units* that are not required to be an *Accessible unit*, *Type A unit* or *Type B unit*, the minimum clear opening width shall not apply to door openings that are not part of the required *means of egress*.
2. In Group I-3, door openings to resident *sleeping units* that are not required to be an *Accessible unit* shall have a ~~minimum~~ clear opening width of not less than 28 inches (711 mm).
3. Door openings to storage closets less than 10 square feet (0.93 m^2) in area shall not be limited by the minimum clear opening width.
4. ~~Door openings within a *dwelling unit* or *sleeping unit* shall have a minimum clear opening height of 78 inches (1981 mm).~~
5. ~~In *dwelling and sleeping units* that are not required to be *Accessible*, Type A or *Type B units*, exterior door openings other than the required *exit* door shall have a minimum clear opening height of 76 inches (1930 mm).~~

~~6.~~4. In Groups I-1, R-2, R-3 and R-4, in *dwelling and sleeping units* that are not required to be *Accessible*, Type A or *Type B units*, the minimum clear opening widths shall not apply to interior egress doors.

~~7.~~5. Door openings required to be accessible within *Type B units* intended for user passage shall have a ~~minimum~~ clear opening width of not less than 31.75 inches (806 mm).

~~8.~~6. Doors serving sauna compartments, toilet compartments or dressing, fitting or changing compartments that are not required to be accessible shall have a ~~minimum~~ clear opening width of not less than 20 inches (508 mm).

~~9.~~7. Doors serving shower compartments shall comply with Section 421.4.2 of the *International Plumbing Code*.

Add new text as follows:

1010.1.1.1.1 Clear opening width measurement. The clear opening width of doorways with swinging doors shall be measured between the face of the door and the frame stop, with the door open 90 degrees (1.57 rad).

1010.1.1.1.2 Two door leaves. Where a minimum clear opening width is required and a door opening includes two door leaves without a mullion, one leaf shall provide that required minimum clear opening width.

1010.1.1.1.3 Opposite-swinging doors. Where a pair of opposite-swinging doors are in the means of egress, each door required to swing in the direction of egress travel shall provide the required minimum clear opening width.

1010.1.1.2 Minimum height. The clear opening height of doors shall be not less than 80 inches (2032 mm).

Exceptions:

1. Door openings within a dwelling unit or sleeping unit shall have a clear opening height of not less than 78 inches (1981 mm).
2. In dwelling and sleeping units that are not required to be Accessible, Type A or Type B units, exterior door openings other than the required exit door shall have a clear opening height of not less than 76 inches (1930 mm).

Revise as follows:

~~1010.1.1.1~~1010.1.1.3 Projections into clear opening.
There shall not be projections into the required clear opening width lower than 34 inches (864 mm) above the floor or ground. Projections into the clear opening width between 34 inches (864 mm) and 80 inches (2032 mm) above the floor or ground shall not exceed 4 inches (102 mm).

Exception: Door closers, *overhead doorstops*, frame stops, power door operators, and electromagnetic door locks shall project into the door opening height not lower than 78 inches (1980 mm) above the floor.

2024 International Fire Code

Add new text as follows:

1010.1.1 Size of doors. Doors in the means of egress shall comply with the minimum clear opening width and minimum height requirements of Sections 1010.1.1.1 and 1010.1.1.2.

Revise as follows:

[BE] ~~1010.1.1~~1010.1.1.1 ~~Size of doors~~Minimum width.
The required capacity of each door opening shall be sufficient for the *occupant load* thereof and shall provide a ~~minimum~~ clear opening width of not less than 32 inches (813 mm). ~~The clear opening width of doorways with swinging doors shall be measured between the face of the door and the frame stop, with the door open 90 degrees (1.57 rad). Where this section requires a minimum clear opening width of 32 inches (813 mm) and a door opening includes two door leaves without a mullion, one leaf shall provide a minimum clear opening width of 32 inches (813 mm).~~ In Group I-2, doors serving as *means of egress* doors where used for the movement of beds shall provide a ~~minimum~~ clear opening width of not less than $41^{1}/_{2}$ inches (1054 mm). ~~The minimum clear opening height of doors shall be not less than 80 inches (2032 mm).~~

Exceptions:

1. In Group R-2 and R-3 *dwelling* and *sleeping units* that are not required to be an Accessible unit, Type A unit or Type B unit, the minimum clear opening width shall not apply to door openings that are not part of the required *means of egress*.
2. Group I-3 door openings to resident *sleeping units* that are not required to be an Accessible unit shall have a ~~minimum~~ clear opening width of not less than 28 inches (711 mm).
3. Door openings to storage closets less than 10 square feet (0.93 m^2) in area shall not be limited by the minimum clear opening width.
4. ~~Door openings within a *dwelling unit* or *sleeping unit* shall have a minimum clear opening height of 78 inches (1981 mm).~~
5. ~~In *dwelling* and *sleeping units* that are not required to be Accessible, Type A or Type B units, exterior door openings, other than the required exit door, shall have a minimum clear opening height of 76 inches (1930 mm).~~

~~6.~~4. In Groups I-1, R-2, R-3 and R-4, in dwelling and *sleeping units* that are not required to be Accessible, Type A or Type B units, the minimum clear opening widths shall not apply to interior egress doors.

~~7.~~5. Door openings required to be *accessible* within Type B units intended for user passage shall have a ~~minimum~~ clear opening width of not less than 31.75 inches (806 mm).

~~8.~~6. Doors serving sauna compartments, toilet compartments or dressing, fitting or changing rooms compartments that are not required to be accessible shall have a ~~minimum~~ clear opening width of not less than 20 inches (508 mm).

~~9.~~7. Doors serving shower compartments shall comply with Section 421.4.2 of the *International Plumbing Code*.

Add new text as follows:

1010.1.1.1.1 Clear opening width measurement. The clear opening width of doorways with swinging doors shall be measured between the face of the door and the frame stop, with the door open 90 degrees (1.57 rad).

1010.1.1.1.2 Two door leaves. Where a minimum clear opening width is required and a door opening includes two door leaves without a mullion, one leaf shall provide that required minimum clear opening width.

1010.1.1.1.3 Opposite-swinging doors. Where a pair of opposite-swinging doors are in the means of egress, each door required to swing in the direction of egress travel shall provide the required minimum clear opening width.

1010.1.1.2 Minimum height. The clear opening height of doors shall be not less than 80 inches (2032 mm).

Exceptions:

1. Door openings within a dwelling unit or sleeping unit shall have a clear opening height of not less than 78 inches (1981 mm).
2. In dwelling and sleeping units that are not required to be Accessible, Type A or Type B units, exterior door openings other than the required exit door shall have a clear opening height of not less than 76 inches (1930 mm).

Revise as follows:

[BE] ~~1010.1.1.1~~1010.1.1.3 Projections into clear opening.
There shall not be projections into the required clear opening width lower than 34 inches (864 mm) above the floor or ground. Projections into the clear opening width between 34 inches (864 mm) and 80 inches (2032 mm) above the floor or ground shall not exceed 4 inches (102 mm).

Exception: Door closers, overhead doorstops, frame stops, power door operators, and electromagnetic door locks shall project into the door opening height not lower than 78 inches (1980 mm) above the floor.

Reason: This proposal editorially separates door size provisions into minimum width requirements (and related exceptions) from minimum height requirements (and related exceptions). All current requirements are retained, but many are relocated.

In addition, in several locations phrasing was revised from “minimum clear opening width of” to “clear opening width of not less than” for editorial consistency within the code. And, a few other editorial adjustments were made with the text.

Also, this proposal adds provisions for where a pair of opposite-swinging doors are in the means of egress in proposed new section 1010.1.1.1.3. Where the occupant load is such that doors are required to swing in the direction of egress travel, the code currently does not make it clear that each door which is required to swing in the direction of egress travel (of the pair of opposite-swinging doors) is required to meet the required minimum clear opening width.

This new section (1010.1.1.1.3) clearly expresses what we believe is the intent of the code, but this may be considered a technical revision. If what’s proposed in 1010.1.1.1.3 is the intent of the code, there would be no increase in the cost of construction. On the other hand, in situations where doors are required to swing in the direction of egress travel, if the intent of the code is to allow the door which swings against egress travel to be included in measuring the clear width provided by the pair of opposite-swinging doors, then this proposed new section may increase the cost of construction. But, we don’t believe the latter situation reflects the intent of the code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

There should be not increase or decrease in the cost of construction.

The proposed new section 1010.1.1.1.3 is consistent with the intent of the code. The other proposed revisions are intended to be editorial.

E45-24

E46-24

IBC: 1010.1.2.1; IFC: [BE] 1010.1.2.1

Proponents: Ray Steadward, Town of Enfield CT, CT Code Development (rsteadward@enfield.org)

2024 International Building Code

Revise as follows:

1010.1.2.1 Direction of swing. Side-hinged swinging doors, pivoted doors and balanced doors shall swing in the direction of egress travel where serving a room or area under any of the following conditions;

1. ~~containing~~ Containing an occupant load ~~of 50~~ greater than 49 ~~or more persons or~~.
2. More than one exit access doorway is required.
3. Group H occupancy.

2024 International Fire Code

Revise as follows:

[BE] 1010.1.2.1 Direction of swing.
Side-hinged swinging doors, pivoted doors and balanced doors shall swing in the direction of egress travel where serving a room or area under any of the following conditions;

1. ~~containing~~ Containing an occupant load ~~of 50~~ greater than 49 ~~or more persons or~~.
2. More than one exit access doorway is required.
3. Group H occupancy.

Reason: Changing the number from 50 occupants to 49 stays consistent with other sections and tables within the IBC. Adding the stipulation when more than one exit access doorway is required provides clarity. There are situations that the occupant load of a room or space does not exceed 49 people, but the common path of travel distance is exceeded, resulting in additional exit access doorway(s) to be added. When more than one exit access doorway is required, exit signs are required and occupants will try and push open a door in an emergency.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

At most it adjusts door swings of doors and should have no cost impact.

E46-24

E47-24

IBC: 1010.1.2.1; IFC: [BE] 1010.1.2.1

Proponents: Peter Zvingilas, State of Connecticut, SECTBO (zvinpete@gmail.com)

2024 International Building Code

Revise as follows:

1010.1.2.1 Direction of swing.
Side-hinged swinging doors, pivoted doors and *balanced doors* shall swing in the direction of egress travel where serving a room or area ~~containing an *occupant load* of 50 or more *persons* or a Group H occupancy.~~
under any of the following conditions;

1. Containing an occupant load greater than 49.
2. More than one exit access doorway required.
3. Group H occupancy.

2024 International Fire Code

Revise as follows:

[BE] 1010.1.2.1 Direction of swing.
Side-hinged swinging doors, pivoted doors and *balanced doors* shall swing in the direction of egress travel where serving a room or area ~~containing an *occupant load* of 50 or more *persons* or a Group H occupancy.~~
under any of the following conditions;

1. Containing an occupant load greater than 49.
2. More than one exit access doorway required.
3. Group H occupancy.

Reason: Changing the number from 50 occupants to 49 stays consistent with other sections and tables within the IBC. Adding the stipulation when more than one exit access doorway is required provides clarity. There are situations that the occupant load of a room or space does not exceed 49 people, but the common path of travel distance exceeded, resulting in additional exit access doorway(s) to be added. When more than one exit access doorway is required, exit signs are required and occupants will try and push open a door in an emergency.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is clarifying a section to read consistent with other sections of similar language.

E47-24

E48-24

IBC: SECTION 202 (New), 1010.1.4, 1010.1.6, 1011.5.5.2, 1011.6, 1011.8, 1011.14, 1027.3; IFC: SECTION 202 (New), [BE] 1010.1.4, [BE] 1010.1.6, [BE] 1011.5.5.2, [BE] 1011.6, [BE] 1011.8, [BE] 1011.14, [BE] 1027.3

Proponents: David Cooper, Stair Manufacturing and Design Consultants, Stairbuilders and Manufacturers Association, SMA (coderep@stairways.org)

2024 International Building Code

Add new definition as follows:

LANDING. The portion of a walking surface required for direct access to or from an adjacent, door, stair, flight of stairs, ramp run, or elevator.

Revise as follows:

1010.1.4 Floor elevation.
There shall be a ~~floor or~~ landing on each side of a door. Such ~~floor or~~ landing shall be at the same elevation on each side of the door. Landings shall be level except for exterior landings, which are permitted to have a slope not to exceed 0.25 unit vertical in 12 units horizontal (2-percent slope).

Exceptions:

1. At doors serving individual *dwelling units* or *sleeping units* in Groups R-2 and R-3, a door is permitted to open at the top step of an interior *flight* of stairs, provided that the door does not swing over the top step.
2. At exterior doors serving Groups F, H, R-2 and S and where such doors are not part of an *accessible route*, the landing at an exterior door shall not be more than 7 inches (178 mm) below the landing on the egress side of the door, provided that the door, other than an exterior storm or screen door, does not swing over the landing.
3. At exterior doors serving Group U and individual *dwelling units* and *sleeping units* in Groups R-2 and R-3, and where such units are not required to be *Accessible units*, *Type A units* or *Type B units*, the landing at an exterior doorway shall be not more than $7^3/_4$ inches (197 mm) below the landing on the egress side of the door. Such doors, including storm or screen doors, shall be permitted to swing over either landing.
4. Variations in elevation due to differences in finish materials, but not more than $^1/_2$ inch (12.7 mm).
5. Exterior decks, patios or balconies that are part of Type B *dwelling units* or *sleeping units*, that have impervious surfaces and that are not more than 4 inches (102 mm) below the finished floor level of the adjacent interior space of the *dwelling unit* or *sleeping unit*.
6. Doors serving equipment spaces not required to be *accessible* in accordance with Section 1103.2.9 and serving an *occupant load* of five or less shall be permitted to have a landing on one side to be not more than 7 inches (178 mm) above or below the landing on the egress side of the door.

1010.1.6 Thresholds.
Thresholds at doorways shall not exceed $^3/_4$ inch (19.1 mm) in height above the ~~finished floor or~~ landing for sliding doors serving *dwelling units* or $^1/_2$ inch (12.7 mm) above the ~~finished floor or~~ landing for other doors. Raised thresholds and ~~floor level~~ changes of level greater than $^1/_4$ inch (6.4 mm) at doorways shall be beveled with a slope not greater than one unit vertical in two units horizontal (50-percent slope).

Exceptions:

1. In occupancy Group R-2 or R-3, threshold heights for sliding and side-hinged exterior doors shall be permitted to be up to $7^3/_4$ inches (197 mm) in height if all of the following apply:
   1.1. The door is not part of the required *means of egress*.
   1.2. The door is not part of an *accessible route* as required by Chapter 11.
   1.3. The door is not part of an *Accessible unit*, *Type A unit* or *Type B unit*.
2. In *Type B units*, where Exception 5 to Section 1010.1.4 permits a 4-inch (102 mm) elevation change at the door, the threshold height on the exterior side of the door shall not exceed $4^3/_4$ inches (120 mm) in height above the exterior deck, patio or balcony for sliding doors or $4^1/_2$ inches (114 mm) above the exterior deck, patio or balcony for other doors.

1011.5.5.2 Nosing projection uniformity. Nosing projections shall be of uniform size, including the projection~~s~~ of the *nosing~~s~~* of the ~~floor or~~ landing at the top of a *flight*.

1011.6 Stairway landings.
There shall be a ~~floor or~~ landing at the top and bottom of each *stairway*. The width of landings, measured perpendicularly to the direction of travel, shall be not less than the width of *stairways* served. Every landing shall have a minimum depth, measured parallel to the direction of travel, equal to the width of the *stairway* or 48 inches (1219 mm), whichever is less. Doors opening onto a landing shall not reduce the landing to less than one-half the required width. When fully open, the door shall not project more than 7 inches (178 mm) into the required width of a landing. Where *wheelchair spaces* are required on the *stairway* landing in accordance with Section 1009.6.3, the *wheelchair space* shall not be located in the required width of the landing and doors shall not swing over the *wheelchair spaces*.

Exceptions:
1. Where *stairways* connect stepped *aisles* to cross *aisles* or concourses, *stairway* landings are not required at the transition between *stairways* and stepped *aisles* constructed in accordance with Section 1030.
2. Where curved *stairways* of constant radius have intermediate landings, the landing depth shall be measured horizontally between the intersection of the walkline of the lower *flight* at the landing *nosing* and the intersection of the walkline of the upper *flight* at the *nosing* of the lowest tread of the upper *flight*.
3. Where a landing turns 90 degrees (1.57 rad) or more, the minimum landing depth in accordance with this section shall not be required where the landing provided is not less than that described by an arc with a radius equal to the width of the *flight* served.

1011.8 Vertical rise. A *flight* of *stairs* shall not have a vertical rise greater than 12 feet (3658 mm) between ~~floor levels or~~ landings.

Exception: *Spiral stairways* used as a *means of egress* from *technical production areas*.

1011.14 Alternating tread devices.
Alternating tread devices are limited to an element of a *means of egress* in *buildings* of Groups F, H and S from a *mezzanine* not more than 250 square feet (23 m^2) in area and that serves not more than five occupants; in *buildings* of Group I-3 from a guard tower, observation station or control room not more than 250 square feet (23 m^2) in area and for access to unoccupiable roofs. *Alternating tread devices* used as a *means of egress* shall not have a rise greater than 20 feet (6096 mm) between ~~floor levels or~~ landings.

1027.3 Open side. *Exterior exit stairways* and *ramps* serving as an element of a required *means of egress* shall be open on not less than one side, except for required structural columns, beams, *handrails* and *guards*. An open side shall have not less than 35 square feet (3.3 m^2) of aggregate open area adjacent to ~~each floor level and~~ the level of each ~~intermediate~~ landing. The required open area shall be located not less than 42 inches (1067 mm) above the adjacent floor or landing level.

2024 International Fire Code

Add new definition as follows:

<u>**LANDING**. The portion of a walking surface required for direct access to or from an adjacent, door, stair, flight of stairs, ramp run, or</u>

elevator.

Revise as follows:

[BE] 1010.1.4 Floor elevation.
There shall be a ~~floor or~~ landing on each side of a door. Such ~~floor or~~ landing shall be at the same elevation on each side of the door. Landings shall be level except for exterior landings, which are permitted to have a slope not to exceed 0.25 unit vertical in 12 units horizontal (2-percent slope).

Exceptions:

1. At doors serving individual *dwelling units* or *sleeping units* in Groups R-2 and R-3, a door is permitted to open at the top step of an interior *flight* of stairs, provided that the door does not swing over the top step.
2. At exterior doors serving Groups F, H, R-2 and S and where such doors are not part of an *accessible route*, the landing at an exterior door shall be not more than 7 inches (178 mm) below the landing on the egress side of the door, provided that the door, other than an exterior storm or screen door, does not swing over the landing.
3. At exterior doors serving Group U and individual *dwelling units* and *sleeping units* in Groups R-2 and R-3, and where such units are not required to be Accessible units, Type A units or Type B units, the landing at an exterior doorway shall be not more than $7^3/_4$ inches (197 mm) below the landing on the egress side of the door. Such doors, including storm or screen doors, shall be permitted to swing over either landing.
4. Variations in elevation due to differences in finish materials, but not more than $^1/_2$ inch (12.7 mm).
5. Exterior decks, patios or balconies that are part of Type B *dwelling units* or *sleeping units*, that have impervious surfaces and that are not more than 4 inches (102 mm) below the finished floor level of the adjacent interior space of the *dwelling unit* or *sleeping unit*.
6. Doors serving equipment spaces not required to be accessible in accordance with Section 1103.2.9 of the International Building Code and serving an *occupant load* of five or less shall be permitted to have a landing on one side to be not more than 7 inches (178 mm) above or below the landing on the egress side of the door.

[BE] 1010.1.6 Thresholds.
Thresholds at doorways shall not exceed $^3/_4$ inch (19.1 mm) in height above the ~~finished floor or~~ landing for sliding doors serving *dwelling units* or $^1/_2$ inch (12.7 mm) above the ~~finished floor or~~ landing for other doors. Raised thresholds and ~~floor level~~ changes <u>of level</u> greater than $^1/_4$ inch (6.4 mm) at doorways shall be beveled with a slope not greater than 1 unit vertical in 2 units horizontal (50-percent slope).

Exceptions:

1. In occupancy Group R-2 or R-3, threshold heights for sliding and side-hinged exterior doors shall be permitted to be up to $7^3/_4$ inches (197 mm) in height if all of the following apply:
   1.1. The door is not part of the required *means of egress*.
   1.2. The door is not part of an *accessible route* as required by Chapter 11 of the International Building Code.
   1.3. The door is not part of an accessible unit, Type A unit or Type B unit.
2. In Type B units, where Exception 5 to Section 1010.1.4 permits a 4-inch (102 mm) elevation change at the door, the threshold height on the exterior side of the door shall not exceed $4^3/_4$ inches (120 mm) in height above the exterior deck, patio or balcony for sliding doors or $4^1/_2$ inches (114 mm) above the exterior deck, patio or balcony for other doors.

[BE] 1011.5.5.2 Nosing projection uniformity.
Nosing projections shall be of uniform size, including the projections of the *nosings* of the ~~floor or~~ landing at the top of a *flight*.

[BE] 1011.6 Stairway landings.
There shall be a ~~floor or~~ landing at the top and bottom of each *stairway*. The width of landings, measured perpendicularly to the direction of travel, shall be not less than the width of *stairways* served. Every landing shall have a minimum depth, measured parallel to the direction of travel, equal to the width of the *stairway* or 48 inches (1219 mm), whichever is less. Doors opening onto a landing shall not

reduce the landing to less than one-half the required width. When fully open, the door shall not project more than 7 inches (178 mm) into the required width of a landing. Where wheelchair spaces are required on the stairway landing in accordance with Section 1009.6.3, the wheelchair space shall not be located in the required width of the landing and doors shall not swing over the wheelchair spaces.

Exceptions:

1. Where *stairways* connect stepped *aisles* to cross *aisles* or concourses, *stairway* landings are not required at the transition between *stairways* and stepped *aisles* constructed in accordance with Section 1030.
2. Where curved *stairways* of constant radius have intermediate landings, the landing depth shall be measured horizontally between the intersection of the walkline of the lower *flight* at the landing *nosing* and the intersection of the walkline of the upper *flight* at the *nosing* of the lowest tread of the upper *flight*.
3. Where a landing turns 90 degrees (1.57 rad) or more, the minimum landing depth in accordance with this section shall not be required where the landing provided is not less than that described by an arc with a radius equal to the width of the *flight* served.

[BE] 1011.8 Vertical rise. A *flight* of *stairs* shall not have a vertical rise greater than 12 feet (3658 mm) between ~~floor levels or~~ landings.

Exception: *Spiral stairways* used as a *means of egress* from technical production areas.

[BE] 1011.14 Alternating tread devices. *Alternating tread devices* are limited to an element of a *means of egress* in buildings of Groups F, H and S from a *mezzanine* not more than 250 square feet (23 m^2) in area and that serves not more than five occupants; in buildings of Group I-3 from a guard tower, observation station or control room not more than 250 square feet (23 m^2) in area and for access to unoccupiable roofs. *Alternating tread devices* used as a *means of egress* shall not have a rise greater than 20 feet (6096 mm) between ~~floor levels or~~ landings.

[BE] 1027.3 Open side. *Exterior exit stairways* and *ramps* serving as an element of a required *means of egress* shall be open on not less than one side, except for required structural columns, beams, *handrails* and guards. An open side shall have not less than 35 square feet (3.3 m^2) of aggregate open area adjacent to ~~each floor level and~~ the level of each ~~intermediate~~ landing. The required open area shall be located not less than 42 inches (1067 mm) above the adjacent floor or landing level.

Reason: What is the difference between a landing and a floor? There is clearly a difference that is not understood. An entire floor is not a landing, but the code uses the term “floor-or-landing” as if they are the same. In other instances, such as in **1027.3 Open side**, the two terms used confusingly allow the required open side to be located anywhere on the floor level as opposed to at the landing, as if they might be considered to be uniquely different locations. The confused use of the terms interchangeably is due to the lack of a definition for either floor or landing.

Is it a "landing", a "floor", or is it a "floor-or-landing"?

A landing is but a portion of a floor. The attribute of size is not addressed in dictionaries and this alone is justification for a unique definition in the code. A landing may not be a floor at all if it is not at a floor level but only located between flights or at a mezzanine. If it is a landing, the current code does not require it between flights. Landings are only required at the top and bottom of stairways. But that is an issue we will discuss in a separate code change related to the definition of stairway.

If it is a deck or patio connected to the structure, is it a floor or landing? Clearly only enough area is needed to safely access or depart from the door or flight of stairs. The code, however, provides an option for a floor of indefinite size though only a landing is needed. An entire floor is not necessary to enter or exit a stairway. If a floor is provided instead of a landing, is it limited to the size of a landing or what portion of the floor is the landing? This same circular rhetoric could be applied to landings at elevators as well.

How big is a floor or should I ask is there a need to describe the limits of a floor's size? If you could define "floor", it would likely not be in terms of its size? A landing is much different. The code specifies landing sizes throughout the code, albeit, sometimes indirectly as related to egress capacity. This alone makes a landing uniquely different from a floor.

The limit of a landing’s size is what defines where the stairway ends and where a floor begins. This is important because the width, depth, and headroom of landings are uniquely regulated within **1011 Stairways**. The suggested definition clearly identifies the unique quality of landing size as *"The portion of a walking surface required..."* and quantifies the landing as the amount of space needed to perform the functions of a landing, e.g., change in direction, change in stride, rest, or simply provide the area required to enter or exit a doorway, stair, ramp or elevator.

In addition to the definition, we have included comprehensive changes to all the requirements with instances of confusing reference to the terms floor or landing based upon a search of the IBC. Each has been corrected by deleting floor where "floor or landing" has been used and any related contextual changes necessary. Each of these necessary changes to the code are very clear examples of how the suggested definition for landing can simplify code language and provide for consistent interpretation.

In an effort to correlate with the A117.1 standard the proposed definition has been submitted and approved in the proceedings of the A117.1 committee for inclusion in the final ballot of the ICC A117.1 Standard expected in 2024. The text is the same except that "door" is deleted as landings at doors are not mentioned in A117.1.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is a new definition and editorial changed needed to correlate with other ICC defined terminology. The changes have no material affect upon the cost of construction.

E48-24

E49-24

IBC: 1010.1.4, 1010.1.6; IFC: [BE] 1010.1.4, [BE] 1010.1.6

Proponents: Jennifer Hatfield, J. Hatfield & Associates, Fenestration & Glazing Industry Alliance (formerly AAMA) (jen@jhatfieldandassociates.com)

2024 International Building Code

Revise as follows:

1010.1.4 Floor elevation.
There shall be a floor or landing on each side of a door. Such floor or landing shall be at the same elevation on each side of the door. Landings shall be level except for exterior landings, which are permitted to have a slope not to exceed 0.25 unit vertical in 12 units horizontal (2-percent slope).

Exceptions:

1. At doors serving individual *dwelling units* or *sleeping units* in Groups R-2 and R-3, a door is permitted to open at the top step of an interior *flight* of stairs, provided that the door does not swing over the top step.
2. At exterior doors serving Groups F, H, R-2 and S and where such doors are not part of an *accessible route*, the landing at an exterior door shall not be more than 7 inches (178 mm) below the landing on the egress side of the door, provided that the door, other than an exterior storm or screen door, does not swing over the landing.
3. At exterior doors serving Group U and individual *dwelling units* and *sleeping units* in Groups R-2 and R-3, and where such units are not required to be *Accessible units*, *Type A units* or *Type B units*, the landing at an exterior doorway shall be not more than $7^{3}/_{4}$ inches (197 mm) below the landing on the egress side of the door. Such doors, including storm or screen doors, shall be permitted to swing over either landing.
4. Variations in elevation due to differences in finish materials, but not more than $^{1}/_{2}$ inch (12.7 mm).
5. Exterior decks, patios or balconies that are part of Type B dwelling units or sleeping units, that have impervious surfaces shall be permitted for the exterior surface to be ~~and that are~~ not more than 4 inches (102 mm) below the finished floor level of the adjacent interior space of the dwelling unit or *sleeping unit*. or allowed at a height necessary to comply with the water resistance requirements of Section 1709.5, whichever is greater.
6. Doors serving equipment spaces not required to be *accessible* in accordance with Section 1103.2.9 and serving an *occupant load* of five or less shall be permitted to have a landing on one side to be not more than 7 inches (178 mm) above or below the landing on the egress side of the door.

1010.1.6 Thresholds.
Thresholds at doorways shall not exceed $^{3}/_{4}$ inch (19.1 mm) in height above the finished floor or landing for sliding doors serving *dwelling units* or $^{1}/_{2}$ inch (12.7 mm) above the finished floor or landing for other doors. Raised thresholds and floor level changes greater than $^{1}/_{4}$ inch (6.4 mm) at doorways shall be beveled with a slope not greater than one unit vertical in two units horizontal (50-percent slope).

Exceptions:

1. In occupancy Group R-2 or R-3, threshold heights for sliding and side-hinged exterior doors shall be permitted to be up to $7^{3}/_{4}$ inches (197 mm) in height if all of the following apply:
   1.1. The door is not part of the required *means of egress*.
   1.2. The door is not part of an *accessible route* as required by Chapter 11.
   1.3. The door is not part of an *Accessible unit*, *Type A unit* or *Type B unit*.

2. In *Type B units*, where Exception 5 to Section 1010.1.4 permits a 4-inch (102 mm) elevation change at the door, the threshold height on the exterior side of the door shall not exceed 43/4 inches (120 mm) in height above the exterior deck, patio or balcony for sliding doors or 41/2 inches (114 mm) above the exterior deck, patio or balcony for other doors or allowed at a height necessary to comply with the water resistance requirements of Section 1709.5, whichever is greater.

2024 International Fire Code

Revise as follows:

[BE] 1010.1.4 Floor elevation.
There shall be a floor or landing on each side of a door. Such floor or landing shall be at the same elevation on each side of the door. Landings shall be level except for exterior landings, which are permitted to have a slope not to exceed 0.25 unit vertical in 12 units horizontal (2-percent slope).

Exceptions:

1. At doors serving individual *dwelling units* or *sleeping units* in Groups R-2 and R-3, a door is permitted to open at the top step of an interior *flight* of stairs, provided that the door does not swing over the top step.
2. At exterior doors serving Groups F, H, R-2 and S and where such doors are not part of an *accessible route*, the landing at an exterior door shall be not more than 7 inches (178 mm) below the landing on the egress side of the door, provided that the door, other than an exterior storm or screen door, does not swing over the landing.
3. At exterior doors serving Group U and individual *dwelling units* and *sleeping units* in Groups R-2 and R-3, and where such units are not required to be Accessible units, Type A units or Type B units, the landing at an exterior doorway shall be not more than $7^{3}/_{4}$ inches (197 mm) below the landing on the egress side of the door. Such doors, including storm or screen doors, shall be permitted to swing over either landing.
4. Variations in elevation due to differences in finish materials, but not more than $^{1}/_{2}$ inch (12.7 mm).
5. Exterior decks, patios or balconies that are part of Type B dwelling units or sleeping units, that have impervious surfaces shall be permitted for the exterior surface to be ~~and that are~~ not more than 4 inches (102 mm) below the finished floor level of the adjacent interior space of the dwelling unit or *sleeping unit*. or allowed at a height necessary to comply with the water resistance requirements of Section 1709.5 of the *International Building Code*, whichever is greater.
6. Doors serving equipment spaces not required to be accessible in accordance with Section 1103.2.9 of the International Building Code and serving an *occupant load* of five or less shall be permitted to have a landing on one side to be not more than 7 inches (178 mm) above or below the landing on the egress side of the door.

[BE] 1010.1.6 Thresholds.
Thresholds at doorways shall not exceed $^{3}/_{4}$ inch (19.1 mm) in height above the finished floor or landing for sliding doors serving *dwelling units* or $^{1}/_{2}$ inch (12.7 mm) above the finished floor or landing for other doors. Raised thresholds and floor level changes greater than $^{1}/_{4}$ inch (6.4 mm) at doorways shall be beveled with a slope not greater than 1 unit vertical in 2 units horizontal (50-percent slope).

Exceptions:

1. In occupancy Group R-2 or R-3, threshold heights for sliding and side-hinged exterior doors shall be permitted to be up to $7^{3}/_{4}$ inches (197 mm) in height if all of the following apply:
   1.1. The door is not part of the required *means of egress*.
   1.2. The door is not part of an *accessible route* as required by Chapter 11 of the International Building Code.
   1.3. The door is not part of an accessible unit, Type A unit or Type B unit.
2. In *Type B units*, where Exception 5 to Section 1010.1.4 permits a 4-inch (102 mm) elevation change at the door, the threshold height on the exterior side of the door shall not exceed 43/4 inches (120 mm) in height above the exterior deck, patio or balcony for sliding doors or 41/2 inches (114 mm) above the exterior deck, patio or balcony for other doors or allowed at a height necessary to comply with the water resistance requirements of Section 1709.5 of the *International Building Code*, whichever is greater..

Reason: This proposal is intended to provide needed clarity in Section 1010.1.4 Exception 5 and Section 1010.1.6 Exception 2 for decks on Type B units, as it is confusing as currently written. The revised language simply clarifies that a higher door threshold may be allowed as required to meet the water testing requirements found in Section 1709.5 of the IBC.

This change is similar to the clarification made in the current Florida Building Code.

Bibliography: Section 1010.1.6 of the 2023 Florida Building Code, Building, Eighth Edition

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is a clarification of allowances required for step downs and thresholds at decks when it comes to door thresholds and water testing requirements.

E49-24

E50-24

IBC: 1010.2.1, 1010.2.4; IFC: [BE] 1010.2.1, [BE] 1010.2.4

Proponents: John Woestman, Kellen Company, Builders Hardware Manufacturers Association (BHMA) (jwoestman@kellencompany.com)

2024 International Building Code

Revise as follows:

1010.2.1 Unlatching.
The unlatching of any door or leaf for egress shall require not more than one motion in a single linear or rotational direction to release all latching and all locking devices. locking devices. *Manual bolts* are not permitted.

Exceptions:

1. Places of detention or restraint in Group I-3 occupancies.
2. Doors with *manual bolts*, *automatic flush bolts* and *constant latching bolts* as permitted by Section 1010.2.4, Item 4.
3. Doors from individual *dwelling units* and *sleeping units* of Group R occupancies as permitted by Section 1010.2.4, Item 5.

1010.2.4 Locks and latches.
Locks and latches shall be permitted to prevent operation of doors where any of the following exist:

1. Places of detention or restraint in Group I-3 occupancies.
2. In Group I-1, Condition 2 and Group I-2 occupancies where the clinical needs of *persons* receiving care require containment or where *persons* receiving care pose a security threat, provided that all clinical staff can readily unlock doors at all times, and all such locks are keyed to keys carried by all clinical staff at all times or all clinical staff have the codes or other means necessary to operate the locks at all times.
3. In *buildings* in occupancy Group A having an *occupant load* of 300 or less, Groups B, F, M and S, and in *places of religious worship*, the main door or doors are permitted to be equipped with key-operated locking devices from the egress side provided that:
   - 3.1. The doors are the main exterior doors to the *building*, or the doors are the main doors to the tenant space.
   - 3.2. The locking device is readily distinguishable as locked.
   - 3.3. A readily visible durable sign is posted on the egress side on or adjacent to the door stating: THIS DOOR TO REMAIN UNLOCKED WHEN THIS SPACE IS OCCUPIED. The sign shall be in letters 1 inch (25 mm) high on a contrasting background.
   - 3.4. The use of the key-operated locking device is revocable by the *building official* for due cause.
4. *Manual bolts*, automatic flush bolts and *constant latching bolts* on the inactive leaf of a pair of doors in accordance with Table 1010.2.4, provided that the inactive leaf does not have a doorknob, *panic hardware*, or similar operating hardware.
5. Single exit doors complying with Section 1006.2.1 or 1006.3.4 from individual *dwelling* or *sleeping units* of Group R occupancies and equipped with a night latch, *dead bolt* or security chain that requires a second releasing motion, provided that such devices are openable from the inside without the use of a key or tool.
6. *Fire doors* after the minimum elevated temperature has disabled the unlatching mechanism in accordance with *listed fire door* test procedures.
7. Doors serving roofs not intended to be occupied shall be permitted to be locked preventing entry to the *building* from the roof.

8. Other than egress *courts*, where occupants must egress from an exterior space through the *building* for *means of egress*, exit access doors shall be permitted to be equipped with an approved locking device where installed and operated in accordance with all of the following:
   8.1. The maximum *occupant load* shall be posted where required by Section 1004.9. Such signage shall be permanently affixed inside the building and shall be posted in a conspicuous space near all the *exit access doorways*.
   8.2. A weatherproof telephone or two-way communication system installed in accordance with Sections 1009.8.1 and 1009.8.2 shall be located adjacent to not less than one required exit access door on the exterior side.
   8.3. The egress door locking device is readily distinguishable as locked and shall be a key-operated locking device.
   8.4. A clear window or glazed door opening, not less than 5 square feet (0.46 m^2) in area, shall be provided at each exit access door to determine if there are occupants using the outdoor area.
   8.5. A readily visible, durable sign shall be posted on the interior side on or adjacent to each locked required exit access door serving the exterior area stating, "THIS DOOR TO REMAIN UNLOCKED WHEN THE OUTDOOR AREA IS OCCUPIED." The letters on the sign shall be not less than 1 inch (25.4 mm) high on a contrasting background.
   8.6. The *occupant load* of the occupied exterior area shall not exceed 300 occupants in accordance with Section 1004.

9. Locking devices are permitted on doors to balconies, decks or other exterior spaces serving individual *dwelling* or *sleeping units*.
10. Locking devices are permitted on doors to balconies, decks or other exterior spaces of 250 square feet (23.23 m^2) or less serving a private office space.

2024 International Fire Code

Revise as follows:

[BE] 1010.2.1 Unlatching.
The unlatching of any door orleaf for egress shall require not more than one motion ina single linear or rotational direction to release all latching and all locking devices. locking devices. Manual bolts are not permitted.

Exceptions:
1. Places of detention or restraint <u>in Group I-3 occupancies</u>.
2. Doors with manual bolts, automatic flush bolts and constant latching bolts as permitted by Section 1010.2.4, Item 4.
3. Doors from individual *dwelling units* and *sleeping units* of Group R occupancies as permitted by Section 1010.2.4, Item 5.

[BE] 1010.2.4 Locks and latches.
Locks and latches shall be permitted to prevent operation of doors where any of the following exist:
1. Places of detention or restraint <u>in Group I-3 occupancies</u>.
2. In Group I-1, Condition 2 and Group I-2 occupancies where the clinical needs of persons receiving care require containment or where persons receiving care pose a security threat, provided that all clinical staff can readily unlock doors at all times, and all such locks are keyed to keys carried by all clinical staff at all times or all clinical staff have the codes or other means necessary to operate the locks at all times.

3. In buildings in occupancy Group A having an *occupant load* of 300 or less, Groups B, F, M and S, and in *places of religious worship*, the main door or doors are permitted to be equipped with key-operated locking devices from the egress side provided that:
   3.1. The doors are the main exterior doors to the building, or the doors are the main doors to the tenant space.
   3.2. The locking device is readily distinguishable as locked.
   3.3. A readily visible durable sign is posted on the egress side on or adjacent to the door stating: “THIS DOOR TO REMAIN UNLOCKED WHEN THIS SPACE IS OCCUPIED.” The sign shall be in letters 1 inch (25 mm) high on a contrasting background.
   3.4. The use of the key-operated locking device is revocable by the *fire code official* for due cause.
4. Manual bolts, automatic flush bolts and constant latching bolts on the inactive leaf of a pair of doors in accordance with Table 1010.2.4, provided that the inactive leaf does not have a doorknob, panic hardware, or similar operating hardware.
5. Single exit doors complying with Section 1006.2.1 or 1006.3.4 from individual *dwelling* or sleeping units of Group R occupancies and equipped with a night latch, dead bolt or security chain that requires a second releasing motion, provided that such devices are openable from the inside without the use of a key or tool.
6. Fire doors after the minimum elevated temperature has disabled the unlatching mechanism in accordance with *listed* fire door test procedures.
7. Doors serving roofs not intended to be occupied shall be permitted to be locked, preventing entry to the building from the roof.
8. Other than *egress courts*, where occupants must egress from an exterior space through the building for *means of egress*, *exit access* doors shall be permitted to be equipped with an *approved* locking device where installed and operated in accordance with all of the following:
   8.1. The maximum *occupant load* shall be posted where required by Section 1004.9. Such sign shall be permanently affixed inside the building and shall be posted in a conspicuous space near all the *exit access doorways*.
   8.2. A weatherproof telephone or two-way communication system installed in accordance with Sections 1009.8.1 and 1009.8.2 shall be located adjacent to not less than one required *exit access* door on the exterior side.
   8.3. The egress door locking device is readily distinguishable as locked and shall be a key-operated locking device.
   8.4. A clear window or glazed door opening, not less than 5 square feet (0.46 m^2) in area, shall be provided at each *exit access* door to determine if there are occupants using the outdoor area.
   8.5. A readily visible durable sign shall be posted on the interior side on or adjacent to each locked required *exit access* door serving the exterior area stating: “THIS DOOR TO REMAIN UNLOCKED WHEN THE OUTDOOR AREA IS OCCUPIED.” The letters on the sign shall be not less than 1 inch (25.4 mm) high on a contrasting background.
   8.6. The *occupant load* of the occupied exterior area shall not exceed 300 occupants in accordance with Section 1004.
9. Locking devices are permitted on doors to balconies, decks or other exterior spaces serving individual *dwelling*or *sleeping units*.
10. Locking devices are permitted on doors to balconies, decks or other exterior spaces of 250 square feet (23.23 m^2) or less, serving a private office space.

Reason: The revisions of this proposal are intended to be editorial and to better communicate the intent of the code.
Our understanding is Exception 1 is intended to apply to Occupancy Group I-3, where security measures are not under the occupants' control.
In Occupancy Group I-3, the unlatching of a door would be expected to require more than on motion.
These are the only locations in the IBC and IFC where the phrase “detention or restraint” is used.
The specific needs for Groups I-1 and I-2 for health care clinical needs of care recipients are addressed in 1010.2.4 Item 2 (locks and latches), 1010.2.13.1 Item 6 exception (delayed egress locking systems), and 1010.2.14 Item 8 exception 1 (controlled egress locking systems).

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Should not increase or decrease the cost of construction.
Code change proposal is editorial clarification of the intent of the code for places of detention and restraint.

E50-24

E51-24

IBC: 1010.2.1; IFC: [BE] 1010.2.1

Proponents: Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org)

2024 International Building Code

Revise as follows:

1010.2.1 Unlatching.
The unlatching of any door or leaf for egress shall require not more than one motion in a single linear or rotational direction to release all latching and all locking devices. locking devices. *Manual bolts* are not permitted.

Exceptions:

1. Places of detention or restraint.
2. Doors with *manual bolts*, *automatic flush bolts* and *constant latching bolts* as permitted by Section 1010.2.4, Item 4.
3. Doors from individual *dwelling units* and *sleeping units* of Group R occupancies as permitted by Section 1010.2.4, Item 5.
4. Doors serving individual toilet or bathing room or compartment.

2024 International Fire Code

Revise as follows:

[BE] 1010.2.1 Unlatching.
The unlatching of any door or leaf for egress shall require not more than one motion in a single linear or rotational direction to release all latching and all locking devices. locking devices. Manual bolts are not permitted.

Exceptions:

1. Places of detention or restraint.
2. Doors with manual bolts, automatic flush bolts and constant latching bolts as permitted by Section 1010.2.4, Item 4.
3. Doors from individual *dwelling units* and *sleeping units* of Group R occupancies as permitted by Section 1010.2.4, Item 5.
4. Doors serving individual toilet or bathing room or compartment.

Reason: Many single user toilet or bathing rooms have an additional latching mechanism that is used for privacy. With the increased usage of gender-neutral toilet rooms, these locking mechanisms will be increasing in popularity. These indicators require an additional motion to open the door as they must be manually engaged by the user within the toilet/bathing room. Since these rooms are limited to the number of occupants, usually one or in the case of an assisted use toilet/bathing room, a care giver, or other family members, and privacy is a concern in many of these cases, the use of an additional motion to exit the toilet/dressing room should be permitted. Shown below are examples of what these devices look like and what operation must happen in order to disengage the privacy lock.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).
BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC webpage.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is an option for toilet or bathing room locking, not a requirement, so there is no change in construction requirements.

E51-24

E52-24

IBC: 1010.2.2, 1010.2.3; IFC: [BE] 1010.2.2, [BE] 1010.2.3

Proponents: John Woestman, Kellen Company, Builders Hardware Manufacturers Association (BHMA) (jwoestman@kellencompany.com)

2024 International Building Code

Revise as follows:

1010.2.2 Hardware.
Door handles, pulls, latches, locks and other operating devices ~~on~~ of doors required to be *accessible* by Chapter 11 shall not require tight grasping, tight pinching or twisting of the wrist to operate.

1010.2.3 Hardware height.
Door handles, pulls, latches, locks and other operating devices of doors shall be installed 34 inches (864 mm) minimum and 48 inches (1219 mm) maximum above the finished floor.

Exceptions:

1. Locks used only for security purposes and not used for normal operation are permitted at any height.
2. ~~Where~~ The height of operating devices of locks and latches of doors and gates in barriers required by the International Swimming Pool and Spa Code shall comply with Section 305.3 of the International Swimming Pool and Spa Code. ~~requires restricting access to a pool, spa or hot tub, and where door and gate latch release mechanisms are accessed from the outside of the barrier and are not of the self-locking type, such a mechanism shall be located above the finished floor or ground surface not less than 52 inches (1219 mm) and not greater than 54 inches (1370 mm), provided that the latch release mechanism is not a self-locking type such as where the lock is operated by means of a key, electronic opener or the entry of a combination into an integral combination lock.~~

2024 International Fire Code

Revise as follows:

[BE] 1010.2.2 Hardware.
Door handles, pulls, latches, locks and other operating devices ~~on~~ of doors required to be accessible by Chapter 11 of the International Building Code shall not require tight grasping, tight pinching or twisting of the wrist to operate.

[BE] 1010.2.3 Hardware height.
Door handles, pulls, latches, locks and other operating devices of doors shall be installed 34 inches (864 mm) minimum and 48 inches (1219 mm) maximum above the finished floor.

Exceptions:

1. Locks used only for security purposes and not used for normal operation are permitted at any height.
2. ~~Where~~ The height of operating devices of locks and latches of doors and gates in barriers required by the International Swimming Pool and Spa Code shall comply with Section 305.3 of the International Swimming Pool and Spa Code. ~~requires restricting access to a pool, spa or hot tub, and where door and gate latch release mechanisms are accessed from the outside of the barrier and are not of the self-locking type, such a mechanism shall be located above the finished floor or ground surface, not less than 52 inches (1219 mm) and not greater than 54 inches (1370 mm), provided that the latch release mechanism is not a self-locking type such as where the lock is operated by means of a key, electronic opener or the entry of a combination into an integral combination lock.~~

Reason: Exception 2 of 1010.2.3 is currently a bit challenging to interpret and apply consistently with the requirements in Section 305.3 of the ISPSC regarding locks and latches on doors and gates in barriers required by the ISPSC. The detailed provisions in the ISPSC are not a good candidate for summarizing into an exception in the IBC – hence this proposal to editorially revise this exception. Section 305.3 of the ISPSC is inserted below.

305.3 Doors and gates.

Doors and gates in barriers shall comply with the requirements of Sections 305.3.1 through 305.3.3 and shall be equipped to accommodate a locking device. Pedestrian access doors and gates shall open outward away from the pool or spa, shall be self-closing and shall have a self-latching device. Doors and gates shall not swing over stairs.

305.3.1 Utility or service doors and gates.

Doors and gates not intended for pedestrian use, such as utility or service doors and gates, shall remain locked when not in use.

305.3.2 Double or multiple doors and gates.

Double doors and gates or multiple doors and gates shall have not fewer than one leaf secured in place and the adjacent leaf shall be secured with a self-latching device.

305.3.3 Latch release.

For doors and gates in barriers, the door and gate latch release mechanisms shall be in accordance with the following:

1. Where door and gate latch release mechanisms are accessed from the outside of the barrier and are not of the self-locking type, such mechanism shall be located above the finished floor or ground surface in accordance with the following:
   1.1. At public pools and spas, not less than 52 inches (1219 mm) and not greater than 54 inches (1372 mm).
   1.2. At *residential* pools and spas, not less than 54 inches (1372 mm).
2. Where door and gate latch release mechanisms are of the self-locking type such as where the lock is operated by means of a key, an electronic opener or the entry of a combination into an integral combination lock, the lock operation control and the latch release mechanism shall be located above the finished floor or ground surface in accordance with the following:
   2.1. At public pools and spas, not less than 34 inches and not greater than 48 inches (1219 mm).
   2.2. At *residential* pools and spas, at not greater than 54 inches (1372 mm).
3. At private pools, where the only latch release mechanism of a self-latching device for a gate is located on the pool and spa side of the barrier, the release mechanism shall be located at a point that is at least 3 inches (76 mm) below the top of the gate.

305.3.4 Barriers adjacent to latch release mechanisms.

Where a latch release mechanism is located on the inside of a barrier, openings in the door, gate and barrier within 18 inches (457 mm) of the latch shall not be greater than $^{1}/_{2}$ inch (12.7 mm) in any dimension.

Section 305.3 of the ISPSC.

The other editorial revisions are because some operating devices for locks and latches of doors are not on the door, but may be adjacent to the door.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is replacing repeated text for a pointer. There is no change in requirements.

E52-24

E53-24

IBC: [BE] 403.5.3, [BE] 403.5.3.1, 1010.2.4, 1010.2.6; IFC: [BE] 1010.2.4, [BE] 1010.2.6

Proponents: John Woestman, Kellen Company, Builders Hardware Manufacturers Association (BHMA) (jwoestman@kellencompany.com)

2024 International Building Code

Revise as follows:

[BE] 403.5.3 Stairway door operation.
Stairway doors ~~other than the exit discharge doors~~ shall be permitted to be locked to prevent passage from the *stairway* ~~side~~ into the building. *Stairway* doors that are locked to prevent passage from the *stairway* ~~side~~ into the building shall be capable of being unlocked without unlatching where any of the following conditions occur:

1. Individually or simultaneously upon a signal from the *fire command center*.
2. Simultaneously upon activation of a *fire alarm signal* in an area served by the *stairway*.
3. Upon failure of the power supply to the lock or the locking system.

[BE] 403.5.3.1 Stairway communication system.
A telephone or other two-way communications system connected to an *approved constantly attended station* shall be provided at not less than every fifth floor in each *stairway* where the ~~doors to the~~ *stairway* doors are locked to prevent passage from the stairway into the building. Systems shall be *listed* in accordance with UL 2525 and installed in accordance with NFPA 72.

1010.2.4 Locks and latches.
Locks and latches shall be permitted to prevent operation of doors where any of the following exist:

1. Places of detention or restraint.
2. In Group I-1, Condition 2 and Group I-2 occupancies where the clinical needs of *persons* receiving care require containment or where *persons* receiving care pose a security threat, provided that all clinical staff can readily unlock doors at all times, and all such locks are keyed to keys carried by all clinical staff at all times or all clinical staff have the codes or other means necessary to operate the locks at all times.
3. In *buildings* in occupancy Group A having an *occupant load* of 300 or less, Groups B, F, M and S, and in *places of religious worship*, the main door or doors are permitted to be equipped with key-operated locking devices ~~from the~~ which, when locked, prevent egress ~~side~~ provided that:
   - 3.1. The doors are the main exterior doors to the *building*, or the doors are the main doors to the tenant space.
   - 3.2. The locking device is readily distinguishable as locked.
   - 3.3. A readily visible durable sign is posted on the egress side on or adjacent to the door stating: THIS DOOR TO REMAIN UNLOCKED WHEN THIS SPACE IS OCCUPIED. The sign shall be in letters 1 inch (25 mm) high on a contrasting background.
   - 3.4. The use of the key-operated locking device is revocable by the *building official* for due cause.
4. *Manual bolts*, automatic flush bolts and *constant latching bolts* on the inactive leaf of a pair of doors in accordance with Table 1010.2.4, provided that the inactive leaf does not have a doorknob, *panic hardware*, or similar operating hardware.
5. Single exit doors complying with Section 1006.2.1 or 1006.3.4 from individual *dwelling* or *sleeping units* of Group R occupancies and equipped with a night latch, *dead bolt* or security chain that requires a second releasing motion, provided that such devices are openable from the inside without the use of a key or tool.
6. *Fire doors* after the minimum elevated temperature has disabled the unlatching mechanism in accordance with *listed fire door* test procedures.

7. Doors serving roofs not intended to be occupied shall be permitted to be locked preventing entry to the *building* from the roof.
8. Other than egress *courts*, where occupants must egress from an exterior space through the *building* for *means of egress*, exit access doors shall be permitted to be equipped with an approved locking device where installed and operated in accordance with all of the following:
   8.1. The maximum *occupant load* shall be posted where required by Section 1004.9. Such signage shall be permanently affixed inside the building and shall be posted in a conspicuous space near all the *exit access doorways*.

   8.2. A weatherproof telephone or two-way communication system installed in accordance with Sections 1009.8.1 and 1009.8.2 shall be located adjacent to not less than one required exit access door on the exterior side.

   8.3. The egress door locking device is readily distinguishable as locked and shall be a key-operated locking device.

   8.4. A clear window or glazed door opening, not less than 5 square feet (0.46 m^2) in area, shall be provided at each exit access door to determine if there are occupants using the outdoor area.

   8.5. A readily visible, durable sign shall be posted on the interior side on or adjacent to each locked required exit access door serving the exterior area stating, "THIS DOOR TO REMAIN UNLOCKED WHEN THE OUTDOOR AREA IS OCCUPIED." The letters on the sign shall be not less than 1 inch (25.4 mm) high on a contrasting background.

   8.6. The *occupant load* of the occupied exterior area shall not exceed 300 occupants in accordance with Section 1004.
9. Locking devices are permitted on doors to balconies, decks or other exterior spaces serving individual *dwelling* or *sleeping units*.
10. Locking devices are permitted on doors to balconies, decks or other exterior spaces of 250 square feet (23.23 m^2) or less serving a private office space.

1010.2.6 Stairway door~~s~~ operation.
~~Interior *stairway*~~ *Stairway* doors in the *means of egress* ~~doors~~ shall be openable from both sides without the use of a key or special knowledge or effort.

Exceptions:

1. *Stairway* discharge doors shall be openable from the egress side and shall ~~only be locked from the opposite side~~ be permitted to be locked to prevent passage into the stairway through the stairway discharge door.
2. ~~This section shall not apply to~~ *Stairway* doors arranged in accordance with Section 403.5.3 shall be permitted to be locked to prevent passage from the stairway into the building.
3. *Stairway* ~~exit~~ doors shall not be locked ~~from the side opposite the egress side,~~ to prevent passage from the stairway into the building unless they are openable from the egress side and capable of being unlocked ~~simultaneously~~ without unlatching by any of the following methods:
   3.1. Shall be capable of being unlocked individually or simultaneously upon a signal from the *fire command center*, where present, or a signal by emergency personnel from a single location inside the main entrance to the *building*.

   3.2. Shall unlock simultaneously upon activation of a *fire alarm signal* when a fire alarm system is present in an area served by the stairway.

   3.3. Shall unlock upon failure of the power supply to the electric lock or the locking system.
4. *Stairway* ~~*exit*~~ doors shall be openable from the egress side and shall only be locked ~~from the opposite side~~ to prevent passage from the stairway into the building in Group B, F, M and S occupancies where the only interior access to the tenant space is from a single *exit stairway* where permitted in Section 1006.3.4.
5. *Stairway* ~~exit~~ doors shall be openable from the egress side and shall only be locked ~~from the opposite side~~ to prevent passage from the stairway into the building in Group R-2 occupancies where the only interior access to the *dwelling unit* is from a single exit *stairway* where permitted in Section 1006.3.4.

2024 International Fire Code

Revise as follows:

[BE] 1010.2.4 Locks and latches.
Locks and latches shall be permitted to prevent operation of doors where any of the following exist:

1. Places of detention or restraint.
2. In Group I-1, Condition 2 and Group I-2 occupancies where the clinical needs of persons receiving care require containment or where persons receiving care pose a security threat, provided that all clinical staff can readily unlock doors at all times, and all such locks are keyed to keys carried by all clinical staff at all times or all clinical staff have the codes or other means necessary to operate the locks at all times.
3. In buildings in occupancy Group A having an *occupant load* of 300 or less, Groups B, F, M and S, and in *places of religious worship*, the main door or doors are permitted to be equipped with key-operated locking devices ~~from the~~ which, when locked, prevent egress ~~side~~ provided that:
   3.1. The doors are the main exterior doors to the building, or the doors are the main doors to the tenant space.
   3.2. The locking device is readily distinguishable as locked.
   3.3. A readily visible durable sign is posted on the egress side on or adjacent to the door stating: “THIS DOOR TO REMAIN UNLOCKED WHEN THIS SPACE IS OCCUPIED.” The sign shall be in letters 1 inch (25 mm) high on a contrasting background.
   3.4. The use of the key-operated locking device is revocable by the *fire code official* for due cause.
4. Manual bolts, automatic flush bolts and constant latching bolts on the inactive leaf of a pair of doors in accordance with Table 1010.2.4, provided that the inactive leaf does not have a doorknob, panic hardware, or similar operating hardware.
5. Single exit doors complying with Section 1006.2.1 or 1006.3.4 from individual *dwelling* or sleeping units of Group R occupancies and equipped with a night latch, dead bolt or security chain that requires a second releasing motion, provided that such devices are openable from the inside without the use of a key or tool.
6. Fire doors after the minimum elevated temperature has disabled the unlatching mechanism in accordance with *listed* fire door test procedures.
7. Doors serving roofs not intended to be occupied shall be permitted to be locked, preventing entry to the building from the roof.
8. Other than *egress courts*, where occupants must egress from an exterior space through the building for *means of egress*, *exit access* doors shall be permitted to be equipped with an *approved* locking device where installed and operated in accordance with all of the following:
   8.1. The maximum *occupant load* shall be posted where required by Section 1004.9. Such sign shall be permanently affixed inside the building and shall be posted in a conspicuous space near all the *exit access doorways*.
   8.2. A weatherproof telephone or two-way communication system installed in accordance with Sections 1009.8.1 and 1009.8.2 shall be located adjacent to not less than one required *exit access* door on the exterior side.
   8.3. The egress door locking device is readily distinguishable as locked and shall be a key-operated locking device.
   8.4. A clear window or glazed door opening, not less than 5 square feet (0.46 m^2) in area, shall be provided at each *exit access* door to determine if there are occupants using the outdoor area.
   8.5. A readily visible durable sign shall be posted on the interior side on or adjacent to each locked required *exit access* door serving the exterior area stating: “THIS DOOR TO REMAIN UNLOCKED WHEN THE OUTDOOR AREA IS OCCUPIED.” The letters on the sign shall be not less than 1 inch (25.4 mm) high on a contrasting background.
   8.6. The *occupant load* of the occupied exterior area shall not exceed 300 occupants in accordance with Section 1004.
9. Locking devices are permitted on doors to balconies, decks or other exterior spaces serving individual *dwelling*or *sleeping units*.

10. Locking devices are permitted on doors to balconies, decks or other exterior spaces of 250 square feet (23.23 m^2) or less, serving a private office space.

[BE] 1010.2.6 Stairway doors~~ ~~ operation.

~~Interior *stairway*~~ *Stairway* doors in the *means of egress* ~~doors~~ shall be openable from both sides without the use of a key or special knowledge or effort.

Exceptions:

1. *Stairway* discharge doors shall be openable from the egress side and shall ~~only be locked from the opposite side~~ be permitted to be locked to prevent passage into the stairway through the stairway discharge door.
2. ~~This section shall not apply to~~ *Stairway* doors arranged in accordance with Section 403.5.3 of the International Building Code shall be permitted to be locked to prevent passage from the stairway into the building.
3. *Stairway* ~~exit~~ doors shall not be locked ~~from the side opposite the egress side,~~ to prevent passage from the stairway into the building unless they are openable from the egress side and capable of being unlocked ~~simultaneously~~ without unlatching by any of the following methods:
   3.1. Shall be capable of being unlocked individually or simultaneously upon a signal from the *fire command center*, where present, or a signal by emergency personnel from a single location inside the main entrance to the building.
   3.2. Shall unlock simultaneously upon activation of a fire alarm signal when a *fire alarm system* is present in an area served by the stairway.
   3.3. Shall unlock upon failure of the power supply to the electric lock or the locking system.
4. *Stairway* ~~*exit*~~ doors shall be openable from the egress side and shall only be locked ~~from the opposite side~~ to prevent passage from the stairway into the building in Group B, F, M and S occupancies where the only interior access to the tenant space is from a single *exit stairway* where permitted in Section 1006.3.4.
5. *Stairway* ~~exit~~ doors shall be openable from the egress side and shall only be locked ~~from the opposite side~~ to prevent passage from the stairway into the building in Group R-2 occupancies where the only interior access to the *dwelling unit* is from a single exit stairway where permitted in Section 1006.3.4.

Reason: Reviewing these sections of the IBC with a critical eye identifies several opportunities for editorial improvements.

In several sections there's language that permits stairway doors, where they comply with specified conditions, to be locked preventing passage from the stairway into the building or structure. But, the language used in the code is less clear than the language used in the 1st sentence of this paragraph of this reason statement. Several edits reflect the language of the 1st sentence of this paragraph.

Section 403.5.3 is all about provisions permitting locking of stairway doors in high-rise buildings limiting passage from the stairway into the building. In these provisions, there's not a need to address stairway exit discharge doors as stairway exit discharge doors are addressed in 1010.2.6 Exception 1. Section 403.5.3 is edited appropriately.

In sections 403.5.2 and 1010.2.6, the terms "stairway doors" and "stairway exit doors" are used to describe the same doors. It appears that "stairway doors" may be the better term to use when the code is addressing doors to / from stairways where the doors are in the means of egress (if the stairway doors are not in the means of egress, the code provisions most likely would not apply). Also, these provisions regarding stairway doors should be applicable to doors in interior exit stairways and to doors in exterior exit stairways. Edits are made in 403.5.2 and 1010.2.6.

The language of Exception 1 and 2 to Section 1010.2.6, as currently in the IBC, essentially exempt stairway discharge doors (Exception 1) and stairway doors complying with 403.5.3 (Exception 2) from the requirements in 1010.2.6 to be openable without the use of a key, special knowledge, or effort. That's not the intent of the code. These two exceptions are edited to more accurately describe the intent and scope of the exceptions.

In Exception 3 of Section 1010.2.6, the word "simultaneously" is redundant with the requirements in Items 3.1 and 3.2, and not appropriate if applied to Item 3.3. Thus "simultaneously" is deleted in Item 3 of 1010.2.6.

Exceptions 4 and 5 of Section 1010.2.6 are editorially revised to more clearly describe the intent of the code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposal is not expected to increase or decrease the cost of construction.

The revisions are intended to be editorial improvements to the existing requirements of the code for stairways where the door can be locked.

E53-24

E54-24

IBC: 1010.2.4; IFC: [BE] 1010.2.4

Proponents: John Woestman, Kellen Company, Builders Hardware Manufacturers Association (BHMA) (jwoestman@kellencompany.com)

2024 International Building Code

Revise as follows:

1010.2.4 Locks and latches.
Locks and latches shall be permitted to prevent operation of doors where any of the following exist:

1. Places of detention or restraint.
2. In Group I-1, Condition 2 and Group I-2 occupancies where the clinical needs of *persons* receiving care require containment or where *persons* receiving care pose a security threat, provided that all clinical staff can readily unlock doors at all times, and all such locks are keyed to keys carried by all clinical staff at all times or all clinical staff have the codes or other means necessary to operate the locks at all times.
3. In *buildings* in occupancy Group A having an *occupant load* of 300 or less, Groups B, F, M and S, and in *places of religious worship*, the main door or doors are permitted to be equipped with key-operated locking devices from the egress side provided that:
   3.1. The doors are the main exterior doors to the *building*, or the doors are the main doors to the tenant space.

   3.2. The locking device is readily distinguishable as locked.

   3.3. A readily visible durable sign is posted on the egress side on or adjacent to the door stating: THIS DOOR TO REMAIN UNLOCKED WHEN THIS SPACE IS OCCUPIED. The sign shall be in letters 1 inch (25 mm) high on a contrasting background.

   3.4. The use of the key-operated locking device is revocable by the *building official* for due cause.
4. *Manual bolts*, automatic flush bolts and *constant latching bolts* on the inactive leaf of a pair of doors in accordance with Table 1010.2.4, provided that the inactive leaf does not have a doorknob, *panic hardware*, or similar operating hardware.
5. ~~Single exit doors complying with Section 1006.2.1 or 1006.3.4 from individual *dwelling* or *sleeping units* of Group R occupancies and~~ Doors complying with any of the following are permitted to be equipped with a night latch, *dead bolt* or security chain that requires a second releasing motion, provided that such devices are openable from the inside without the use of a key or tool.
   5.1. Doors from individual Group R *dwelling* or *sleeping units* where a single *exit* complies with Section 1006.2.1 or 1006.3.4.

   5.2 Doors from individual sleeping rooms within *sleeping units* of *congregate living facilities* of Group R-2 and Group R-3 occupancies.

   5.3 Doors from individual sleeping rooms of *dwelling units* of Group R-2 occupancies serving as college or university residence halls.
6. *Fire doors* after the minimum elevated temperature has disabled the unlatching mechanism in accordance with *listed fire door* test procedures.
7. Doors serving roofs not intended to be occupied shall be permitted to be locked preventing entry to the *building* from the roof.

8. Other than egress *courts*, where occupants must egress from an exterior space through the *building* for *means of egress*, exit access doors shall be permitted to be equipped with an approved locking device where installed and operated in accordance with all of the following:
    8.1. The maximum *occupant load* shall be posted where required by Section 1004.9. Such signage shall be permanently affixed inside the building and shall be posted in a conspicuous space near all the *exit access doorways*.
    8.2. A weatherproof telephone or two-way communication system installed in accordance with Sections 1009.8.1 and 1009.8.2 shall be located adjacent to not less than one required exit access door on the exterior side.
    8.3. The egress door locking device is readily distinguishable as locked and shall be a key-operated locking device.
    8.4. A clear window or glazed door opening, not less than 5 square feet (0.46 m^2) in area, shall be provided at each exit access door to determine if there are occupants using the outdoor area.
    8.5. A readily visible, durable sign shall be posted on the interior side on or adjacent to each locked required exit access door serving the exterior area stating, "THIS DOOR TO REMAIN UNLOCKED WHEN THE OUTDOOR AREA IS OCCUPIED." The letters on the sign shall be not less than 1 inch (25.4 mm) high on a contrasting background.
    8.6. The *occupant load* of the occupied exterior area shall not exceed 300 occupants in accordance with Section 1004.
9. Locking devices are permitted on doors to balconies, decks or other exterior spaces serving individual *dwelling* or *sleeping units*.
10. Locking devices are permitted on doors to balconies, decks or other exterior spaces of 250 square feet (23.23 m^2) or less serving a private office space.

2024 International Fire Code

Revise as follows:

[BE] 1010.2.4 Locks and latches.
Locks and latches shall be permitted to prevent operation of doors where any of the following exist:

1. Places of detention or restraint.
2. In Group I-1, Condition 2 and Group I-2 occupancies where the clinical needs of persons receiving care require containment or where persons receiving care pose a security threat, provided that all clinical staff can readily unlock doors at all times, and all such locks are keyed to keys carried by all clinical staff at all times or all clinical staff have the codes or other means necessary to operate the locks at all times.
3. In buildings in occupancy Group A having an *occupant load* of 300 or less, Groups B, F, M and S, and in *places of religious worship*, the main door or doors are permitted to be equipped with key-operated locking devices from the egress side provided that:
    3.1. The doors are the main exterior doors to the building, or the doors are the main doors to the tenant space.
    3.2. The locking device is readily distinguishable as locked.
    3.3. A readily visible durable sign is posted on the egress side on or adjacent to the door stating: “THIS DOOR TO REMAIN UNLOCKED WHEN THIS SPACE IS OCCUPIED.” The sign shall be in letters 1 inch (25 mm) high on a contrasting background.
    3.4. The use of the key-operated locking device is revocable by the *fire code official* for due cause.
4. Manual bolts, automatic flush bolts and constant latching bolts on the inactive leaf of a pair of doors in accordance with Table 1010.2.4, provided that the inactive leaf does not have a doorknob, panic hardware, or similar operating hardware.

5. ~~Single exit doors complying with Section 1006.2.1 or 1006.3.4 from individual *dwelling* or sleeping units of Group R occupancies and~~ Doors complying with any of the following are permitted to be equipped with a night latch, dead bolt or security chain that requires a second releasing motion, provided that such devices are openable from the inside without the use of a key or tool.
   5.1. Doors from individual Group R *dwelling* or *sleeping units* where a single *exit* complies with Section 1006.2.1 or 1006.3.4.
   5.2 Doors from individual sleeping rooms within *sleeping units* of *congregate living facilities* of Group R-2 and Group R-3 occupancies.
   5.3 Doors from individual sleeping rooms of *dwelling units* of Group R-2 occupancies serving as college or university residence halls.
6. Fire doors after the minimum elevated temperature has disabled the unlatching mechanism in accordance with *listed* fire door test procedures.
7. Doors serving roofs not intended to be occupied shall be permitted to be locked, preventing entry to the building from the roof.
8. Other than *egress courts*, where occupants must egress from an exterior space through the building for *means of egress*, *exit access* doors shall be permitted to be equipped with an *approved* locking device where installed and operated in accordance with all of the following:
   8.1. The maximum *occupant load* shall be posted where required by Section 1004.9. Such sign shall be permanently affixed inside the building and shall be posted in a conspicuous space near all the *exit access doorways*.
   8.2. A weatherproof telephone or two-way communication system installed in accordance with Sections 1009.8.1 and 1009.8.2 shall be located adjacent to not less than one required *exit access* door on the exterior side.
   8.3. The egress door locking device is readily distinguishable as locked and shall be a key-operated locking device.
   8.4. A clear window or glazed door opening, not less than 5 square feet (0.46 m^2) in area, shall be provided at each *exit access* door to determine if there are occupants using the outdoor area.
   8.5. A readily visible durable sign shall be posted on the interior side on or adjacent to each locked required *exit access* door serving the exterior area stating: “THIS DOOR TO REMAIN UNLOCKED WHEN THE OUTDOOR AREA IS OCCUPIED.” The letters on the sign shall be not less than 1 inch (25.4 mm) high on a contrasting background.
   8.6. The *occupant load* of the occupied exterior area shall not exceed 300 occupants in accordance with Section 1004.
9. Locking devices are permitted on doors to balconies, decks or other exterior spaces serving individual *dwelling*or *sleeping units*.
10. Locking devices are permitted on doors to balconies, decks or other exterior spaces of 250 square feet (23.23 m^2) or less, serving a private office space.

Reason: This code proposal is about permitting locking of doors to individual sleeping rooms on Group R-2 occupancies similar to what’s permitted regarding locking of doors of hotel rooms (i.e. *sleeping units*) and college / university *dormitory* rooms (i.e. *sleeping units*).

Some college and university *dormitories* and residence halls are designed and constructed with suite-style layouts. The residence halls at Upstate University of South Carolina are one example: www.uscupstate.edu/campus-life/housing-and-dining/housing-floor-plans/.

Another example is Clarkson College residence hall: www.clarksoncollege.edu/student-life/residence-life/floor-plan-layout/index. But, do note the layout of the Clarkson College residence hall suites include permanent provisions for living, sleeping, eating, cooking, and sanitation, which means these suites would be considered *dwelling units,* per the IBC definition of *dwelling units*, and the buildings would be R-2 apartment houses. Thus, these suites would not be *congregate living facilities* (because *congregate living facilities* have *sleeping units*, but not *dwelling units*, per the IBC definition of *congregate living facilities*), and additionally, buildings containing these suites would not be a *dormitories* (because *dormitories* are a subset of *congregate living facilities*, per IBC Section 310.3).

The IBC currently permits dead bolts on the door into residence hall suites in the same manner as doors into *dwelling units* – see IBC

Section 1010.2.4 Item 5. Considering the occupants of these residence hall suites are unlikely to be of the same family group (see the IBC definition of *dormitory*), there's a desire by the occupants to be able to enhance the security of their individual sleeping rooms. But, the IBC does not permit dead bolts on doors into each of the sleeping rooms of these residence hall suites.

This proposal was initially conceived as applicable only to Group R-2 *dormitories*; but perhaps the proposed revisions should be applicable to (permitted for) the individual sleeping rooms of all Group R-2 and Group R-3 *congregate living facilities* (as proposed here). *Congregate living facilities* include *boarding houses*, convents, *dormitories*, fraternities and sororities, and monasteries. In all of these uses, the occupants of the sleeping rooms would be primarily adults, are unlikely to be of the same family group, and the person that locks the door for security would be able to quickly unlock the door for egress.

Item 5.1 is moved from the Item 5 and editorially revised.

Item 5.2 applies to the individual sleeping rooms within the *sleeping units* of nontransient *congregate living facilities* of Group R-2, and applies to the sleeping units of nontransient and *transient congregate living facilities* of Group R-3.

Item 5.3 applies to the individual sleeping rooms of *dwelling units* in college and university residence halls.

2024 IBC Definitions (for information only):

[BG] BOARDING HOUSE. A building arranged or used for lodging for compensation, with or without meals, and not occupied as a single-family unit.

[BG] CONGREGATE LIVING FACILITIES. A building or part thereof that contains sleeping units where residents share bathroom or kitchen facilities, or both.

[BG] DORMITORY. A space in a building where group sleeping accommodations are provided in one room, or in a series of closely associated rooms, for persons not members of the same family group, under joint occupancy and single management, as in college dormitories or fraternity houses.

[A] DWELLING. A building that contains one or two dwelling units used, intended or designed to be used, rented, leased, let or hired out to be occupied for living purposes.

[A] DWELLING UNIT. A single unit providing complete, independent living facilities for one or more persons, including permanent provisions for living, sleeping, eating, cooking and sanitation.

[A] SLEEPING UNIT. A single unit that provides rooms or spaces for one or more persons, includes permanent provisions for sleeping and can include provisions for living, eating and either sanitation or kitchen facilities but not both. Such rooms and spaces that are also part of a dwelling unit are not sleeping units.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

No cost changes.
This proposal permits, but does not require, the use of locking devices in these Group R applications.

E54-24

E55-24

IBC: 1010.2.4; IFC: [BE] 1010.2.4

Proponents: John Woestman, Kellen Company, Builders Hardware Manufacturers Association (BHMA) (jwoestman@kellencompany.com)

2024 International Building Code

Revise as follows:

1010.2.4 Locks and latches.
Locks and latches shall be permitted to prevent operation of doors where any of the following exist:

1. Places of detention or restraint.
2. In Group I-1, Condition 2 and Group I-2 occupancies where the clinical needs of *persons* receiving care require containment or where *persons* receiving care pose a security threat, provided that all clinical staff can readily unlock doors at all times, and all such locks are keyed to keys carried by all clinical staff at all times or all clinical staff have the codes or other means necessary to operate the locks at all times.
3. In *buildings* in occupancy Group A having an *occupant load* of 300 or less, Groups B, F, M and S, and in *places of religious worship*, the main door or doors are permitted to be equipped with key-operated locking devices from the egress side provided that:
   - 3.1. The doors are the main exterior doors to the *building*, or the doors are the main doors to the tenant space.
   - 3.2. The locking device is readily distinguishable as locked.
   - 3.3. A readily visible durable sign is posted on the egress side on or adjacent to the door stating: THIS DOOR TO REMAIN UNLOCKED WHEN THIS SPACE IS OCCUPIED. The sign shall be in letters 1 inch (25 mm) high on a contrasting background.
   - 3.4. The use of the key-operated locking device is revocable by the *building official* for due cause.
4. *Manual bolts*, automatic flush bolts and *constant latching bolts* on the inactive leaf of a pair of doors in accordance with Table 1010.2.4, provided that the inactive leaf does not have a doorknob, *panic hardware*, or similar operating hardware.
5. Single exit doors complying with Section 1006.2.1 or 1006.3.4 from individual *dwelling* or *sleeping units* of Group R occupancies and equipped with a night latch, *dead bolt* or security chain that requires a second <u>non-simultaneous</u> releasing motion, provided that such devices are openable from the inside without the use of a key or tool.
6. *Fire doors* after the minimum elevated temperature has disabled the unlatching mechanism in accordance with *listed fire door* test procedures.
7. Doors serving roofs not intended to be occupied shall be permitted to be locked preventing entry to the *building* from the roof.

8. Other than egress *courts*, where occupants must egress from an exterior space through the *building* for *means of egress*, exit access doors shall be permitted to be equipped with an approved locking device where installed and operated in accordance with all of the following:
   8.1. The maximum *occupant load* shall be posted where required by Section 1004.9. Such signage shall be permanently affixed inside the building and shall be posted in a conspicuous space near all the *exit access doorways*.
   8.2. A weatherproof telephone or two-way communication system installed in accordance with Sections 1009.8.1 and 1009.8.2 shall be located adjacent to not less than one required exit access door on the exterior side.
   8.3. The egress door locking device is readily distinguishable as locked and shall be a key-operated locking device.
   8.4. A clear window or glazed door opening, not less than 5 square feet (0.46 m^2) in area, shall be provided at each exit access door to determine if there are occupants using the outdoor area.
   8.5. A readily visible, durable sign shall be posted on the interior side on or adjacent to each locked required exit access door serving the exterior area stating, "THIS DOOR TO REMAIN UNLOCKED WHEN THE OUTDOOR AREA IS OCCUPIED." The letters on the sign shall be not less than 1 inch (25.4 mm) high on a contrasting background.
   8.6. The *occupant load* of the occupied exterior area shall not exceed 300 occupants in accordance with Section 1004.
9. Locking devices are permitted on doors to balconies, decks or other exterior spaces serving individual *dwelling* or *sleeping units*.
10. Locking devices are permitted on doors to balconies, decks or other exterior spaces of 250 square feet (23.23 m^2) or less serving a private office space.

2024 International Fire Code

Revise as follows:

[BE] 1010.2.4 Locks and latches.
Locks and latches shall be permitted to prevent operation of doors where any of the following exist:
1. Places of detention or restraint.
2. In Group I-1, Condition 2 and Group I-2 occupancies where the clinical needs of persons receiving care require containment or where persons receiving care pose a security threat, provided that all clinical staff can readily unlock doors at all times, and all such locks are keyed to keys carried by all clinical staff at all times or all clinical staff have the codes or other means necessary to operate the locks at all times.
3. In buildings in occupancy Group A having an *occupant load* of 300 or less, Groups B, F, M and S, and in *places of religious worship*, the main door or doors are permitted to be equipped with key-operated locking devices from the egress side provided that:
   3.1. The doors are the main exterior doors to the building, or the doors are the main doors to the tenant space.
   3.2. The locking device is readily distinguishable as locked.
   3.3. A readily visible durable sign is posted on the egress side on or adjacent to the door stating: “THIS DOOR TO REMAIN UNLOCKED WHEN THIS SPACE IS OCCUPIED.” The sign shall be in letters 1 inch (25 mm) high on a contrasting background.
   3.4. The use of the key-operated locking device is revocable by the *fire code official* for due cause.
4. Manual bolts, automatic flush bolts and constant latching bolts on the inactive leaf of a pair of doors in accordance with Table 1010.2.4, provided that the inactive leaf does not have a doorknob, panic hardware, or similar operating hardware.

5. Single exit doors complying with Section 1006.2.1 or 1006.3.4 from individual *dwelling* or sleeping units of Group R occupancies and equipped with a night latch, dead bolt or security chain that requires a second non-simultaneous releasing motion, provided that such devices are openable from the inside without the use of a key or tool.
6. Fire doors after the minimum elevated temperature has disabled the unlatching mechanism in accordance with *listed* fire door test procedures.
7. Doors serving roofs not intended to be occupied shall be permitted to be locked, preventing entry to the building from the roof.
8. Other than *egress courts*, where occupants must egress from an exterior space through the building for *means of egress*, *exit access* doors shall be permitted to be equipped with an *approved* locking device where installed and operated in accordance with all of the following:
   - 8.1. The maximum *occupant load* shall be posted where required by Section 1004.9. Such sign shall be permanently affixed inside the building and shall be posted in a conspicuous space near all the *exit access doorways*.
   - 8.2. A weatherproof telephone or two-way communication system installed in accordance with Sections 1009.8.1 and 1009.8.2 shall be located adjacent to not less than one required *exit access* door on the exterior side.
   - 8.3. The egress door locking device is readily distinguishable as locked and shall be a key-operated locking device.
   - 8.4. A clear window or glazed door opening, not less than 5 square feet (0.46 m^2) in area, shall be provided at each *exit access* door to determine if there are occupants using the outdoor area.
   - 8.5. A readily visible durable sign shall be posted on the interior side on or adjacent to each locked required *exit access* door serving the exterior area stating: "THIS DOOR TO REMAIN UNLOCKED WHEN THE OUTDOOR AREA IS OCCUPIED." The letters on the sign shall be not less than 1 inch (25.4 mm) high on a contrasting background.
   - 8.6. The *occupant load* of the occupied exterior area shall not exceed 300 occupants in accordance with Section 1004.
9. Locking devices are permitted on doors to balconies, decks or other exterior spaces serving individual *dwelling*or *sleeping units*.
10. Locking devices are permitted on doors to balconies, decks or other exterior spaces of 250 square feet (23.23 m^2) or less, serving a private office space.

Reason: A "non-simultaneous" requirement for the permitted second releasing motion is currently not included in Item 5 of 1010.2.4. Although extremely unlikely, installing two lever-operated spring-loaded latching and locking devices on the door – which would require simultaneous releasing motions – should be prohibited by the code.
This proposal addresses this oversight in the IBC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal should not increase or decrease the cost of construction. It is an editorial clarification of the intent for locking arrangements at entrance doors in Group R dwelling and sleeping units.

E55-24

E56-24

IBC: TABLE 1010.2.4; IFC: [BE]TABLE 1010.2.4

Proponents: John Woestman, Kellen Company, Builders Hardware Manufacturers Association (BHMA) (jwoestman@kellencompany.com)

2024 International Building Code

Revise as follows:

TABLE 1010.2.4 MANUAL BOLTS, AUTOMATIC FLUSH BOLTS AND CONSTANT LATCHING BOLTS ON THE INACTIVE LEAF OF A PAIR OF DOORS

APPLICATION WITH A PAIR OF DOORS WITH AN ACTIVE LEAF AND AN INACTIVE LEAF	THE PAIR OF DOORS IS REQUIRED TO COMPLY WITH SECTION 716	PERMITTED USES OF MANUAL BOLTS, AUTOMATIC FLUSH BOLTS AND CONSTANT LATCHING BOLTS ON THE INACTIVE LEAF OF A PAIR OF DOORS.		
		Surface- or flush-mounted manual bolts	Automatic flush bolts	Constant latching bolts
Group B, F, M, or S occupancies with occupant load less than 50.	No	P	P	P
	Yes	NP	~~NP~~P[b]	P[b]
Group B, F, M, or S occupancies where the building is equipped with an automatic sprinkler system in accordance with Section 903.3.1.1 and the inactive leaf is not needed to meet egress capacity requirements.	No	P	P	P
	Yes	NP	~~NP~~P[b]	P[b]
Group I-2 patient care and sleeping rooms where inactive leaf is not needed to meet egress capacity requirements.	No	NP	~~NP~~P~~[b]~~	P
	~~Yes~~	~~NP~~	~~NP[b]~~	~~P~~
Any occupancy where panic hardware is not required, egress doors are used in pairs, and where both leaves are required to meet egress capacity requirements.	No	NP	P	NP
	Yes	NP	~~NP~~P[b]	NP
Storage or equipment rooms where the inactive leaf is not needed to meet egress capacity requirements.	No	P[a]	P	P
	Yes	P[a]	P	P

P = Permitted. NP = Not permitted.

a. Not permitted on corridor doors in Group I-2 occupancies where corridor doors are required to be positive latching.

b. Permitted only where both door leafs are self closing or automatic closing, and both leafs are arranged to automatically latch in the closed position ~~provided with a coordinator that causes the inactive leaf to be closed prior to the active leaf.~~.

2024 International Fire Code

Revise as follows:

[BE]TABLE 1010.2.4 MANUAL BOLTS, AUTOMATIC FLUSH BOLTS AND CONSTANT LATCHING BOLTS ON THE INACTIVE LEAF OF A PAIR OF DOORS

APPLICATION WITH A PAIR OF DOORS WITH AN ACTIVE LEAF AND AN INACTIVE LEAF	THE PAIR OF DOORS ARE REQUIRED TO COMPLY WITH IBC SECTION 716	PERMITTED USES OF MANUAL BOLTS, AUTOMATIC FLUSH BOLTS AND CONSTANT LATCHING BOLTS ON THE INACTIVE LEAF OF A PAIR OF DOORS		
		Surface- or flush-mounted manual bolts	Automatic flush bolts	Constant latching bolts
Group B, F, M, or S occupancies with occupant load less than 50.	No	P	P	P
	Yes	NP	~~NP~~P[b]	P[b]

Group B, F, M, or S occupancies where the building is equipped with an automatic sprinkler system in accordance with Section 903.3.1.1 and the inactive leaf is not needed to meet egress capacity requirements.	No	P	P	P
	Yes	NP	~~NP~~P[b]	P[b]
Group I-2 patient care and sleeping rooms where inactive leaf is not needed to meet egress capacity requirements.	No	NP	~~NP~~P~~[b]~~	P
	~~Yes~~	~~NP~~	~~NP[b]~~	~~P~~
Any occupancy where panic hardware is not required, egress doors are used in pairs, and where both leaves are required to meet egress capacity requirements.	No	NP	P	NP
	Yes	NP	~~NP~~P[b]	NP
Storage or equipment rooms where the inactive leaf is not needed to meet egress capacity requirements.	No	P[a]	P	P
	Yes	P[a]	P	P

P = Permitted. NP = Not Permitted.

a. Not permitted on corridor doors in Group I-2 occupancies where corridor doors are required to be positive latching.

b. Permitted only where both door leafs are self closing or automatic closing, and both leafs are arranged to automatically latch in the closed position ~~provided with a coordinator that causes the inactive leaf to be closed prior to the active leaf.~~

Reason: This proposal adds the Mercantile occupancy (M) to the first two rows of Table 1010.2.4 to specifically permit manual bolts, automatic flush bolts, or constant latching bolts on the inactive leaf of a pair of doors. A common application of these hardware items are the doors to automobile showrooms, where the inactive leaf opens wide enough to permit cars to be rolled into and out of the showroom. These two rows in Table 1010.2.4 are where the inactive leaf is not needed for egress capacity.

Also, footnote b is added to two cells in the right-hand column. In these applications where the doors are required to comply with Section 716, these doors are required by other parts of the IBC to be opening protectives, and required to be self-closing or automatic-closing, and to latch when closed. We overlooked this nuance when we proposed this table for the 2024 IBC.

This proposal also editorially revises this table and footnote. Footnote b of Table 1010.2.4 currently is not quite accurate as some pairs of doors are designed such that both door leafs (the active leaf and the inactive leaf) close and latch without needing a coordinator to close the inactive leaf prior to the active leaf. Also, revising a couple cells in Table 1010.2.4 to mesh with the revisions in Footnote b.

In Group I-2, patient care and sleeping room doors are, for all practical purposes, not required by the IBC to comply with Section 716 (i.e. to be fire rated doors). Thus, it is appropriate to remove this partial row for Group I-2 patient care rooms and sleeping rooms.

IBC Section 407.3.1 specifically states that Group I-2 corridor doors are not required to be self-closing or automatic-closing except in the very limited situations where the corridor doors are in a wall required to be rated by Section 509.4 Incidental uses, or for enclosure of a vertical opening or an exit. In Group I-2, patient care and sleeping room doors are essentially not installed in these situations.

Also, in Group I-2, patient care and sleeping room doors are not required to be self-closing or automatic-closing, and the footnote in the cell under Automatic flush bolts should not be there.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal does not increase or decrease the cost of construction.

This proposal adds, for Mercantile occupancies, the option to use manual bolts, automatic flush bolts, or constant latching bolts on the inactive leaf of a pair of doors. And, the proposal editorially corrects footnote b and editorially revises Table 1010.2.4.

E56-24

E57-24

IBC: 1010.2.7 (New), 1010.2.7, 1010.2.7.2 (New), 1010.2.7.3 (New); IFC: 1010.2.7 (New), [BE] 1010.2.7, 1010.2.7.2 (New), 1010.2.7.3 (New)

Proponents: John Woestman, Kellen Company, Builders Hardware Manufacturers Association (BHMA) (jwoestman@kellencompany.com)

2024 International Building Code

Add new text as follows:

1010.2.7 Locking arrangements in educational occupancies. In Group E occupancies, Group B colleges and universities, Group A occupancies accessory to Group B colleges and universities, and Group I-4 occupancies, egress doors and exterior entry doors shall comply with Sections 1010.2.7.1 through 1010.2.7.3.

Revise as follows:

~~1010.2.7~~1010.2.7.1 ~~Locking arrangements~~ Egress doors in educational occupancies.
~~In Group E occupancies, Group B educational occupancies, and Group I-4 occupancies, egress~~ Egress doors from classrooms, offices and other occupied rooms shall be provided with locking arrangements designed to keep intruders from entering the room and shall comply with all of the following ~~conditions~~:

1. The doors shall be capable of being locked from inside the room.
2. ~~1.~~ The doors shall be capable of being unlocked from outside the room with a key or other *approved* means.
3. ~~2.~~ The doors shall be openable from within the room in accordance with Section 1010.2.
4. ~~3.~~ Modifications shall not be made to *listed panic hardware*, *fire door* hardware or door closers.
5. ~~4.~~ Modifications to *fire door assemblies* shall be in accordance with NFPA 80.

~~Remote locking or unlocking of doors from an *approved* location shall be permitted in addition to the unlocking operation in Item 1.~~

Add new text as follows:

1010.2.7.2 Exterior entry doors. Exterior doors which provide entry into the building shall be provided with locking arrangements designed to keep intruders from entering the building, and shall comply with all of the following:

1. The doors shall be lockable from the egress side of the door.
2. A minimum of one door on each building face shall be capable of being unlocked from outside the building with a key or other approved means.
3. Each egress door shall be openable from within the building in accordance with Section 1010.2.

1010.2.7.3 Remote locking and unlocking. Remote locking and unlocking of doors from an approved location shall be permitted.

2024 International Fire Code

Add new text as follows:

1010.2.7 Locking arrangements in educational occupancies. In Group E occupancies, Group B colleges and universities, Group A occupancies accessory to Group B colleges and universities, and Group I-4 occupancies, egress doors and exterior entry doors shall comply with Sections 1010.2.7.1 through 1010.2.7.3.

Revise as follows:

[BE] ~~1010.2.7~~1010.2.7.1 ~~Locking arrangements~~ Egress doors in educational occupancies.
~~In Group E occupancies, Group B educational occupancies, and Group I-4 occupancies, egress~~ Egress doors from classrooms, offices and other occupied rooms shall be provided with locking arrangements designed to keep intruders from entering the room and shall comply with all of the following ~~conditions~~:

1. The doors shall be capable of being locked from inside the room.
2. ~~1.~~2. The doors shall be capable of being unlocked from outside the room with a key or other *approved* means.
3. ~~2.~~3. The doors shall be openable from within the room in accordance with Section 1010.2.
4. ~~3.~~4. Modifications shall not be made to *listed* panic hardware, fire door hardware or door closers.
5. ~~4.~~5. Modifications to fire door assemblies shall be in accordance with NFPA 80.

~~Remote locking or unlocking of doors from an *approved* location shall be permitted in addition to the unlocking operation in Item 1.~~

Add new text as follows:

1010.2.7.2 Exterior entry doors. Exterior doors which provide entry into the building shall be provided with locking arrangements designed to keep intruders from entering the building and shall comply with all of the following:

1. The doors shall be lockable from the egress side of the door.
2. A minimum of one door of each building face shall be capable of being unlocked from outside the building with a key or other approved means.
3. Each egress door shall be openable from within the building in accordance with Section 1010.2.

1010.2.7.3 Remote locking and unlocking. Remote locking and unlocking of doors from an approved location shall be permitted.

Reason: IBC

In educational occupancies, this proposal requires, primarily, egress doors from classrooms and other occupiable rooms to be lockable from the inside of the room. This proposal also requires exterior entry doors to be lockable from inside the buildings. These proposed requirements are consistent with current practices of design and construction of new schools, and are consistent with recommendations by a wide range of school safety and security advocates, including the U.S. Dept. of Homeland Security (DHS), and the Partner Alliance for Safer Schools (PASS).

Several poignant examples:

The Sandy Hook Advisory Commission's Final Report, dated March 6, 2015, of the investigation of the tragedy at Sandy Hook Elementary School in Newtown, Connecticut, Dec. 14, 2012, recommends:

1. Requiring classroom and other safe-haven areas to have doors that can be locked from the inside.

2. All exterior doors in K-12 schools be equipped with hardware capable of implementing a full perimeter lockdown.

The May 24, 2022 incident at Robb Elementary, Uvalde, Texas, confirmed the importance of the ability to lock exterior doors from the interior of the building. Reportedly, the door the gunman used to enter the Robb Elementary building was lockable only from the outside of the building (same with other exterior doors), and from the inside it was not possible to determine if the exterior door was locked to prevent entry. These exterior doors were required to be kept locked and closed. The interior classroom doors in Robb Elementary reportedly could only be locked from outside the classroom, and teachers were required, by policy, to keep the classroom doors locked and closed. But, there was no way to confirm whether the exterior handle was locked from the inside of the classroom. For convenience, reportedly teachers would use rocks to prop open exterior doors, and they used door stops, wedges, and magnets to prevent interior door locks from latching.

Despite billions of dollars invested in hardening schools nationally, 1 in 4 U.S. public schools lack classroom doors that can be locked from the inside, according to a survey conducted two years ago by the National Center on Education Statistics, a federal research office.Doors that can be quickly and easily locked can mean the difference between life and death when a shooter is on school grounds.

Safety commissions, teachers, fire safety groups, and both gun rights and gun control groups have all advocated for doors which can be locked from the inside since the Columbine High School, Columbine, Colorado, shooting in 1999.

Sources:

https://passk12.org/

https://www.cisa.gov/topics/physical-security/school-safety

https://passk12.org/

https://portal.ct.gov/-/media/Malloy-Archive/Sandy-Hook-Advisory-Commission/SHAC_Final_Report_3-6-2015.pdf

https://house.texas.gov/_media/pdf/committees/reports/87interim/Robb-Elementary-Investigative-Committee-Report-update.pdf

https://apnews.com/article/politics-shootings-texas-school-safety-2c97d26b56e8b081aa725ee2235e4a3b

https://www.nbcnews.com/news/us-news/uvalde-classrooms-lacked-security-door-locks-rcna37358

https://nces.ed.gov/programs/digest/d21/tables/dt21_233.50.asp

https://www.cft.org/california-teacher/our-fight-win-security-doorlocks

https://www.firemarshals.org/resources/Documents/NASFM%20Classroom%20Door%20Security%2020210217.pdf

https://www.defensivestrategies.org/downloads/NRA-National-School-Shield-Report.pdf

https://everytownresearch.org/report/how-to-stop-shootings-and-gun-violence-in-schools/

The proposed requirements do not mandate the use of specific locks or lock functions – that should be left up to the schools and educational institutions.

IFC

In educational occupancies, this proposal requires, primarily, egress doors from classrooms and other occupiable rooms to be lockable from the inside of the room. This proposal also requires exterior entry doors to be lockable from inside the buildings. These proposed requirements are consistent with recommendations by a wide range of school safety and security advocates, including the U.S. Dept. of Homeland Security (DHS), and the Partner Alliance for Safer Schools (PASS).

Several poignant examples:

The Sandy Hook Advisory Commission's Final Report, dated March 6, 2015, of the investigation of the tragedy at Sandy Hook Elementary School in Newtown, Connecticut, Dec. 14, 2012, recommends:

1. Requiring classroom and other safe-haven areas to have doors that can be locked from the inside.

2. All exterior doors in K-12 schools be equipped with hardware capable of implementing a full perimeter lockdown.

The May 24, 2022 incident at Robb Elementary, Uvalde, Texas, confirmed the importance of the ability to lock exterior doors from the interior of the building. Reportedly, the door the gunman used to enter the Robb Elementary building was lockable only from the outside of the building (same with other exterior doors), and from the inside it was not possible to determine if the exterior door was locked to prevent entry. These exterior doors were required to be kept locked and closed. The interior classroom doors in Robb Elementary reportedly could only be locked from outside the classroom, and teachers were required, by policy, to keep the classroom doors locked and closed. But, there was no way to confirm whether the exterior handle was locked from the inside of the classroom. For convenience, reportedly teachers would use rocks to prop open exterior doors, and they used door stops, wedges, and magnets to prevent interior door locks from latching.

Despite billions of dollars invested in hardening schools nationally, 1 in 4 U.S. public schools lack classroom doors that can be locked from the inside, according to a survey conducted in 2020 by the National Center on Education Statistics, a federal research office.

Doors that can be quickly and easily locked can mean the difference between life and death when a shooter is on school grounds. Safety commissions, teachers, fire safety groups, and both gun rights and gun control groups have all advocated for doors which can be locked from the inside since the Columbine High School, Columbine, Colorado, shooting in 1999.

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https://portal.ct.gov/-/media/Malloy-Archive/Sandy-Hook-Advisory-Commission/SHAC_Final_Report_3-6-2015.pdf

https://house.texas.gov/_media/pdf/committees/reports/87interim/Robb-Elementary-Investigative-Committee-Report-update.pdf

https://apnews.com/article/politics-shootings-texas-school-safety-2c97d26b56e8b081aa725ee2235e4a3b

https://www.nbcnews.com/news/us-news/uvalde-classrooms-lacked-security-door-locks-rcna37358

https://nces.ed.gov/programs/digest/d21/tables/dt21_233.50.asp

https://www.cft.org/california-teacher/our-fight-win-security-doorlocks

https://www.firemarshals.org/resources/Documents/NASFM%20Classroom%20Door%20Security%2020210217.pdf

https://www.defensivestrategies.org/downloads/NRA-National-School-Shield-Report.pdf

https://everytownresearch.org/report/how-to-stop-shootings-and-gun-violence-in-schools/

The proposed requirements do not mandate the use of specific locks or lock functions – that should be left up to the schools and educational institutions.

Cost Impact: Increase

Estimated Immediate Cost Impact:

Greater than $10.

Estimated Immediate Cost Impact Justification (methodology and variables):

IBC

From an IBC perspective, the proposal includes new requirements that would be applicable to locks on interior doors, and applicable to locks on exterior doors. However, from a practical perspective, the proposed requirements for locks on interior and exterior doors are consistent with current practices of design and construction of new schools. Thus, from a cost perspective, the actual increase in cost is nil.

The amount of greater than $10 is submitted to satisfy ICC's requirement for quantifying cost.

This proposal will increase the cost of construction by at least $10 for hardware, installation, etc., however the significant safety benefits secured by making this change will far outweigh any increased costs incurred. Discussions about specific costs and prices would violate ICC's Council Policy 50 (CP-50), conflict with legal advice given to the staff and members of the Builders Hardware Manufacturers Association, and defy legal guidance provided to associations by government antitrust regulators.

IFC

From an IFC perspective, the proposal includes new requirements that would be applicable to existing buildings for locks on interior doors, and for locks on exterior doors. 1 in 4 U.S. public schools lack classroom doors that can be locked from the inside, according to a survey conducted in 2020 by the National Center on Education Statistics, a federal research office. The proposed requirements are consistent with recommendations by a wide range of school safety and security advocates, including the U.S. Dept. of Homeland Security, and the Partner Alliance for Safe Schools (PASS).

The devastating events in schools have demonstrated the need for locks on interior doors that are lockable from inside the room, and have demonstrated the need for locks on exterior doors that are also lockable from inside the building. That's the bottom line of what this proposal requires.

The amount of greater than $10 is submitted to satisfy ICC's requirement for quantifying cost.

This proposal will increase the cost of construction by at least $10 for hardware, installation, etc., however the significant safety benefits secured by making this change will far outweigh any increased costs incurred. Discussions about specific costs and prices would violate ICC's Council Policy 50 (CP-50), conflict with legal advice given to the staff and members of the Builders Hardware Manufacturers Association, and defy legal guidance provided to associations by government antitrust regulators.

E57-24

E58-24

IBC: 1010.2.8; IFC: [BE] 1010.2.8

Proponents: John Woestman, Kellen Company, Builders Hardware Manufacturers Association (BHMA) (jwoestman@kellencompany.com)

2024 International Building Code

Revise as follows:

1010.2.8 Panic and fire exit hardware.
Swinging doors serving a Group H occupancy and swinging doors serving rooms or spaces with an *occupant load* of 50 or more in a Group A or E occupancy shall not be provided with a latch or lock other than *panic hardware* or *fire exit hardware*.

Exceptions:

1. A main exit of a Group A occupancy shall be permitted to have locking devices in accordance with Section 1010.2.4, Item 3.
2. Doors provided with *panic hardware* or *fire exit hardware* and serving a Group A or E occupancy shall be permitted to be electrically locked in accordance with Section 1010.2.10.
3. Exit access doors serving occupied exterior areas shall be permitted to be locked in accordance with Section 1010.2.4, Item 8.
4. Courtrooms shall be permitted to be locked in accordance with Section 1010.2.12, Item 3.
5. Gates surrounding stadiums complying with Section 1010.4.1.

2024 International Fire Code

Revise as follows:

[BE] 1010.2.8 Panic and fire exit hardware.
Swinging doors serving a Group H occupancy and swinging doors serving rooms or spaces with an *occupant load* of 50 or more in a Group A or E occupancy shall not be provided with a latch or lock other than *panic hardware* or *fire exit hardware*.

Exceptions:

1. A main *exit* of a Group A occupancy shall be permitted to have locking devices in accordance with Section 1010.2.4, Item 3.
2. Doors provided with *panic hardware* or *fire exit hardware* and serving a Group A or E occupancy shall be permitted to be electrically locked in accordance with Section 1010.2.10.
3. *Exit access* doors serving occupied exterior areas shall be permitted to be locked in accordance with Section 1010.2.4, Item 8.
4. Courtrooms shall be permitted to be locked in accordance with Section 1010.2.12, Item 3.
5. Gates surrounding stadiums complying with Section 1010.4.1.

Reason: This proposal is intended to address an internal conflict in the code:
IBC Section 1010.4 (and same section in IFC) requires gates to comply with applicable requirements of the code which would include 1010.2.8 Panic and Fire Exit Hardware (see the text copied below). But, Section 1010.4.1 states panic hardware is not required on gates surrounding stadiums where specific conditions are met.
This proposal adds a coordinating exception to 1010.2.8 to address this conflict.
2024 IBC, and IFC
1010.4 Gates. Gates serving the means of egress system shall comply with the requirements of this section. Gates used as a component in a means of egress shall conform to the applicable requirements for doors.
Exception: Horizontal sliding or swinging gates exceeding the 4-foot (1219 mm) maximum leaf width limitation are permitted in fences and walls surrounding a stadium.
1010.4.1 Stadiums. Panic hardware is not required on gates surrounding stadiums where such gates are under constant immediate supervision while the public is present, and where safe dispersal areas based on 3 square feet (0.28 m2) per occupant are located

between the fence and enclosed space. Such required safe dispersal areas shall not be located less than 50 feet (15 240 mm) from the enclosed space. See Section 1028.5 for means of egress from safe dispersal areas.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

No cost implications. This proposal is an editorial improvement in the code that eliminates the conflicts with Section 1010.4 for gates.

E58-24

E59-24

IBC: 1010.2.8.2, 1010.2.8.2.1 (New); IFC: [BE] 1010.2.8.2, 1010.2.8.2.1 (New)

Proponents: John Woestman, Kellen Company, Builders Hardware Manufacturers Association (BHMA) (jwoestman@kellencompany.com)

2024 International Building Code

Delete and substitute as follows:

~~**1010.2.8.2 Rooms with electrical equipment.**~~
~~Exit or exit access doors serving transformer vaults, rooms designated for batteries or energy storage systems, or modular *data centers* shall be equipped with *panic hardware* or *fire exit hardware*. Rooms containing electrical equipment rated 800 amperes or more that contain overcurrent devices, switching devices or control devices and where the exit or exit access door is less than 25 feet (7620 mm) from the equipment working space as required by NFPA 70, such doors shall not be provided with a latch or lock other than *panic hardware* or *fire exit hardware*. The doors shall swing in the direction of egress travel.~~

1010.2.8.2 Rooms with electrical equipment. Where an electrical equipment room, enclosure, or vault meets one or more of the following criteria, exit doors or exit access doors shall comply with Section 1010.2.8.2.1.

1. Room, enclosure, or vault for electrical equipment of 1000 volts, nominal, or less and rated 800 amperes or more that contain overcurrent devices, switching devices, or control devices and where the exit door or exit access door is less than 25 feet (7620 mm) from the equipment working space as required by NFPA 70.
2. Vault for electrical equipment of over 1000 volts, nominal.
3. Room or enclosure for electrical equipment of over 1000 volts, nominal, and where the exit door or exit access door is less than 25 feet (7620 mm) from the equipment working space as required by NFPA 70.
4. Transformer vault.
5. Room, enclosure, or vault for batteries or energy storage systems having a capacity greater than 1 kWh (3.6MJ).
6. Modular data center.

Add new text as follows:

1010.2.8.2.1 Electrical equipment room doors. Exit doors and exit access doors of such electrical room, enclosure, or vault shall swing in the direction of egress travel, and locks and latches on the doors shall be provided with panic hardware or fire exit hardware.

2024 International Fire Code

Delete and substitute as follows:

~~**[BE] 1010.2.8.2 Rooms with electrical equipment .**~~
~~*Exit* or *exit access* doors serving transformer vaults, rooms designated for batteries or energy storage systems, or modular *data centers* shall be equipped with *panic hardware* or *fire exit hardware*. Rooms containing electrical equipment rated 800 amperes or more that contain overcurrent devices, switching devices or control devices and where the *exit* or *exit access* door is less than 25 feet (7620 mm) from the equipment working space as required by NFPA 70, such doors shall not be provided with a latch or lock other than *panic hardware* or *fire exit hardware*. The doors shall swing in the direction of egress travel.~~

[BE] 1010.2.8.2 Rooms with electrical equipment . Where an electrical equipment room, enclosure, or vault meets one or more of the following criteria, exit doors or exit access doors shall comply with Section 1010.2.8.2.1.

1. Room, enclosure, or vault for electrical equipment of 1000 volts, nominal, or less and rated 800 amperes or more that contain overcurrent devices, switching devices, or control devices and where the exit door or exit access door is less than 25 feet (7620 mm) from the equipment working space as required by NFPA 70.
2. Vault for electrical equipment of over 1000 volts, nominal.
3. Room or enclosure for electrical equipment of over 1000 volts, nominal, and where the exit door or exit access door is less than 25 feet (7620 mm) from the equipment working space as required by NFPA 70.
4. Transformer vault.
5. Room, enclosure, or vault for batteries or energy storage systems having a capacity greater than 1 kWh (3.6MJ).
6. Modular data center.

Add new text as follows:

1010.2.8.2.1 Electrical equipment room doors. Exit doors and exit access doors of such electrical room, enclosure, or vault shall swing in the direction of egress travel, and locks and latches on the doors shall be provided with panic hardware or fire exit hardware.

Reason: This proposal is intended to be editorial and to more closely mesh with the requirements in NFPA 70 National Electrical Code. The IBC, in Chapter 27, requires compliance with NFPA 70. The current text in Section 1010.2.8.2 closely follows requirements in NFPA 70 regarding panic hardware and fire exit hardware, but the revised text more closely follows the requirements in NFPA 70, making it easier to understand what's required to comply with NFPA 70.

The charging language of 1010.2.8.2 is primarily the existing language in 1010.2.8.2 with editing to more closely mesh with terms used in NFPA 70. For example, electrical enclosures of wire fence-like material surrounding electrical equipment may not be considered an electrical equipment room – hence the proposed revisions to electrical equipment room, enclosure, or vault.

The criteria in Items 1 through 6 are from current requirements in 1010.2.8.2 and augmented by requirements in these sections of NFPA 70:

1. 110.26(C)(3) – electrical equipment rooms, enclosures, or vaults for 1000 volts or less
2. 110.31(A)(4) – electrical equipment vaults for more than 1000 volts
3. 110.33(A)(3) – electrical equipment rooms or enclosures for more than 1000 volts
4. 450.43(C) – transformer vaults
5. 480.1 and 480.10(E) – batteries and energy storage systems
6. 646.19 – modular data centers

Also, these six criteria were separated into items for easier correlation to NFPA 70 requirements.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal should result in no cost increase or decrease. The IBC requires compliance to the NEC, and the proposed revisions are intended for ease of understanding this aspect of NEC requirements.

E59-24

E60-24

IBC: 1010.2.12.1; IFC: [BE] 1010.2.12.1

Proponents: John Woestman, Kellen Company, Builders Hardware Manufacturers Association (BHMA) (jwoestman@kellencompany.com)

2024 International Building Code

Revise as follows:

1010.2.12.1 Delayed egress locking system.
The delayed egress electrical locking system shall be installed and operated in accordance with all of the following:

1. The delay of the delayed egress electrical locking system shall deactivate upon actuation of the *automatic sprinkler system* or *automatic fire detection system*, allowing immediate free egress.
2. The delay of the delayed egress electrical locking system shall deactivate upon loss of power to the electrical locking system or electrical lock, allowing immediate free egress.
3. The delay of the delayed egress locking electrical system shall have the capability of being deactivated at the *fire command center* and other *approved* locations.
4. ~~An attempt to egress shall initiate an irreversible process that shall allow such egress in not more than 15 seconds when~~ When a physical effort to exit is applied to the egress side door hardware for not more than 3 seconds, an irreversible process shall be initiated that allows such egress in not more than 15 seconds. Initiation of the irreversible process shall activate an audible signal in the vicinity of the door. ~~Once the delay has been deactivated, rearming~~ Rearming the delay electronics shall be by manual means only.

   Exception: Where *approved*, a delay of not more than 30 seconds is permitted on a door with a delayed egress ~~door~~ locking system.

5. The egress path from any point shall not pass through more than one delayed egress locking system.

   Exceptions:

   1. In Group I-1, Condition 2, Group I-2 or I-3 occupancies, the egress path from any point in the *building* shall pass through not more than two delayed egress locking systems provided that the combined delay does not exceed 30 seconds.
   2. In Group I-1, Condition 1 or Group I-4 occupancies, the egress path from any point in the *building* shall pass through not more than two delayed egress locking systems provided the combined delay does not exceed 30 seconds and the *building* is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1.
   3. The egress path from any point in the building shall be permitted to pass a second delayed egress locking systems where the irreversible process of the second delayed egress locking system is initiated concurrently with the irreversible process required by Item 4 of the first delayed egress locking system.

6. A sign shall be provided on the door and shall be located above and within 12 inches (305 mm) of the door exit hardware.

   Exception: Where *approved*, in Group I occupancies, the installation of a sign is not required where care recipients who because of clinical needs require restraint or containment as part of the function of the treatment area.

   6.1. For doors that swing in the direction of egress, the sign shall read, "PUSH UNTIL ALARM SOUNDS. DOOR CAN BE OPENED IN 15 [30] SECONDS."

   6.2. For doors that swing in the opposite direction of egress, the sign shall read, "PULL UNTIL ALARM SOUNDS. DOOR CAN BE OPENED IN 15 [30] SECONDS."

   6.3. The sign shall comply with the visual character requirements in ICC A117.1.

7. Emergency lighting shall be provided on the egress side of the door.

8. The electromechanical or electromagnetic locking device shall be *listed* in accordance with either UL 294 or UL 1034 .

2024 International Fire Code

Revise as follows:

[BE] 1010.2.12.1 Delayed egress locking system.
The delayed egress electrical locking system shall be installed and operated in accordance with all of the following:

1. The delay of the delayed egress electrical locking system shall deactivate upon actuation of the *automatic sprinkler system* or automatic fire detection system, allowing immediate, free egress.
2. The delay of the delayed egress electrical locking system shall deactivate upon loss of power to the electrical locking system or electrical lock , allowing immediate free egress.
3. The delay of the delayed egress locking electrical system shall have the capability of being deactivated at the *fire command center* and other *approved* locations.
4. ~~An attempt to egress shall initiate an irreversible process that shall allow such egress in not more than 15 seconds when~~When a physical effort to exit is applied to the egress side door hardware for not more than 3 seconds, an irreversible process shall be initiated that allows such egress in not more than 15 seconds. Initiation of the irreversible process shall activate an audible signal in the vicinity of the door. ~~Once the delay has been deactivated, rearming~~ Rearming the delay electronics shall be by manual means only.

   Exception: Where *approved*, a delay of not more than 30 seconds is permitted on a door with a delayed egress ~~door~~ locking system.
5. The egress path from any point shall not pass through more than one delayed egress locking system.

   Exceptions:
   1. In Group I-1, Condition 2, Group I-2 or I-3 occupancies, the egress path from any point in the building shall pass through not more than two delayed egress locking systems provided that the combined delay does not exceed 30 seconds.
   2. In Group I-1, Condition 1 or Group I-4 occupancies, the egress path from any point in the building shall pass through not more than two delayed egress locking systems provided that the combined delay does not exceed 30 seconds and the building is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1.
   3. The egress path from any point in the building shall be permitted to pass a second delayed egress locking systems where the irreversible process of the second delayed egress locking system is initiated concurrently with the irreversible process required by Item 4 of the first delayed egress locking system.
6. A sign shall be provided on the door and shall be located above and within 12 inches (305 mm) of the door exit hardware:

   Exception: Where *approved*, in Group I occupancies, the installation of a sign is not required where care recipients who, because of clinical needs, require restraint or containment as part of the function of the treatment area.

   6.1. For doors that swing in the direction of egress, the sign shall read: “PUSH UNTIL ALARM SOUNDS. DOOR CAN BE OPENED IN 15 [30] SECONDS.”

   6.2. For doors that swing in the opposite direction of egress, the sign shall read: “PULL UNTIL ALARM SOUNDS. DOOR CAN BE OPENED IN 15 [30] SECONDS.”

   6.3. The sign shall comply with the visual character requirements in ICC A117.1.
7. Emergency lighting shall be provided on the egress side of the door.
8. The electromechanical or electromagnetic locking device shall be listed in accordance with either UL 294 or UL 1034.

Reason: In Item 4 and the exception to Item 4, the proposed revisions are primarily editorial. However, the revisions in the last sentence of Item 4 are technical, but are intended to clarify the intent of the code.

The last sentence of Item 4 is typically interpreted to require the delay electronics to be rearmed after the delay of the delayed egress locking system has completed. But, is that actually what this sentence requires? Copied here, for reference, is the existing last sentence of Item 4: “Once the delay electronics have been deactivated, rearming the delay electronics shall be by manual means only.”

Examining the current language, it has explicit requirements for rearming the locking system once the delay has completed, but, this sentence doesn’t explicitly permit, or prohibit, rearming the delay electronics while the delay is underway. From a code perspective, if it’s not prohibited, it’s permitted. If this last sentence of Item 4 is interpreted that the delay electronics are not prohibited from being rearmed while the delay is underway, then it could be further interpreted the rearming could be executed by other than manual means only.

Rearming the delayed egress locking system, after the delay has deactivated, by manual means only communicates the intent that an authorized person, typically an employee or staff person, is required to physically be at the door to investigate what triggered the activation of the delayed egress locking system and to ensure that it is safe to re-set the delay.

With these thoughts in mind, the perspective from which the revisions to the last sentence of Item 4 are written: With a person at the delayed egress door to rearm the locking system manually, and to ensure it’s safe to do so, there’s little, if any, difference if the delayed egress locking system is rearmed while the delay is underway, or the locking system is rearmed after the delay has completed. In other words, there’s little, if any, benefit to be gained if the locking system may be rearmed only after the delay has completed, compared to permitting rearming the locking system at any time after the delay has been initiated, assuming the rearming is required to be by manual means only (a person physically is at the door).

Moving to Item 5, the proposed new exception to Item 5 is intended to address situations in other than I-1 or I-2 where more than one delayed egress locking systems are desired. Consider the situation where a delayed locking system is needed on the stairway door on the 7th floor, and the building owner desires or needs a delayed egress locking system on the ground floor stairway discharge door. This new exception is intended to address these situations.

This proposed additional exception to Item 5 is intended to permit a 2nd delayed egress locking system where the delay of the 2nd system is initiated simultaneously with the delay of the 1st system. The effect is there is no delay at the 2nd delayed egress door for the occupant that goes through the 1st delayed egress locked door.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal should not increase or decrease the cost of construction.

The proposed revisions in Section 1010.2.12.1, Item 4are intended to clarify the intent of the code.

The proposed new exception in Section 1010.2.12.1, Item 5 is an optional application of a second delayed egress locking system. Delayed egress locking systems are not required by the code.

E60-24

E61-24

IBC: SECTION 202 (New), 1010.2.15 (New), 1010.2.15.1 (New), 1010.2.15.2 (New), 1010.2.15.3 (New); IFC: SECTION 202 (New), 1010.2.15 (New), 1010.2.15.1 (New), 1010.2.15.2 (New), 1010.2.15.3 (New)

Proponents: John Woestman, Kellen Company, Builders Hardware Manufacturers Association (BHMA) (jwoestman@kellencompany.com); Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org); Jeff O'Neil, Chair, Committee on Healthcare (ahc@iccsafe.org)

2024 International Building Code

Add new definition as follows:

CONTROL VESTIBULE.
A space with doors in series that are interlocked such that when one door is open other doors are restricted from opening.

Add new text as follows:

1010.2.15 Control Vestibule. Control vestibules shall be permitted in the means of egress for security, environmental control, or clinical needs in:

1. Groups F, H-3, H-4, H-5, I-1, I-2, and S where the occupant load of the room or space served by the control vestibule is less than 50.
2. Groups B and M where the occupant load of the room or space served by the control vestibule is 10 or less.

1010.2.15.1 Protection. Control vestibules shall be permitted where the building complies with either of the following:

1. The building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.
2. An approved automatic smoke detection system in accordance with Section 907 is installed in the room or space served by the control vestibule.

1010.2.15.2 Egress path. The egress path from any point shall not pass through more than one control vestibule.

1010.2.15.3 Interlocking door operation. Where doors in the means of egress are configured as a control vestibule, the control vestibule door interlocking system shall provide for egress. The control vestibule shall comply with all of the following:

1. An approved override switch shall be provided on the egress side of each door of the control vestibule which unlocks the interlocked electric lock of that door.
   1.1. Each override switch shall be located within 48 inches (1219 mm) of the door and 40 inches minimum to 48 inches maximum (1016 mm to 1219 mm) above the floor.
   1.2. Signage shall be provided with instructions on the use of the interlock override switch.
   1.3. When operated, the override switch shall result in direct interruption of power to the interlocked electric lock — independent of other electronics — and the interlocked electric lock shall remain unlocked for not less than 30 seconds.

   Exception: Where the control vestibule is designed to impede occupant egress for security reasons, the override switches for the door interlocks shall be permitted to be moved to approved alternate locations.
2. Upon activation of the automatic sprinkler system or automatic smoke detection system the interlock function of the doors of the control vestibule shall deactivate.
3. Upon loss of power to the interlock function of the doors, the interlock function of the door locking system of the control vestibule shall deactivate.

4. Where a control vestibule serves a room or space equipped with an *emergency alarm system* for *hazardous materials*, the interlock function of the doors shall deactivate when such *emergency alarm system* is activated.
5. The doors of the control vestibule shall be self-closing.
6. The doors of the control vestibule shall swing in the direction of egress travel.

   Exception: Power-operated doors in accordance with Section 1010.3.2.
7. The electro-mechanical or electromagnetic locking devices shall be listed in accordance with either UL 294 or UL 1034.

2024 International Fire Code

Add new definition as follows:

CONTROL VESTIBULE. A space with doors in series that are interlocked such that when one door is open other doors are restricted from opening.

Add new text as follows:

1010.2.15 Control vestibule. Control vestibules shall be permitted in the means of egress for security, environmental control, or clinical needs in:
1. Groups F, H-3, H-4, H-5, I-1, I-2, and S where the occupant load of the room or space served by the control vestibule is less than 50.
2. Groups B and M where the occupant load of the room or space served by the control vestibule is 10 or less.

1010.2.15.1 Protection. Control vestibules shall be permitted where the building complies with either of the following:
1. The building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.
2. An approved automatic smoke detection system in accordance with Section 907 is installed in the room or space served by the control vestibule.

1010.2.15.2 Egress path. The egress path from any point shall not pass through more than one control vestibule.

1010.2.15.3 Interlocking door operation. Where doors in the means of egress are configured as a control vestibule, the control vestibule door interlocking system shall provide for egress. The control vestibule shall comply with all of the following:
1. Interlocking door operation. Where doors in the means of egress are configured as a control vestibule, the control vestibule door interlocking system shall provide for egress. The control vestibule shall comply with all of the following:
   1.1. Each override switch shall be located within 48 inches (1219 mm) of the door and 40 inches minimum to 48 inches maximum (1016 mm to 1219 mm) above the floor.
   1.2. Signage shall be provided with instructions on the use of the interlock override switch.
   1.3. When operated, the override switch shall result in direct interruption of power to the interlocked electric lock — independent of other electronics — and the interlocked electric lock shall remain unlocked for not less than 30 seconds.

   Exception: Where the control vestibule is designed to impede occupant egress for security reasons, the override switches for the door interlocks shall be permitted to be moved to approved alternate locations.
2. Upon activation of the automatic sprinkler system or automatic smoke detection system the interlock function of the doors of the control vestibule shall deactivate.
3. Upon loss of power to the interlock function of the doors, the interlock function of the door locking system of the control vestibule shall deactivate.

4. Where a control vestibule serves a room or space equipped with an emergency alarm system for hazardous materials, the interlock function of the doors shall deactivate when such emergency alarm system is activated.
5. The doors of the control vestibule shall be self-closing.
6. The doors of the control vestibule shall swing in the direction of egress travel.

    Exception: Power-operated doors in accordance with Section 1010.3.2.
7. The electro-mechanical or electromagnetic locking devices shall be listed in accordance with either UL 294 or UL 1034.

Reason: Control vestibules are being incorporated in the means of egress in a variety of occupancies. A control vestibule has doors in series which are interlocked such that when one door of a control vestibule is open, the other door in series in the control vestibule is temporarily prevented from being opened.

The IBC is currently silent regarding requirements and guidance for control vestibules. This proposal does not require installation of control vestibules, but offers requirements (guidance) for where control vestibules are incorporated in the means of egress.

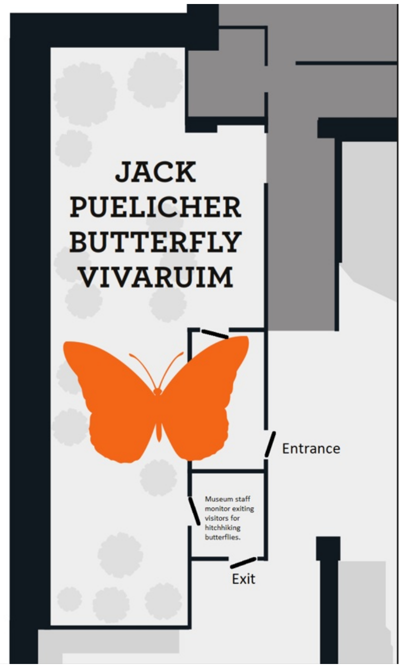
This proposal addresses egress related requirements for control vestibules. Control vestibules which provide security or access control on the ingress side of doors into a building or into a space within a building are more common than control vestibules on the egress side of doors in the means of egress from a space or from a building. Requirements for the access-side of control vestibules is typically outside the scope of the IBC. Thus access-side control vestibules are not regulated or prohibited by the IBC provided all requirements for egress are complied with. This proposal addresses control vestibules in the means of egress with egress-side requirements.

Control vestibules must provide for egress. Together, the definition and proposed requirements provide for egress where control vestibules are installed.

The occupancy groups and maximum occupant loads in this proposal (in 1010.2.15) are the result of discussions and votes during the Committee Action Hearing and Public Comment Hearing of the 2021 ICC code development cycle. And the result of subsequent suggestions and recommendations by stakeholders.

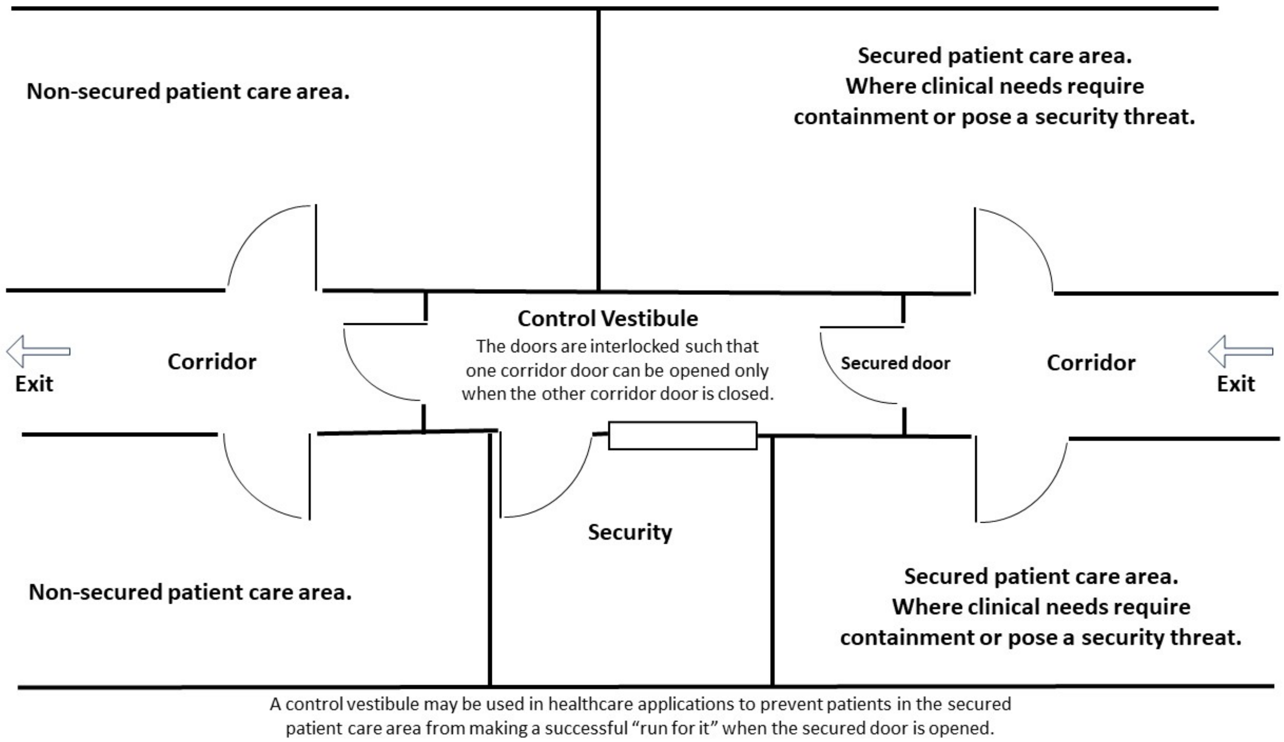
Control vestibules are most commonly configured as a space with two doors in series. But, some control vestibules are configured with more than one inner door and / or more than one outer door. For example, where a control vestibule is required to help keep clean rooms clean, there may be inner doors from more than one clean room opening into the control vestibule, and one outer door for leaving the control vestibule in the direction of egress. Control vestibules are different than sallyports, which are defined in the IBC and permitted in Group I-3 occupancies. Group I-3 includes correction centers, detention centers, jails, prisons, and similar uses. A sallyport is a security vestibule which prevents unobstructed passage. A control vestibule is intended to allow unobstructed passage but prevents more than one door of doors in series to be open at the same time.

The provisions of this proposal have been discussed, debated, and revised during the most recent ICC code development cycles, and the provisions have been further refined via feedback and comments from many stakeholders.

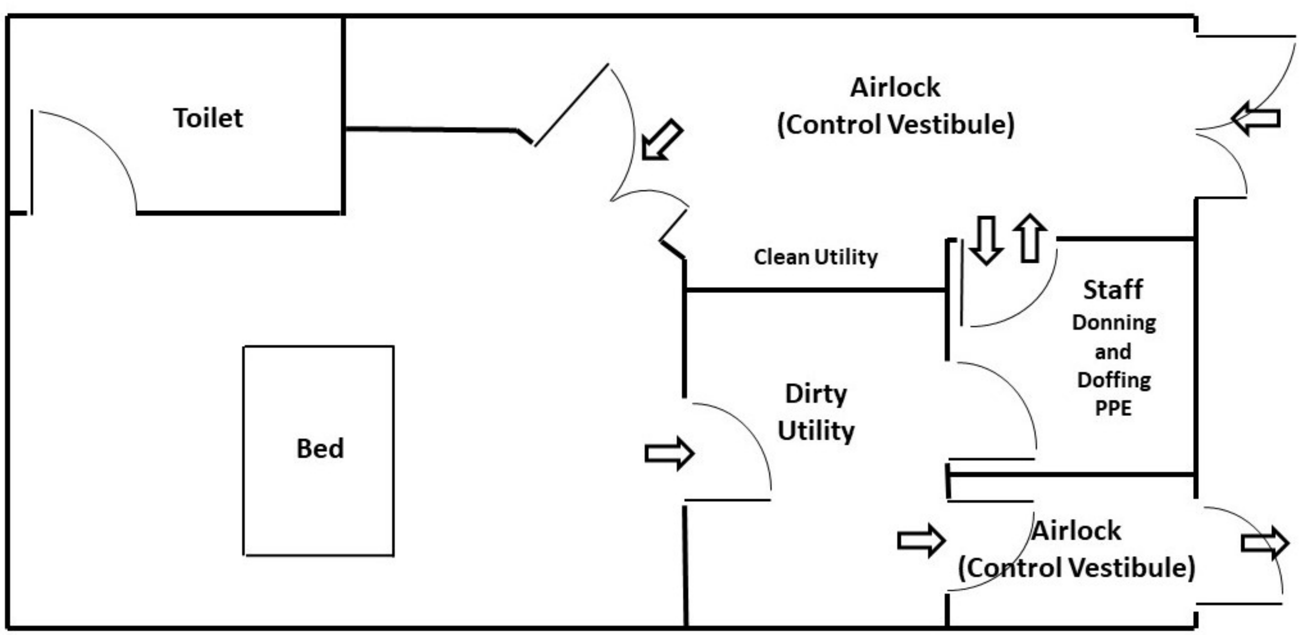


Milwaukee Public Museum Butterfly Vivarium

This picture and floor layout of the butterfly vivarium at the Milwaukee (Wisc.) Public Museum illustrate a potential application of a control vestibule. The vestibule and doors for one-way passage into the butterfly vivarium are currently configured as an "on your honor" control vestibule. The sign on the inner door advises visitors to the vivarium to wait for the outer door to close before opening the second door to enter. With electrical locks on the two doors, and with related controls, this space could be configured as a control vestibule. This proposal addresses requirements of control vestibules from an egress perspective, but not from an ingress perspective. In this butterfly vivarium example, the code's requirements affect how the control vestibule would be configured to ensure egress.The one-way out vestibule on the exit side of this vivarium (see the floor plan) is also an "on your honor" control vestibule. A museum staff person is stationed inside the exit vestibule tasked with ensuring butterflies do not escape with visitors, and with ensuring in each of these two vestibules that both doors in the vestibule are not open at the same time. Installing electrical interlocks and controls on the doors of these vestibules to create control vestibules would relieve the staff person from carefully watching the doors and enable the staff person to interact more with the visitors.



This is an example of an application of a control vestibule in the corridor between secured and non-secured patient care areas in a healthcare setting. The secured patient care area is for patients with clinical needs that require containment or pose a security threat.



Quarantine Suite

In healthcare, where it's critical to manage airflow into and out of the patient treatment space, quarantine suites may be configured with airlocks with interlocked doors (i.e. control vestibules). The airlock doors in the sketch would be configured such that only one door (or one pair of doors) in the airlock could be open at a time.

This proposal is submitted by the ICC Building Code Action Committee (BCAC) and ICC Committee for Healthcare (CHC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC webpage.

The Committee on Healthcare (CHC) was established by the ICC Board of Directors in 2011 to pursue opportunities to study and develop effective and efficient provisions for Hospital, Nursing Homes, Assisted Living and Ambulatory Care Facilities. This committee was formed in cooperation with the American Society for Healthcare Engineering (ASHE). In July of 2017, the ICC Board made CHC a standing committee. In 2023 the CHC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the CHC website at CHC webpage.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The IBC is currently silent regarding control vestibules, and control vestibules are not proposed to be required.
Today, where control vestibules are optionally constructed, alternative means and methods are typically used for code compliance.

E61-24

E62-24

IBC: 1010.3.1; IFC: [BE] 1010.3.1

Proponents: John Woestman, Kellen Company, Builders Hardware Manufacturers Association (BHMA) (jwoestman@kellencompany.com)

2024 International Building Code

Revise as follows:

1010.3.1 Revolving doors.
Revolving doors shall comply with the following:

1. Revolving doors shall comply with BHMA A156.27 and shall be installed in accordance with the manufacturer's instructions.
2. Each revolving door shall be capable of *breakout* in accordance with BHMA A156.27 and shall provide an aggregate width of not less than 36 inches (914 mm).
3. A revolving door shall not be located within 10 feet (3048 mm) of the foot or top of *stairways* or escalators. A dispersal area shall be provided between the *stairways* or escalators and the revolving doors.
4. The revolutions per minute (rpm) for a revolving door shall not exceed the maximum rpm as specified in BHMA A156.27. Manual revolving doors shall comply with Table 1010.3.1(1). Automatic or *power-operated* revolving doors shall comply with Table 1010.3.1(2).
5. An emergency stop switch shall be provided near each entry point of power or automatic operated revolving doors within 48 inches (1219 mm) of the door and between 34 inches (864 mm) and 48 inches (1219 mm) above the floor. The activation area of the emergency stop switch button shall be not less than 1 inch (25 mm) in diameter and shall be red.
6. Each revolving door shall have ~~a side-hinged swinging~~ not less than one door that complies with Section 1010.1, and is not a revolving door, in the same wall and within 10 feet (3048 mm) of the revolving door.
7. Revolving doors shall not be part of an *accessible route* required by Section 1009 and Chapter 11.

2024 International Fire Code

Revise as follows:

[BE] 1010.3.1 Revolving doors.
Revolving doors shall comply with the following:

1. Revolving doors shall comply with BHMA A156.27 and shall be installed in accordance with the manufacturer's instructions.
2. Each revolving door shall be capable of *breakout* in accordance with BHMA A156.27 and shall provide an aggregate width of not less than 36 inches (914 mm).
3. A revolving door shall not be located within 10 feet (3048 mm) of the foot or top of *stairways* or escalators. A dispersal area shall be provided between the *stairways* or escalators and the revolving doors.
4. The revolutions per minute (rpm) for a revolving door shall not exceed the maximum rpm as specified in BHMA A156.27. Manual revolving doors shall comply with Table 1010.3.1(1). Automatic or power-operated revolving doors shall comply with Table 1010.3.1(2).
5. An emergency stop switch shall be provided near each entry point of power or automatic operated revolving doors within 48 inches (1219 mm) of the door and between 34 inches (864 mm) and 48 inches (1219 mm) above the floor. The activation area of the emergency stop switch button shall be not less than 1 inch (25 mm) in diameter and shall be red.
6. Each revolving door shall have ~~a side-hinged swinging~~ not less than one door that complies with Section 1010.1, and is not a revolving door, in the same wall and within 10 feet (3048 mm) of the revolving door.

7. Revolving doors shall not be part of an *accessible route* required by Section 1009 of this code and Chapter 11 of the International Building Code.

Reason: The stricken text in Item 6 is unnecessarily restrictive by requiring specifically a side hinged door where a balanced door or a pivoted door could also be used.
The proposed revisions reflect what we believe is the intent of Item 6: For normal ingress and egress, and for emergency egress, revolving doors must be complemented with a minimum of one nearby door that is not a revolving door, and which meets all the requirements for egress, and where required, meets accessibility requirements.
Also, it is not uncommon for the door beside a revolving door to be a low-energy power-operated hinged door. The current code language doesn't specifically permit a power-operated hinged door beside a revolving door. This could result in the interpretation that a low-energy power-operated hinged door is not permitted in that application.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal should not increase or decrease the cost of construction.
The requirement for a door next to revolving doors has not changed. The proposal results in expanding the options available to designers as long as the door meets all the requirements for egress and accessibility (where required) and is not a revolving door.

E62-24

E63-24

IBC: 1010.3.5 (New); IFC: 1010.3.5 (New)

Proponents: John Woestman, Kellen Company, Builders Hardware Manufacturers Association (BHMA) (jwoestman@kellencompany.com)

2024 International Building Code

Add new text as follows:

1010.3.5 Airport Terminal Exit Lanes. Airport terminal egress from the secured airside area to the nonsecured landside area shall be permitted to be through exit lane breach control systems which comply with all of the following:

1. The exit lane breach control system is installed in accordance with the manufacturer's instructions.
2. The exit lane breach control system is approved by the building official.
3. The exit lane breach control system is accepted by the U.S. Department of Homeland Security (DHS) Transportation Security Administration (TSA).
4. The operation of the exit lane breach control system is included in the TSA-required airport security program.

2024 International Fire Code

Add new text as follows:

1010.3.5 Airport Terminal Exit Lanes. Airport terminal egress from the secured airside area to the nonsecured landside area shall be permitted to be through exit lane breach control systems which comply with all of the following:

1. The exit lane breach control system is installed in accordance with the manufacturer's instructions.
2. The exit lane breach control system is approved by the building official.
3. The exit lane breach control system is accepted by the U.S. Department of Homeland Security (DHS) Transportation Security Administration (TSA).
4. The operation of the exit lane breach control system is included in the TSA-required airport security program.

Reason: Airport exit lane breach control systems facilitate passenger movement in the terminals from secure areas to non-secure areas. Airports are installing these automated systems to improve security and remove much of the human element where arriving passengers move from the secure area of the airport to the unsecured area. The IBC is currently silent regarding requirements for airport exit lane breach control systems.

Airport exit lane breach control systems are relatively sophisticated, and not all the details as to how they work are made public (for good reasons). These systems incorporate power-operated doors, sensors, cameras, alarms, and electronic and human monitoring, all designed to detect unauthorized intruders and unauthorized objects.

Portland, Oregon airport exit lane breach control system.

This four-minute video of one manufacturer's exit lane breach control systems provides a good illustration of the functions: https://www.youtube.com/watch?v=PxMQB4ykOeo

Additional information about exit lane breach control systems is available:

https://www.assaabloyentrance.com/global/en/solutions/products/security-entrance-control/exit-lanes
https://www.hortondoors.com/additional-products/exit-breach-control/secure-exit-lane/

The TSA requires the airport's security program to include operation procedures for exit lane breach control systems.

The TSA does not "approve" the method for controlling exit lanes they no longer staff in airports—they only accept or do not accept the solution. However, the TSA can levy penalties or open a Letter of Investigation for breaches and any incidents that occur. As a result, it is in the airport's best interest to work closely with local TSA during the design and procurement stages and to update the airport security plan as appropriate.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal does not increase or decrease the cost of construction.
Airports are not required by this proposal to install exit lane breach control systems. This proposal provides guidance and requirements for airport exit lane breach control systems, should they be installed.

E63-24

E64-24

IBC: 1010.5, 1010.5.1, 1010.5.1.1, 1010.5.1.2 (New), 1010.5.1.3 (New), 1010.5.2, 1010.5.3, 1010.5.4, ; IFC: [BE] 1010.5, [BE] 1010.5.1, [BE] 1010.5.1.1, 1010.5.1.2 (New), 1010.5.1.3 (New), [BE] 1010.5.2, [BE] 1010.5.3, [BE] 1010.5.4

Proponents: Daniel Nichols, MTA Construction and Development, MTA Construction and Development (dnichols@mnr.org)

2024 International Building Code

Revise as follows:

1010.5 Turnstiles, security access turnstiles ~~and~~or similar devices.
Turnstiles, security access turnstiles~~and~~or similar devices that restrict travel to one direction shall not be placed so as to obstruct any required *means of egress*, except where permitted in accordance with Sections 1010.5.1, 1010.5.2 and 1010.5.3.

Delete without substitution:

~~**1010.5.1 Capacity**~~**.**
~~Each turnstile or similar device shall be credited with a capacity based on not more than a 50-*person occupant load* where all of the following provisions are met:~~

1. ~~Each device shall turn free in the direction of egress travel when primary power is lost and on the manual release by an employee in the area.~~
2. ~~Such devices are not given credit for more than 50 percent of the required egress capacity or width.~~
3. ~~Each device is not more than 39 inches (991 mm) high.~~
4. ~~Each device has not less than 16$^1/_2$ inches (419 mm) clear width at and below a height of 39 inches (991 mm) and not less than 22 inches (559 mm) clear width at heights above 39 inches (991 mm).~~

Add new text as follows:

1010.5.1 Turnstiles and Similar Devices. Turnstiles and similar devices shall comply with Sections 1010.5.1.1 through 1010.5.1.5.

1010.5.1.1 Dimensions. Each turnstile or similar device shall meet the following dimensional requirements:

1. Each device has not less than 16$^1/_2$ inches (419 mm) clear width at and below a height of 39 inches (991 mm) and not less than 22 inches (559 mm) clear width at heights above 39 inches (991 mm).
2. Each manually operated device is not more than 39 inches in (991 mm) high.

1010.5.1.2 Operation. Each device shall operate freely in the direction of egress travel.

Exception: Free operation in the direction of egress travel is not required for power controlled devised that fail open when primary power is lost and on manual release by an employee in the area.

1010.5.1.3 Capacity. Each turnstile or similar device shall be credited with a capacity based on not more than a 50-person occupant load. The aggregate capacity of such devices shall not be credited for more than 50 percent of the required egress capacity or width.

Exception: Accessible turnstiles complying with Section 1010.5.1.4 shall be credited with a capacity based on the clear width and shall not be included when determining the 50 percent aggregate capacity limitation.

Revise as follows:

~~1010.5.1.1~~ 1010.5.1.4 Accessible Turnstile~~Clear Width~~.
Where located as part of an *accessible route*, at least one turnstile ~~turnstiles~~ shall have not less than 36 inches (914 mm) clear width at and below a height of 34 inches (864 mm), not less than 32 inches (813 mm) clear width between 34 inches (864 mm) and 80 inches (2032 mm) and shall consist of a mechanism other than a revolving device.

~~1010.5.4~~ 1010.5.1.5 Additional door. Where serving an *occupant load* greater than 300, ~~each turnstile~~ turnstiles that ~~is~~ are not portable shall have a side-hinged swinging door that conforms to Section 1010.1 or a turnstile complying with 1010.5.1.4 within 50 feet (15 240 mm).

~~**Exception:** A side-hinged swinging door is not required at security access turnstiles that comply with Section 1010.5.2.~~

1010.5.2 Security access turnstiles.
Security access turnstiles that inhibit travel in the direction of egress utilizing a physical barrier shall be permitted to be considered as a component of the *means of egress*, provided that all of the following criteria are met:

1. The *building* is protected throughout by an *approved*, supervised *automatic sprinkler system* in accordance with Section 903.3.1.1.
2. Each security access turnstile lane configuration has a minimum clear passage width of 22 inches (559 mm).
3. Any security access turnstile lane configuration providing a clear passage width of less than 32 inches (810 mm) shall be credited with a maximum egress capacity of 50 *persons*.
4. Any security access turnstile lane configuration providing a clear passage width of 32 inches (810 mm) or more shall be credited with a maximum egress capacity as calculated in accordance with Section 1005.
5. Each secured physical barrier shall automatically retract or swing to an unobstructed open position in the direction of egress, under each of the following conditions:
   - 5.1. Upon loss of power to the turnstile or any part of the access control system that secures the physical barrier.
   - 5.2. Upon actuation of a clearly identified manual release device with ready access that results in direct interruption of power to each secured physical barrier, after which such barriers remain in the open position for not less than 30 seconds. The manual release device shall be positioned at one of the following locations:
     - 5.2.1. On the egress side of each security access turnstile lane.
     - 5.2.2. At an *approved* location where it can be actuated by an employee assigned to the area at all times that the *building* is occupied.
   - 5.3. Upon actuation of the *building fire alarm system*, if provided, after which the physical barrier remains in the open position until the *fire alarm system* is manually reset.

     Exception: Actuation of a *manual fire alarm box*.
   - 5.4. Upon actuation of the *building automatic sprinkler system* or fire detection system, after which the physical barrier remains in the open position until the *fire alarm system* is manually reset.

Revise as follows:

1010.5.3 High turnstile.
Turnstiles or similar devices more than 39 inches (991 mm) high and that are manually operated shall meet the requirements for revolving doors or the requirements of Section 1010.5.2 for security access turnstiles.

2024 International Fire Code

Revise as follows:

[BE] 1010.5 Turnstiles, security access turnstiles ~~and~~or similar devices.
Turnstiles, security access turnstiles~~and~~or similar devices that restrict travel to one direction shall not be placed so as to obstruct any

required *means of egress*, except where permitted in accordance with Sections 1010.5.1, 1010.5.2 and 1010.5.3.

Delete without substitution:

~~**[BE] 1010.5.1 Capacity**. Each turnstile or similar device shall be credited with a capacity based on not more than a 50-person *occupant load* where all of the following provisions are met:~~

1. ~~Each device shall turn free in the direction of egress travel when primary power is lost and on the manual release by an employee in the area.~~
2. ~~Such devices are not given credit for more than 50 percent of the required egress capacity or width.~~
3. ~~Each device is not more than 39 inches (991 mm) high.~~
4. ~~Each device has not less than $16^1/_2$ inches (419 mm) clear width at and below a height of 39 inches (991 mm) and not less than 22 inches (559 mm) clear width at heights above 39 inches (991 mm).~~

Add new text as follows:

1010.5.1 Turnstiles and Similar Devices. Turnstiles and similar devices that restrict travel into a building or portion thereof but do not control passage in the direction of egress travel shall comply with Sections 1010.5.1.1 through 1010.5.1.5.

1010.5.1.1 Dimensions. Each turnstile or similar device meet the following dimensional requirements:

1. Each device has not less than $16^1/_2$ inches (419 mm) clear width at and below a height of 39 inches (991 mm) and not less than 22 inches (559 mm) clear width at heights above 39 inches (991 mm).
2. Each manually operated device is not more than 39 inches in (991 mm) high.

1010.5.1.2 Operation. Each device shall operate freely in the direction of egress travel.

Exception: Free operation in the direction of egress travel is not required for power controlled devised that fail open when primary power is lost and on manual release by an employee in the area.

1010.5.1.3 Capacity. Each turnstile or similar device shall be credited with a capacity based on not more than a 50-person occupant load. The aggregate capacity of such devices shall not be credited for more than 50 percent of the required egress capacity or width.

Exception: Accessible turnstiles complying with Section 1010.5.1.4 shall be credited with a capacity based on the clear width and shall not be included when determining the 50 percent aggregate capacity limitation.

Revise as follows:

[BE] ~~1010.5.1.1~~ 1010.5.1.4 Accessible Turnstile ~~Clear width~~.
Where located as part of an *accessible route*, at least one turnstile ~~turnstiles~~ shall have not less than 36 inches (914 mm) clear width at and below a height of 34 inches (864 mm), not less than 32 inches (813 mm) clear width between 34 inches (864 mm) and 80 inches (2032 mm) and shall consist of a mechanism other than a revolving device.

[BE] ~~1010.5.4~~ 1010.5.1.5 Additional door.
Where serving an *occupant load* greater than 300, ~~each turnstile~~ turnstiles that ~~is~~ are not portable shall have a side-hinged swinging door that conforms to Section 1010.1 or a turnstile complying with 1010.5.1.4 within 50 feet (15 240 mm).

~~**Exception:** A side-hinged swinging door is not required at security access turnstiles that comply with Section 1010.5.2.~~

[BE] 1010.5.2 Security access turnstiles.

Security access turnstiles that inhibit travel in the direction of egress utilizing a physical barrier shall be permitted to be considered as a component of the *means of egress*, provided that all of the following criteria are met:

1. The building is protected throughout by an *approved*, supervised *automatic sprinkler system* in accordance with Section 903.3.1.1.
2. Each security access turnstile lane configuration has a minimum clear passage width of 22 inches (559 mm).
3. Any security access turnstile lane configuration providing a clear passage width of less than 32 inches (810 mm) shall be credited with a maximum egress capacity of 50 persons.
4. Any security access turnstile lane configuration providing a clear passage width of 32 inches (810 mm) or more shall be credited with a maximum egress capacity as calculated in accordance with Section 1005.
5. Each secured physical barrier shall automatically retract or swing to an unobstructed open position in the direction of egress, under each of the following conditions:
   5.1. Upon loss of power to the turnstile or any part of the access control system that secures the physical barrier.
   5.2. Upon actuation of a clearly identified manual release device with ready access that results in direct interruption of power to each secured physical barrier, after which such barriers remain in the open position for not less than 30 seconds. The manual release device shall be positioned at one of the following locations:
      5.2.1. On the egress side of each security access turnstile lane.
      5.2.2. At an *approved* location where it can be actuated by an employee assigned to the area at all times that the building is occupied.
   5.3. Upon actuation of the building *fire alarm system*, if provided, after which the physical barrier remains in the open position until the *fire alarm system* is manually reset.
      Exception: Actuation of a manual fire alarm box.
   5.4. Upon actuation of the building *automatic sprinkler system* or fire detection system, after which the physical barrier remains in the open position until the *fire alarm system* is manually reset.

Revise as follows:

[BE] 1010.5.3 High turnstile.

Turnstiles <u>or similar devices</u> more than 39 inches (991 mm) high <u>and that are manually operated</u> shall meet the requirements for revolving doors or the requirements of Section 1010.5.2 for security access turnstiles.

Reason: The term “turnstiles” is a term that has generally referred to an array of devices intended to capture a fare or validate entry when entering a space. These requirements have been in the IBC since it’s inception without much change for their intended purpose. Additionally, “security access turnstiles” have been added to address those devices that can inhibit passage in the direction of egress. What remains is there is not a clear path to those types of turnstiles that are designed outside the traditional 3-arm turnstile with free passage to exit and security turnstiles. This proposal addresses such situations.

The intent of this proposal is to capture the following four basic topics:

1. 1010.5- You cannot block the required means of egress unless turnstiles, security turnstiles, or similar devices meet this section.
2. 1010.5.1- Turnstiles control access to a building but provide exiting without validation or control.
3. 1010.5.2- Security access turnstiles continue as needing validation or control to egress.
4. 1010.5.3- High turnstiles continue to meet either revolving door or security access turnstile requirements.

The drive for this change comes because of three separate initiatives where the section does not lend to improvements to egress:

Initiative 1, improving accessibility- The current 1010.5.1.1 requires “turnstiles” to be at least 36” wide and has been interpreted that it is <u>all</u> turnstiles. This limits the improvement of existing fare control to add a single accessible turnstile. Additionally, the wide turnstile cannot be utilized as the additional exit required and minimizes the initiative to convert exit-only gates into accessible entrances.

Initiative 2, new technology- The currently turnstile language in 1010.5.1 lends that any portion of the turnstile above 39” is a high turnstile and then, by reference, makes it a security access turnstile. This is not a logical reference since the height of the barrier does not vary the ability to exit (unless there is a consideration to jump over a barrier). Newer technologies that are controlled actually increase egress capacity due to their not being an arm to push and minimizes the likelihood of the arm catching on bags, clothing, etc.

Initiative 3, access control vs. egress control- In many locations, access control with free egress is having security access applied due to its “user-friendliness” with new technology. The application of such for access-only control is overly burdensome with conditions, such as an automatic sprinkler system to protect a space that isn’t even limited by turnstiles. When trying to upgrade existing fare arrays, the need for additional systems and controls is problematic and costly; especially when the free movement in the direction of egress has already been given a limitation on capacity and a second path of egress in most cases.

A step-by-step explanation of the change is published below (in italics):

1010.5 -*Added “Security Access Turnstiles” as a topic within 1010.5, which is currently not captured.***1010.5.1 -***Added section to describe what a turnstile does.*

1010.5.1.1 (previously 1010.5.1 #’s 3&4) *The section used to state “Each turnstile or similar device shall be credited with a capacity based on not more than a 50-person occupant load where all of the following provisions are met….” This language conflicts with Section 1010.5 since a turnstile either meets the requirements or is considering an obstruction to the egress. If a code user wants to utilize turnstiles that do not meet these requirements, they need to provide 100% egress capacity in another method, such as access-control doors. Regarding the 39-inch height, this is the area where the traditional arm that is manually pushed forward in located. The language has been revised to specifically address this manual component and meets the intent of the current language that currently regulates widths of the turnstile, as a whole, above 39 inches.*

1010.5.1.2 (previously 1010.5.1 #1) *Technology has changed regarding the actual barrier. When the barrier is not an arm, it still should operate freely under the same conditions as traditional turnstiles.*

1010.5.1.3 (previously 1010.5.1 main text and #2) *Since turnstiles have dimensions to be met, the capacity and 50% are carried over as currently required. Accessible turnstiles be given credit for egress capacity rather than part of the 50% turnstile reduction that narrower turnstile get.*

1010.5.1.4 (previously 1010.5..1.1) *This language has been modified to state “a turnstile” rather than the implicit all turnstiles the language currently reads.*

1010.5.1.5 (previously 1010.5.4) *Added language to acknowledge a wide turnstile can be utilized in the additional swinging door requirements. Added clarification to allow for a single door or wide turnstile to accommodate multiple turnstiles within an array.*

1010.5.2 - *no changes to Security access turnstiles.*

1010.5.3 - *Added language to match the 39-inch manual operator requirements.*

Cost Impact: Decrease

Estimated Immediate Cost Impact:

The proposal updates sections of the IBC/IFC that haven't been substantially updated since the beginning of the I-Codes but the methods of providing modern fare control have. As a general statement, this proposal decreases the soft costs of construction by having clear requirements between a "turnstile" and "security access turnstile" which, in turn, lessens the design time and approval process for newer technologies. As an example in New York State to receive an administrative variance for new turnstile technology (the lesser time of the three choices to receive a variance by regulation), the costs of the designer, regulator, and State reviewer (+ fees) is approximately $7,000 per application.

Additional costs would be:

Change for accessible turnstiles from "all turnstiles" to "a turnstile" would be in the area of $35,000 per turnstile, plus the 60-70% more floor area needed for the width.

Installation of a fire sprinkler system in an unconditioned belowground subway station due to application of security access turnstile vs. turnstile- $934,000 per platform

Estimated Immediate Cost Impact Justification (methodology and variables):

The justification for the immediate cost impact would be based upon actual costs of MTA projects over the last 36 months and estimating produced for projects in 2022.

E64-24

E65-24

IBC: 1010.5.1; IFC: [BE] 1010.5.1

Proponents: Daniel Nichols, MTA Construction and Development, MTA Construction and Development (dnichols@mnr.org)

2024 International Building Code

Revise as follows:

1010.5.1 Capacity.
Each turnstile or similar device shall be credited with a capacity based on not more than a 50-*person occupant load* where all of the following provisions are met:

1. Each device shall turn free in the direction of egress travel when primary power is lost and on the manual release by ~~an employee in the area~~ a trained person in an approved method.
2. Such devices are not given credit for more than 50 percent of the required egress capacity or width.
3. Each device is not more than 39 inches (991 mm) high.
4. Each device has not less than 16$^1/_2$ inches (419 mm) clear width at and below a height of 39 inches (991 mm) and not less than 22 inches (559 mm) clear width at heights above 39 inches (991 mm).

2024 International Fire Code

Revise as follows:

[BE] 1010.5.1 Capacity. Each turnstile or similar device shall be credited with a capacity based on not more than a 50-person *occupant load* where all of the following provisions are met:

1. Each device shall turn free in the direction of egress travel when primary power is lost and on the manual release by ~~an employee in the area~~ a trained person in an approved method.
2. Such devices are not given credit for more than 50 percent of the required egress capacity or width.
3. Each device is not more than 39 inches (991 mm) high.
4. Each device has not less than 16$^1/_2$ inches (419 mm) clear width at and below a height of 39 inches (991 mm) and not less than 22 inches (559 mm) clear width at heights above 39 inches (991 mm).

Reason: The use of turnstiles occurs in many locations such as transportation facilities, lobby control in access-limited buildings, and amusement locations. The current language states that turnstiles need to have a manual release by an "employee in the area", but provides no reasoning for the limitation to an employee, nor to a physical dimension of "in the area".

The proposal moves towards the need for trained personnel to be able to react and have that methodology approved by the AHJ. This could be as simple as a security desk having CCTV observation ability and a remote release for a control point at a building entrance out-of-view, to a multi-lane point of entry into an amusement park with a coordinated command center. Further, the proposal does not remove or inhibit the current use of the "employee in the area" for jurisdictions that already successfully utilize the section.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This provides another option to provide manual release of turnstiles. Many turnstiles already free spin or operate in the direction of egress, so this would provide options due to changes in technology.

E65-24

E66-24

IBC: 1011.4; IFC: [BE] 1011.4

Proponents: David Cooper, Stair Manufacturing and Design Consultants, Stairbuilders and Manufacturers Association, SMA (coderep@stairways.org)

2024 International Building Code

Revise as follows:

1011.4 Walkline.
The walkline across *winder* treads <u>and landings </u>shall be concentric to the <u>turn and parallel to the </u>direction of travel <u>entering and exiting</u> ~~through~~ the turn and located 12 inches (305 mm) from the ~~side where the *winders* are narrower~~ <u>inside of the turn</u>. The 12-inch (305 mm) dimension shall be measured from the widest point of the clear *stair* width at the walking surface of the *winder*. Where *winders* are adjacent within the *flight*, the point of the widest clear *stair* width of the adjacent *winders* shall be used.

2024 International Fire Code

Revise as follows:

[BE] 1011.4 Walkline. The walkline across *winder* treads <u>and landings </u>shall be concentric to the <u>turn and parallel to the </u>direction of travel <u>entering and exiting</u> ~~through~~ the turn and located 12 inches (305 mm) from the ~~side where the *winders* are narrower~~ <u>inside of the turn</u>. The 12-inch (305 mm) dimension shall be measured from the widest point of the clear *stair* width at the walking surface of the *winder*. Where *winders* are adjacent within the *flight*, the point of the widest clear *stair* width of the adjacent *winders* shall be used.

Reason: This change provides specific guidance applicable to curved and spiral stairs and for certain residential stairs where winders are permitted within dwelling units. These changes will result in the same text related to winders as in the IRC since 2018.

In addition, it clarifies the walkline as related to determining landing depth at the walkline of intermediate landings of curved stairways where the walkline is referred to in exception 2 of Section 1011.6 Stairway landings.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposed changes provide for correlation with IRC requirements as well as related IBC requirements without impacting the cost of construction.

E66-24

E67-24

IBC: 1011.5.2; IFC: [BE] 1011.5.2

Proponents: Thomas Zuzik Jr, RailingCodes.com, National Ornamental & Miscellaneous Metals Association (NOMMA.org) (coderep@railingcodes.com)

2024 International Building Code

1011.5 Stair treads and risers.
Stair treads and risers shall comply with Sections 1011.5.1 through 1011.5.5.3.

1011.5.1 Dimension reference surfaces.
For the purpose of this section, all dimensions are exclusive of carpets, rugs or runners.

Revise as follows:

1011.5.2 Riser height and tread depth.
Stair riser heights shall be 7 inches (178 mm) maximum and 4 inches (102 mm) minimum. The riser height shall be measured vertically between the *nosings* of adjacent treads, ~~or~~ between the nosing of the ~~*stairway*~~ upper landing and the adjacent lower tread, and between the nosing of the bottom tread and a projected point forward on the lower landing equal to the bottom tread's depth. Rectangular tread depths shall be 11 inches (279 mm) minimum measured horizontally between the vertical planes of the foremost projection of adjacent treads and at a right angle to the tread's *nosing*. *Winder* treads shall have a minimum tread depth of 11 inches (279 mm) between the vertical planes of the foremost projection of adjacent treads at the intersections with the walkline and a minimum tread depth of 10 inches (254 mm) within the clear width of the stair.

Exceptions:

1. *Spiral stairways* in accordance with Section 1011.10.
2. *Stairways* connecting stepped *aisles* to cross *aisles* or concourses shall be permitted to use the riser/tread dimension in Section 1030.14.2.
3. In Group R-3 occupancies; within *dwelling units* in Group R-2 occupancies not required by Chapter 11 to be *Accessible* or Type A dwelling or *sleeping units* ; and in Group U occupancies that are accessory to a Group R-3 occupancy or accessory to individual *dwelling units* in Group R-2 occupancies; the maximum riser height shall be $7^{3}/_{4}$ inches (197 mm); the minimum tread depth shall be 10 inches (254 mm); the minimum *winder* tread depth at the walkline shall be 10 inches (254 mm); and the minimum *winder* tread depth shall be 6 inches (152 mm). A *nosing* projection not less than $^{3}/_{4}$ inch (19.1 mm) but not more than $1^{1}/_{4}$ inches (32 mm) shall be provided on *stairways* with solid risers where the tread depth is less than 11 inches (279 mm).
4. See Section 503.1 of the International Existing Building Code for the replacement of existing *stairways*.
5. In Group I-3 *facilities*, *stairways* providing access to guard towers, observation stations and control rooms, not more than 250 square feet (23 m^2) in area, shall be permitted to have a maximum riser height of 8 inches (203 mm) and a minimum tread depth of 9 inches (229 mm).
6. Where only a single riser is located between 2 landings, the riser height shall be measured between the upper landing's nosing and a projected point on the lower landing 11 inches (280 mm) forward of the upper landing's nosing.

2024 International Fire Code

[BE] 1011.5 Stair treads and risers.
Stair treads and risers shall comply with Sections 1011.5.1 through 1011.5.5.3.

[BE] 1011.5.1 Dimension reference surfaces. For the purpose of this section, all dimensions are exclusive of carpets, rugs or runners.

Revise as follows:

[BE] 1011.5.2 Riser height and tread depth.
Stair riser heights shall be 7 inches (178 mm) maximum and 4 inches (102 mm) minimum. The riser height shall be measured vertically between the *nosings* of adjacent treads, ~~or~~ between the nosing of the ~~*stairway*~~ upper landing and the adjacent lower tread, and between the nosing of the bottom tread and a projected point forward on the lower landing equal to the bottom tread's depth. Rectangular tread depths shall be 11 inches (279 mm) minimum measured horizontally between the vertical planes of the foremost projection of adjacent treads and at a right angle to the tread's *nosing*. *Winder* treads shall have a minimum tread depth of 11 inches (279 mm) between the vertical planes of the foremost projection of adjacent treads at the intersections with the walkline and a minimum tread depth of 10 inches (254 mm) within the clear width of the stair.

Exceptions:

1. *Spiral stairways* in accordance with Section 1011.10.
2. *Stairways* connecting stepped *aisles* to cross *aisles* or concourses shall be permitted to use the riser/tread dimension in Section 1030.14.2.
3. In Group R-3 occupancies; within *dwelling units* in Group R-2 occupancies not required by Chapter 11 to be *Accessible* or *Type A* dwelling or sleeping units; and in Group U occupancies that are accessory to a Group R-3 occupancy or accessory to individual *dwelling units* in Group R-2 occupancies; the maximum riser height shall be $7^{3}/_{4}$ inches (197 mm); the minimum tread depth shall be 10 inches (254 mm); the minimum *winder* tread depth at the walkline shall be 10 inches (254 mm); and the minimum *winder* tread depth shall be 6 inches (152 mm). A *nosing* projection not less than $^{3}/_{4}$ inch (19.1 mm) but not more than $1^{1}/_{4}$ inches (32 mm) shall be provided on *stairways* with solid risers where the tread depth is less than 11 inches (279 mm).
4. See Section 503.1 of the International Existing Building Code for the replacement of existing *stairways*.
5. In Group I-3 facilities, *stairways* providing access to guard towers, observation stations and control rooms, not more than 250 square feet (23 m^2) in area, shall be permitted to have a maximum riser height of 8 inches (203 mm) and a minimum tread depth of 9 inches (229 mm).
6. Where only a single riser is located between 2 landings, the riser height shall be measured between the upper landing's nosing and a projected point on the lower landing 11 inches (280 mm) forward of the upper landing's nosing.

Reason: This code change is centered on clarifying where a bottom riser's, height measurement, is to be taken in conjunction with the lower landing.

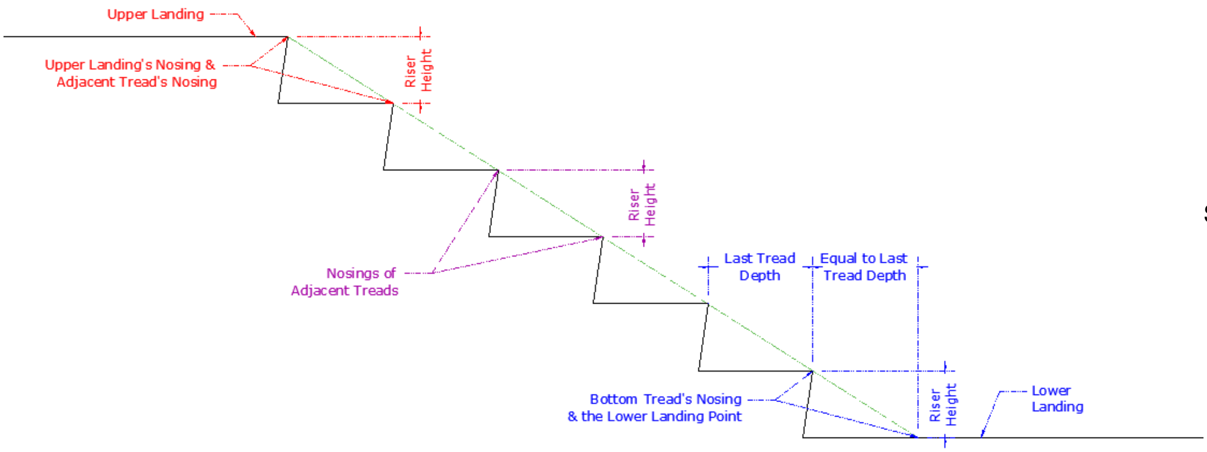
There are 3 distinct parts of a stair flight for when measuring riser heights.

1. The top landing's nosing, to the nosing of the first tread down, the adjacent tread.
2. The nosings of adjacent treads within the flight of stairs.
3. The bottom tread's nosing and the lower landing.

Currently the code is clear in that you are to measure from the upper landing's nosing to the adjacent lower tread's nosing, and to measure from the nosing of one tread to an adjacent tread within the flight, as they all have **nosings.** The confusion and or question comes in that the lower landing does not have a physical/traditional nosing point per say, as defined within the code, and as thus, many a times the bottom riser is measured directly at the bottom tread's riser and not at the same point in distance as every other riser within the flight of stairs, which are all measured to an **adjacent nosing**.

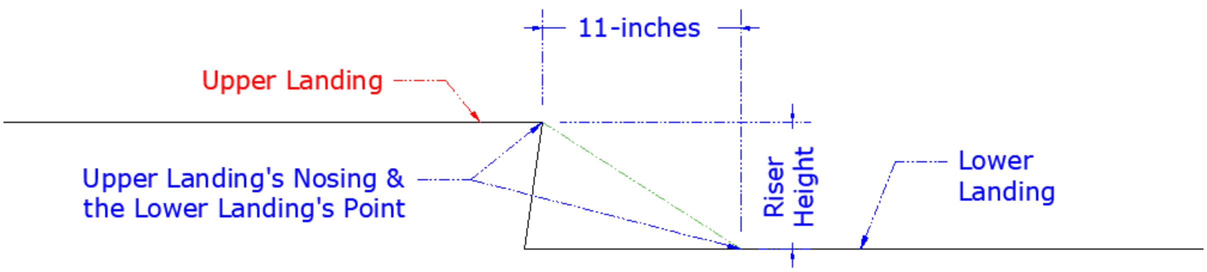
In Section 1014.7 Handrail extensions. The code requires that handrail extensions continue for one tread depth beyond the bottom tread's nosing, this is theorized to be for when descending or ascending the same area is used by the person on the stair flight. With this in our focus, this code change represents that the same theory and point justified and specified for the handrail extension, is to be used for the riser measurement on the lower landing, keeping in mind that this is the same measurement point used within the stair flight on all the other risers up to this point.

To help show a visual representation of the new text, sketch RC-01 included in this reason statement below shows the 3 distinct types of riser measurements within a flight of stairs, in conjunction with a superimposed nosing line as reference for a point of contact on the lower landing, proposed to being revised.



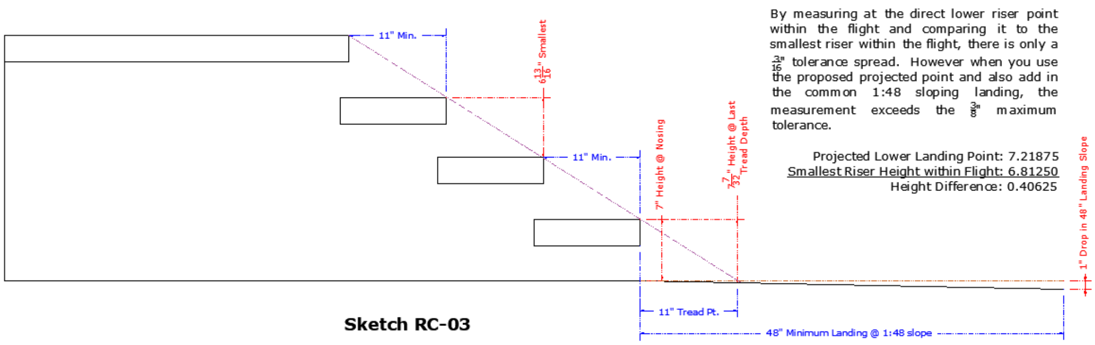
SKETCH RC-01

The second sketch RC-02 included in this reason statement is for the exception and explains the same point of measurement for when there is only one single riser between 2 landings and provides direction with the exception when there are no treads, by following the bottom tread requirement in a flight with the specified minimum tread depth of 11 inches for these specific single riser conditions.



SKETCH RC-02

Of note to keep in mind, If the smallest riser height within a flight is 6.8125", and the bottom riser height at the lower landing is 7", at the riser. And the lower landing slopes away at 1:48, 1/4" to the foot, then at the minimum 11" projected forward point you will be over the maximum 3/8" tolerance allowed per code, see sketch RC-03.



SKETCH RC-03

Bibliography:

- ICC Model 2024 IBC
  - Section 1011.7.1 Stairway walking surface.
  - Section 1014.7 Handrail extensions.
- 2010ADA
  - Section 504.4 Tread surface.
  - Section 505.10.
  - Section 505.10.3
- ICC 2017 A117.1

- Section 504.4 Tread surface.
- Section 505.10.
- Section 505.10.3

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

We believe that there are no cost increases or decrease with this code change, as it only further clarifies the measurement point of the required measurement for where the bottom riser height of a stair flight shall be taken.

E67-24

E68-24

IBC: 1011.5.5.1, 1011.5.5.2; IFC: [BE] 1011.5.5.1, [BE] 1011.5.5.2

Proponents: David Cooper, Stair Manufacturing and Design Consultants, Stairbuilders and Manufacturers Association, SMA (coderep@stairways.org)

2024 International Building Code

Revise as follows:

1011.5.5.1 Nosing projection size. The nosings shall project not more than $1^1/_4$ inches (32 mm) ~~beyond~~ over the trailing edge of the tread below

Exception: When solid risers are not required, the nosing projection is permitted to exceed the maximum projection.

1011.5.5.2 Nosing projection uniformity. Nosing projections of treads within a flight of stairs and of the landing at the top of the flight shall be of uniform size~~, including the projections of the *nosings* of the floor or landing at the top of a *flight*~~.

2024 International Fire Code

Revise as follows:

[BE] 1011.5.5.1 Nosing projection size. The nosings shall project not more than $1^1/_4$ inches (32 mm) ~~beyond~~ over the trailing edge of the tread below.

Exception: When solid risers are not required, the nosing projection is permitted to exceed the maximum projection.

[BE] 1011.5.5.2 Nosing projection uniformity.
Nosing projections of treads within a flight of stairs and of the landing at the top of the flight shall be of uniform size~~, including the projections of the *nosings* of the floor or landing at the top of a *flight*~~.

Reason: Nosing projection size.

Use of the preposition “over” is more accurate than “beyond”. Beyond is defined as indicating to the further side of. A tread’s nosing does not extend or project “to the further side of” the tread below but rather “over” just a small portion of the tread below. The term beyond as used here is inappropriate. Deleting beyond and adding “over the trailing edge” clarifies for enforcement the point on the tread below from which the nosing projection of the tread above can be measured.

Nosing projection uniformity.

The proposal further clarifies the requirement with more direct/concise sentence structure that will result in more consistent understanding and enforcement.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The language substitutions and changes in syntax add no technical requirements that are material to construction methodology and will neither increase or decrease the cost of construction.

E68-24

E69-24

IBC: 1011.6; IFC: [BE] 1011.6

Proponents: David Cooper, Stair Manufacturing and Design Consultants, Stairbuilders and Manufacturers Association, SMA (coderep@stairways.org)

2024 International Building Code

Revise as follows:

1011.6 Stairway landings. There shall be a ~~floor or~~ landing at the top and bottom of each ~~*stairway*~~ *flight* of stairs. The width of landings, measured perpendicularly to the direction of travel of the flight served , shall be not less than the width of ~~*stairways*~~ the flight served. ~~Every landing shall have a minimum depth, measured parallel to the direction of travel, equal to depth of landings shall be measured in the direction of travel of the flight served and shall be not less than the width of the *stairway* or 48 inches (1219 mm), whichever is less.~~ Where there is a change in direction of the stairway at the landing, the landing depth shall be not less than the smallest width of the flights served. Where there is no change in direction of the stairway at the landing, the landing depth shall be 48 inches (1219 mm) minimum. Doors opening onto a landing shall not reduce the landing to less than one-half the required width. When fully open, the door shall not project more than 7 inches (178 mm) into the required width of a landing. Where *wheelchair spaces* are required on the *stairway* landing in accordance with Section 1009.6.3, the *wheelchair space* shall not be located in the required width of the landing and doors shall not swing over the *wheelchair spaces*.

Exceptions:

~~2~~1. Where curved *stairways* of constant radius have intermediate landings, the landing depth shall be measured horizontally between the intersection of the walkline of the lower *flight* at the landing *nosing* and the intersection of the walkline of the upper *flight* at the *nosing* of the lowest tread of the upper *flight*.

~~3~~2. Where a landing turns 90 degrees (1.57 rad) or more, the minimum landing depth in accordance with this section shall not be required where the landing provided is not less than that described by an arc with a radius equal to the width of the *flight* served.

~~1~~3. Where *stairways* connect stepped *aisles* to cross *aisles* or concourses, *stairway* landings are not required at the transition between *stairways* and stepped *aisles* constructed in accordance with Section 1030.

2024 International Fire Code

Revise as follows:

[BE] 1011.6 Stairway landings. There shall be a ~~floor or~~ landing at the top and bottom of each ~~*stairway*~~ *flight* of stairs. The width of landings, measured perpendicularly to the direction of travel of the flight served , shall be not less than the width of ~~*stairways*~~ the flight served. ~~Every landing shall have a minimum depth, measured parallel to the direction of travel, equal to depth of landings shall be measured in the direction of travel of the flight served and shall be not less than the width of the *stairway* or 48 inches (1219 mm), whichever is less.~~ Where there is a change in direction of the stairway at the landing, the landing depth shall be not less than the smallest width of the flights served. Where there is no change in direction of the stairway at the landing, the landing depth shall be 48 inches (1219 mm) minimum. Doors opening onto a landing shall not reduce the landing to less than one-half the required width. When fully open, the door shall not project more than 7 inches (178 mm) into the required width of a landing. Where *wheelchair spaces* are required on the *stairway* landing in accordance with Section 1009.6.3, the *wheelchair space* shall not be located in the required width of the landing and doors shall not swing over the *wheelchair spaces*.

Exceptions:

~~2~~1. Where curved *stairways* of constant radius have intermediate landings, the landing depth shall be measured horizontally between the intersection of the walkline of the lower *flight* at the landing *nosing* and the intersection of the walkline of the upper *flight* at the *nosing* of the lowest tread of the upper *flight*.

~~3~~2. Where a landing turns 90 degrees (1.57 rad) or more, the minimum landing depth in accordance with this section shall not be required where the landing provided is not less than that described by an arc with a radius equal to the width of the *flight* served.

~~1~~3. Where *stairways* connect stepped *aisles* to cross *aisles* or concourses, *stairway* landings are not required at the transition between *stairways* and stepped *aisles* constructed in accordance with Section 1030.

Reason: It is important to note here that by definition in the IBC a stairway includes the flights and landings. A landing may occur at the top or bottom of a flight or between flights of a stairway not only at the top and bottom of a stairway. Substituting *flight* for *stairway* offers the correct description using the terms as defined.

Stairway. One or more flights of stairs, either exterior or interior, with the necessary landings and platforms connecting them, to form a continuous and uninterrupted passage from one level to another.

Flight. A continuous run of rectangular treads, winders or combination thereof from one landing to another.

A stairway may turn at any of these landing locations. The current language refers to the direction of travel but fails to provide a reference location or perspective. Width and depth reverse with ascent and descent on a 90 degree, or quarter space landing. Is the direction of travel to be considered an arc through the turn on the landing or the direction of travel across a landing adjoining two flights at a 180 degree, or half space landing. What is width and what is depth? If there are multiple flights adjoining the landing determining the direction of travel and the width or depth is confusing at best. By referencing the direction of the flight served and the change of the direction of the stairway the depth and width are more clearly understood.

The current text by the most grievous interpretation might imply that the landing may be just 48 inches in depth in situations not intended. We have corrected this anomaly by clarifying that the 48" minimum only applies to stairways that do not change direction a the landing.

The proposed language eliminates trying to distinguish width and depth axes that can reverse with ascent and descent more clearly describes the intent of the width and depth requirements.

Exception 1 has been moved to exception 3 without change because it is likely less common in terms of general use and application when compared to the other exceptions.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The changes proposed serve to restructure and correct the technical requirements for landings to aid interpretation and enforcement without material change to the methods or costs of construction.

E69-24

E70-24

IBC: 1011.7.1 (New), 1012.7.1 (New); IFC: 1011.7.1 (New), 1012.7.1 (New)

Proponents: Jeffrey Grove, Coffman Engineers, Coffman Engineers (jeff.grove@coffman.com)

2024 International Building Code

Add new text as follows:

1011.7.1 Stairway Supporting Construction. *Stairway* supporting construction shall have a fire resistance rating equivalent to the rating of the enclosure or separation required by Sections 1023.2 and 1027.6.

Exception: *Stairway* supporting construction located within the fire resistance rated enclosure or exterior to the building does not require a fire resistance rating.

1012.7.1 Ramp Supporting Construction. *Ramp* supporting construction shall have a fire resistance rating equivalent to the rating of the enclosure or separation required by Sections 1023.2 and 1027.6.

Exception: *Ramp* supporting construction located within the fire resistance rated enclosure or exterior to the building does not require a fire resistance rating.

2024 International Fire Code

Add new text as follows:

1011.7.1 Stairway Supporting Construction. *Stairway* supporting construction shall have a fire resistance rating equivalent to the rating of the enclosure or separation required by Sections 1023.2 and 1027.6.

Exception: *Stairway* supporting construction located within the fire resistance rated enclosure or exterior to the building does not require a fire resistance rating.

1012.7.1 Ramp Supporting Construction. *Ramp* supporting construction shall have a fire resistance rating equivalent to the rating of the enclosure or separation required by Sections 1023.2 and 1027.6.

Exception: *Ramp* supporting construction located within the fire resistance rated enclosure or exterior to the building does not require a fire resistance rating.

Reason: NOTE: These two new sections are intended to be directly following the charging sections, 1011.7 and 1012.7, respectively. The following sections remain unchanged and should follow these new sections.

There is a requirement for stairway and ramp enclosures to be constructed with fire barriers in accordance with IBC Section 1023.2. This requires the supporting construction for the enclosure to be protected to afford the required fire resistance rating of the fire barrier supported in accordance with IBC Section 707.5.1.

Stair and ramp enclosures should be supported in accordance with the fire resistance rating of the enclosure to assist in the egress of occupants and response of first responders. However, this does not currently extend to the landings and stairway/ramp construction which may extend beyond the enclosure into the building. For example, a four-story exit enclosure in a Type II-B building would be provided with a 2-hour fire resistance rating and associated supporting construction. However, if the specific landing supports extend beyond the enclosure, the associated landing supports are not required to be protected. The intent is an exit enclosure to be provided with structural fire protection and reliability and it should extend to the elements which support occupants within that enclosure that are not protected by the enclosure.

The reasoning for locating the requirement in these sections is it would be applicable to stairway and ramp construction (both interior and exterior) that have supporting construction which extends into the building and may be unprotected.

Cost Impact: Increase

Estimated Immediate Cost Impact:

For a single 5-story stair utilizing this design strategy quotes were received for $15,000-$32,000 to provide fireproofing to these supporting structural members. It should be reiterated that other structural design strategies are available which would not represent a cost increase for this scenario. The cost, if present, is immediate with no significant life-cycle cost anticipated.

Estimated Immediate Cost Impact Justification (methodology and variables):

This is not considered a cost increase for all stair/ramp enclosures where stairway/ramp construction are located within the exit enclosure or in circumstances where the enclosure supporting construction is shared with the stairway/ramp. The cost impact for providing fire resistance to supporting construction of stairways/ramps that extend beyond the enclosure is dependent upon numerous factors including number/size of supporting members, method of fire protection and required fire resistance rating.

A case study was developed which may represent a cost increase as a portion of the cost impact statement. Conservatively a 5 story Type II-B (non-rated non-combustible steel building) which could be found in a Group R-2 sprinklered occupancy type building was considered. This would require a 2-hour fire rated separation for the stairway and associated supporting construction which exited the stair enclosure as identified in this proposal. The proposal team worked with a structural engineer on a structural design which would be utilized to support the stairway construction and provided this information to spray-applied fireproofing contractors for pricing.

Additional supporting cost information can be found at the FTP below:

https://files.coffmanftp.comUser name: ICC@coffmanftp.com

Password: G10G7Vw84rjq

E70-24

E71-24

IBC: 1011.7.1; IFC: [BE] 1011.7.1

Proponents: David Cooper, Stair Manufacturing and Design Consultants, Stairbuilders and Manufacturers Association, SMA (coderep@stairways.org)

2024 International Building Code

Revise as follows:

1011.7.1 Stairway walking surface.
The walking surface of treads and landings of a *stairway* shall not be sloped steeper than one unit vertical in 48 units horizontal (2-percent slope) in any direction. *Stairway* treads and landings shall have a solid surface. Finish floor surfaces shall be securely attached.

Exceptions:

1. ~~Openings~~Perforations in *stair* walking surfaces shall be a size that does not permit the passage of $^1/_2$-inch-diameter (12.7 mm) sphere. Elongated ~~openings~~ perforations shall be placed so that the long dimension is perpendicular to the direction of travel.
2. Where open risers are permitted the open ends of treads that do not extend to the face of the guard infill or wall shall extend to a point not more than 2 inches (51 mm) measured horizontally from the face of the guard infill or wall.
3. ~~2~~3. In Group F, H and S occupancies, other than areas of parking *structures* accessible to the public, openings in treads and landings shall not be prohibited provided that a sphere with a diameter of 1$^1/_8$ inches (29 mm) cannot pass through the opening.

2024 International Fire Code

Revise as follows:

[BE] 1011.7.1 Stairway walking surface.
The walking surface of treads and landings of a *stairway* shall not be sloped steeper than 1 unit vertical in 48 units horizontal (2-percent slope) in any direction. *Stairway* treads and landings shall have a solid surface. Finish floor surfaces shall be securely attached.

Exceptions:

1. ~~Openings~~Perforations in *stair* walking surfaces shall be a size that does not permit the passage of $^1/_2$-inch-diameter (12.7 mm) sphere. Elongated ~~openings~~ perforations shall be placed so that the long dimension is perpendicular to the direction of travel.
2. Where open risers are permitted the open ends of treads that do not extend to the face of the guard infill or wall shall extend to a point not more than 2 inches (51 mm) measured horizontally from the face of the guard infill or wall.
3. ~~2~~3. In Group F, H and S occupancies, other than areas of parking structures accessible to the public, openings in treads and landings shall not be prohibited provided that a sphere with a diameter of 1$^1/_8$ inches (29 mm) cannot pass through the opening.

Reason: Although a tread has a solid surface the end of a tread often ends without actually abutting any surface. Such is the case on many open stairs or where open risers are allowed. Opening limitations in guards regulating the vertical plane are not applicable to the horizontal walking surface. This addition to the exception for openings in stair walking surfaces will provide much needed guidance for design and enforcement when the tread does not extend under the guard system or abut a wall, skirtboard, or other vertical surface. The 2 inch limit is reasoned as the maximum standoff used and is considerably smaller than the smallest of shoe sizes for children of 2 -6 months.

Common applications are pictured:

Illustration A: Glass panel is attached to the ends of treads with "standoff" hardware leaving a narrow gap between the glass panel and the extreme end of the tread.

Illustration B: Shows the an open riser mono stringer stair with open ended treads.

In each case the exposed area is well out of the path of travel.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The change provides specific technical requirements that provide clarification for enforcement of a common and highly desired design aesthetic without change to methods of construction or related costs of construction of the stair.

E71-24

E72-24

IBC: 1011.7.1; IFC: [BE] 1011.7.1

Proponents: David Cooper, Stair Manufacturing and Design Consultants, Stairbuilders and Manufacturers Association, SMA (coderep@stairways.org)

2024 International Building Code

Revise as follows:

1011.7.1 Stairway walking surface.
The walking surface of treads and landings of a *stairway* shall not be sloped steeper than one unit vertical in 48 units horizontal (2-percent slope) in any direction. *Stairway* treads and landings shall have a solid surface. Finish floor surfaces shall be securely attached.

Exceptions:

1. Openings in *stair* walking surfaces shall be a size that does not permit the passage of $^{1}/_{2}$-inch-diameter (12.7 mm) sphere. Elongated openings shall be placed so that the long dimension is perpendicular to the direction of travel.
2. In Group F, H and S occupancies, other than areas of parking *structures* accessible to the public, openings in treads and landings shall not be prohibited provided that a sphere with a diameter of 1$^{1}/_{8}$ inches (29 mm) cannot pass through the opening.
3. <u>Where a nonuniform height riser is permitted in accordance with Section 1011.5.4.1, the slope of the established grade, parallel to the riser, serving as the landing shall not exceed one unit vertical in 12 units horizontal (8-percent slope).</u>

1011.5.4.1 Nonuniform height risers.
Where the bottom or top riser adjoins a sloping *public way*, walkway or driveway having an established grade and serving as a landing, the bottom or top riser is permitted to be reduced along the slope to less than 4 inches (102 mm) in height, with the variation in height of the bottom or top riser not to exceed one unit vertical in 12 units horizontal (8-percent slope) of *stair* width. The *nosings* at such nonuniform height risers shall have a distinctive marking stripe, different from any other *nosing* marking provided on the *stair flight*. The distinctive marking stripe shall be visible in descent of the *stair*. Marking stripes shall have a width of not less than 1 inch (25 mm) but not more than 2 inches (51 mm).

2024 International Fire Code

Revise as follows:

[BE] 1011.7.1 Stairway walking surface.
The walking surface of treads and landings of a *stairway* shall not be sloped steeper than 1 unit vertical in 48 units horizontal (2-percent slope) in any direction. *Stairway* treads and landings shall have a solid surface. Finish floor surfaces shall be securely attached.

Exceptions:

1. Openings in *stair* walking surfaces shall be a size that does not permit the passage of $^{1}/_{2}$-inch-diameter (12.7 mm) sphere. Elongated openings shall be placed so that the long dimension is perpendicular to the direction of travel.
2. In Group F, H and S occupancies, other than areas of parking structures accessible to the public, openings in treads and landings shall not be prohibited provided that a sphere with a diameter of 1$^{1}/_{8}$ inches (29 mm) cannot pass through the opening.
3. <u>Where a nonuniform height riser is permitted in accordance with Section 1011.5.4.1, the slope of the established grade, parallel to the riser, serving as the landing shall not exceed one unit vertical in 12 units horizontal (8-percent slope).</u>

[BE] 1011.5.4.1 Nonuniform height risers.
Where the bottom or top riser adjoins a sloping *public way*, walkway or driveway having an established grade and serving as a landing, the bottom or top riser is permitted to be reduced along the slope to less than 4 inches (102 mm) in height, with the variation in height of

the bottom or top riser not to exceed 1 unit vertical in 12 units horizontal (8-percent slope) of *stair* width. The nosings at such nonuniform height risers shall have a distinctive marking stripe, different from any other *nosing* marking provided on the *stair flight*. The distinctive marking stripe shall be visible in descent of the *stair*. Marking stripes shall have a width of not less than 1 inch (25 mm) but not more than 2 inches (51 mm).

Reason: Every flight of stairs must have landing at the top and bottom that must not slope steeper than 1:48. An exception is needed to provide for a stair landing to exceed the maximum slope where nonuniform height risers are allowed. Although the nonuniform riser is allowed when properly marked the landing is technically not permitted to slope more than 2 percent. The text of the new exception 3 parallels that of the cross-referenced section **1011.5.4.1 Nonuniform height risers** that requires a distinctive marking stripe and provides for a riser height less than the 4-inch minimum as required in **1011.5.2 Riser height and tread depth.**

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This change only offers an exception for a condition that is already recognized. The code allows a certain nonuniform height riser where it meets a sloped landing but fails to assure consistent interpretation and enforcement of the adjoining landing. This change results in no material change that will increase or decrease the cost of construction.

E72-24

E73-24

IBC: 1011.7.2 (New), 1011.7.2.1 (New), 1011.7.2.2 (New); IFC: 1011.7.2 (New), 1011.7.2.1 (New), 1011.7.2.2 (New)

Proponents: Nancy Clanton, Clanton & Associates, Inc, Clanton & Associates, Inc. (nancy@clantonassociates.com); Brittany Lynch, Clanton & Associates, Clanton & Associates (brittany@clantonassociates.com); Eunice Noell-Waggoner, President, Center of Design for an Aging Society, IES Lighting for Seniors and the Visually Impaired Committee (eunice@centerofdesign.org); Jonathan McHugh, McHugh Energy Consultants Inc., California Investor Owned Utilities (jon@mchughenergy.com); Harold Jepsen, Legrand (harold.jepsen@legrand.com)

2024 International Building Code

Add new text as follows:

1011.7.2 Markings on stairways. Egress path markings shall be provided on interior and exterior stairways in accordance with Sections 1011.7.2.1 and 1011.7.2.2.

Exceptions:

1. Stairways within individual dwelling units.
2. Stairways with stripes complying with Section 1025.

1011.7.2.1 Steps. A solid and continuous stripe shall be applied to the horizontal leading edge of each step and shall extend for the full length of the step. Stripes shall be a solid color having a visual contrast of dark-on-light or light-on dark from the remainder of the tread or landing surface. Stripes have a minimum horizontal width of 1 inch (25 mm) and a maximum width of 3 inches (76 mm). The leading edge of the stripe shall be placed not more than ½ inch (12.7 mm) from the leading edge of the step and the stripe shall not overlap the leading edge of the step by not more than 1/2 inch (12.7 mm) down the vertical face of the step. The stripe shall be of material that is at least as slip resistant as the other tread surface.

1011.7.2.2 Landings. The leading edge of landings shall be marked with a stripe consistent with the dimensional requirements for steps.

2024 International Fire Code

Add new text as follows:

1011.7.2 Markings on stairways. Egress path markings shall be provided on interior and exterior stairways in accordance with Sections 1011.7.2.1 and1011.7.2.2.

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1011.7.2.1 Steps. A solid and continuous stripe shall be applied to the horizontal leading edge of each step and shall extend for the full length of the step. Stripes shall be a solid color having a visual contrast of dark-on-light or light-on dark from the remainder of the tread or landing surface. Stripes have a minimum horizontal width of 1 inch (25 mm) and a maximum width of 3 inches (76 mm). The leading edge of the stripe shall be placed not more than ½ inch (12.7 mm) from the leading edge of the step and the stripe shall not overlap the leading edge of the step by not more than 1/2 inch (12.7 mm) down the vertical face of the step. The stripe shall be of material that is at least as slip resistant as the other tread surface.

1011.7.2.2 Landings. The leading edge of landings shall be marked with a stripe consistent with the dimensional requirements for steps.

Reason: From Cohen and Pauls (2006) they cite the following statistics about stair safety. *"According to the National Public Services*

Research Institute, in 1995, it was estimated that stair-related injuries in the United States were associated with comprehensive costs of $50 billion, including $4.7 billion in medical costs, $7.1 billion in productivity losses, and $38.1 billion in quality of life losses (T. Miller, Personal Communication. 1998). Even the smallest of these component costs is astonishing relative to annual stair construction costs in the United States; these are only approximately $5 billion. With the possible exception of products, such as handguns, tobacco and illegal drugs, this 10-to-l ratio of injury costs to product production costs is extraordinary."

Cohen and Pauls also note that increasing quantity of lighting alone is not sufficient to incease the visibility of the edge of the stair tread. *"In addition to lighting, there are other important factors in visibility of steps, including careful choice of stairway covering materials to avoid patterns that tend to camouflage the step nosings and the critical leading edges of treads. and to use highly contrasting tread markings."*

The Illuminating Engineering Society's Recommended Practice for Lighting and the Visual Environment for Older Adults and the Visually Impaired (IES-RP-28-20) notes the following concerning the use of reflectance contrast for increasing visibility: *Value contrast should be a design consideration in the selection of finishes for corridors, stairs, lobbies and spaces that become part of the path of egress. Contrast helps to define the space and the elements within the space, e.g., doorways, changes of floor level or direction, and obstructions such as columns, to increase visibility and the occupant's confidence. Everyone's sight benefits from value contrast in low-light conditions, regardless of age or visual acuity.*

The IES also recommends that *"All stairs should have clearly marked edge strips, staircase borders, and handrails to meet the needs of older people and persons with low vision."*

Similar to what has been recommended by Cohen and Pauls and the Illuminating Engineering Society, this proposal would increase the safety of stairways by increasing the reflectance contrast (and thus the luminance contrast) by requiring colored stripes on the nosing or leading edges of stairs. The difference in reflectance between the edge stripe and the rest of the stair tread will to increase the visibility of the edge of the stair. These colored stripes would be one to two inches wide on the edge of nosing the stair. This proposal is written the same format as the requirement as IBC *Section 1011.5.4.1 Nonuniform height risers*. However the distinguishing difference between stripes on nonuniform height risers and those proposed for all other stairs is "nonuniform height risers shall have a distinctive marking stripe, different from any other nosing marking provided on the stair flight."

The description of the marking stripes are written to be in alignment with ANSI/ICC 117.1 Accessibility Standard Section 504.6 "Visual Contrast". Addtionally this proposal modifies both Section 1011.5.4.1 and 1011.7.1 on the geometrical description of the contrasting marking stripe. Originally the stripe is defined as being one to two inches wide, this proposal more clearly defines the stripes as being one to two inches in depth and having a width that extends the width of the stair tread.

Bibliography: ANSI/IES RP-28-20. *Recommended Practice: Lighting and the Visual Environment for Older Adults and the Visually Impaired.* Illuminating Engineering Society. New York.

Cohen, Harvey and Pauls, Jake. *Warnings and Markings for Stairs and Pedestrian Terrain*. **Handbook on Warnings.** In: Michael Wogalter (Ed.),Lawrence Erlbaum, Inc., 2006, pp. 711-722.

Cost Impact: Increase

Estimated Immediate Cost Impact:

The lowest cost method for adding a stripe to stairs is painting a stripe. However to provide conservatively high estimate we have used the cost of adding a metal nosing strip to the tread of each stair and on the nosing of the landing above a stair. From estimates of costs published on the internet the costs of aluminum stair nosing are $6 to $21 per linear foot. https://kofflersales.com/product/metal-stair-nosing Similar costs are found on Grainger's and Lowes websites.

Using a medium costs of $12.50/linear foot, the material cost of adding an aluminum nosing to a 4 foot wide tread is $50/stair. According one home improvement website, "A beginner can install a nosing on a tread in 15 to 30 minutes." https://www.thespruce.com/installing-a-stair-nosing-strip-1822570 According to the US Bureau of Labor Statistics, the Mean Labor wage for carpenter, US average May 2022 is $ 27.99/hr https://www.bls.gov/oes/current/oes472031.htm Thus the labor cost is $14 per step to install a $50 nosing strip for a total installed cost of $64/stair tread. With 50% overhead and profit for carpenters (2020 RS Means), total cost is $96 per installed 4 foot wide nosing. For a 12 foot tall story, with 6 inch risers per step, there are 24 nosings with an installed cost of 24 x $96 = $2,304 per story.

This cost for nosings is compared against the cost adding stairs per story. In the Economics of Egress Alternatives and Life-Safety Costs, NIST Special Publication 1109. September 2010. Gaithersburg, Maryland (https://nvlpubs.nist.gov/nistpubs/Legacy/SP/nistspecialpublication1109.pdf) describes the costs of adding an additional exit stair to a 13 story prototypical building as follows: “The baseline value for the life-cycle costs of installing an additional exit stair in Building 2 ranges from $1.5 million for the 44 in (112 cm) stair width to $2.4 million for the 66 in (168 cm) stair width.” The cost per story of this added exit stair is $1.5 Million/ 12 = $125,000 per story. The fractional cost of adding aluminum stair nosings strips is $2,300/$125,000 = 1.8

Estimated Immediate Cost Impact Justification (methodology and variables):

Adding striping to stairs increases the cost of stairs by 1.8%. However, this cost is offset by the societal savings associated with avoiding trip and fall hazards on stairways.

Estimated Life Cycle Cost Impact:

In Cohen and Pauls, Warnings and Markings for Stairs and Pedestrian Terrain (see bibliography), they estimate that the ratio of the cost of annual injuries on stairs to the annual cost of stair construction is 10 to one. The annual construction rate of nonresidential buildings is 1.3% (table B7 of the US EIA 2012 Commercial Buildings Energy Consumption Survey). Thus the annual value of injuries on stairs are 10 x 0.013 = 13% of the value of the stock of all stairs. Assuming that metal nosing lasts at least 10 years, the ratio of the value of injuries on stairs over 10 years to cost of the stairs is 10 x 13% = 130% of the value of the stairs. As described in the cost impact statement, a conservatively high estimate of the cost of stair striping is 1.8% of total stair cost. Thus, the ratio of the cost of stair striping to the cost of injuries on stairs is 1.8%/130% = 1.4%. If stair striping reduces injuries on stairs, by 1.4% this will pay for the added cost of striping stairs by adding an aluminum nosing that is conspicuously different than the reflectance of the rest of the stair tread. Given the mechanisms of how falls are induced on stairs, we expect that stair striping will reduce the percentage of falls significantly more than 1.4%.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

If the striping reduces falls in stairs by any amount greater than 1.4%, life cycle cost is decreased.

In Cohen and Pauls, Warnings and Markings for Stairs and Pedestrian Terrain, they identify three factors to stair safety.

1. visibility of the stair flight and its individual steps, especially when viewed in descent;

2. adequacy and uniformity of step dimensions in relation to human gait; and

3. availability of reachable, graspable handrails that also provide accurate visual cues about the presence and location of steps.

Items 2 is addressed by IBC Section 1011.5. Item 3 is addressed by IBC section 1011.11. Visibility is only partially addressed by illuminance requirements in IBC Section 1008. Critical to visibility of steps is the luminance contrast of the tread edge; luminance contrast is the ratio of reflected light from the stair edge as compared to other surfaces on the stair. When stairs are uniformly illuminated, luminance contrast is a function of reflectance contrast of the stair edge from the surrounding tread and riser. Increasing illuminance without adjusting the ratios of surface reflectances of stair edge from its surroundings does not increase luminance contrast because with increasing illuminance, the luminance of both the stair edge and its surroundings will both rise proportionately and thus the ratio of the stair edge to its surroundings have not changed. We expect that lack of reflectance contrast is a significant cause of falls on stairs and thus addressing this issue will result in substantially more savings associated with avoided injuries and deaths than its first cost. Reducing stairway falls by only 1.4% will pay for the cost of the stair striping. See the calculations below for the rationale.

E73-24

E74-24

IBC: 1011.7.2 (New), 1011.7.2.1 (New), 1011.7.2.2 (New), 1011.7.2.3 (New), ASTM Chapter 35 (New); IFC: 1011.7.2 (New), 1011.7.2.1 (New), 1011.7.2.2 (New), 1011.7.2.3 (New), ASTM Chapter 80 (New)

Proponents: Eunice Noell-Waggoner, Center of Design for an Aging Society, IES Lighting for Seniors and the Visually Impaired Committee (eunice@centerofdesign.org); Jonathan McHugh, McHugh Energy Consultants Inc., California Investor Owned Utilities (jon@mchughenergy.com); Nancy Clanton, Clanton & Associates, Inc, Clanton & Associates, Inc. (nancy@clantonassociates.com)

2024 International Building Code

Add new text as follows:

1011.7.2 Markings on stairways. Egress path markings shall be provided on interior and exterior stairways in accordance with Sections 1011.7.2.1 through 1011.7.2.3.

Exceptions:

1. Stairways within individual dwelling units.
2. Stairways with stripes complying with Section 1025.

1011.7.2.1 Steps. A solid and continuous stripe shall be applied to the horizontal leading edge of each step and shall extend for the full length of the step. Stripes shall be a solid color having a visual contrast of dark-on-light or light-on dark from the remainder of the tread or landing surface. Stripes have a minimum horizontal width of 1 inch (25 mm) and a maximum width of 3 inches (76 mm). The leading edge of the stripe shall be placed not more than ½ inch (12.7 mm) from the leading edge of the step and the stripe shall not overlap the leading edge of the step by not more than 1/2 inch (12.7 mm) down the vertical face of the step. The stripe shall be of material that is at least as slip resistant as the other tread surface.

1011.7.2.2 Landings. The leading edge of landings shall be marked with a stripe consistent with the dimensional requirements for steps.

1011.7.2.3 Light reflectance. The stripe light reflectance value (LRV) and the tread surface LRV shall be determined in accordance with ASTM E1331. The stripe LRV shall comply with one of the following:

1. Stripe LRV shall be no less than stair tread LRV plus 65.
2. Stripe LRV shall be no greater than stair tread LRV minus 65.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

E1331-15 (2019)	Standard Test Method for Reflectance Factor and Color by Spectrophotometry Using Hemispherical Geometry

2024 International Fire Code

Add new text as follows:

1011.7.2 Markings on stairways. Egress path markings shall be provided on interior and exterior stairways in accordance with Sections 1011.7.2.1 through 1011.7.2.3.

Exceptions:

1. Stairways within individual dwelling units.
2. Stairways with stripes complying with Section 1025.

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1. Stripe LRV shall be no less than stair tread LRV plus 65.
2. Stripe LRV shall be no greater than stair tread LRV minus 65.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428-2959

E 1331-15	ASTM E1331-15 (2019) Standard Test Method for Reflectance Factor and Color by Spectrophotometry Using Hemispherical Geometry

Staff Analysis: A review of the standard proposed for inclusion in the code, ASTM E113-15(2019) Standard Test Method for Reflectance Factor and Color by Spectrophotometry Using Hemispherical Geometry, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: The Importance of Contrast on Stairs

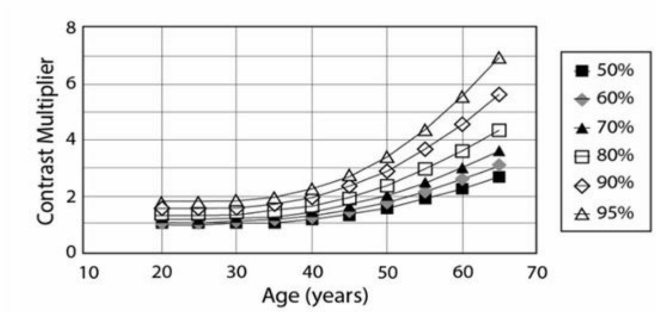
Expanding Baby Boom Cohort: (Official Website of the U.S. Government, Report No. P25-1141)

- By 2029 20% of the US population will be over age 65.
- By 2056 the US population 65+will be larger than the population under 18 years.
- Why aren't building codes keeping pace with the requirement for our aging population?

Age-Related Vision Changes: Sensory loss is the most common aspect of aging; however, perception problems (e.g. vision and hearing) are not easily recognized by others or addressed in the built environment.

- **Low Vision is prevalent in the older population** and increases dramatically at the age of 70. Defined as 20/60 in the better seeing eye, and cannot be corrected with glasses, contact lenses, medicine, or surgery. (National Eye Institute, Low Vision 2010)
- **We see by visual contrast** and as people age, they experience a loss of contrast sensitivity.
- **Contrast sensitivity, not visual acuity, is associated with gait and fall related risk factors in older adults.** Research article: Duggan et al (2017) Time to refocus assessment of vision in older adults? Contrast sensitivity, but not visual acuity is associated with the gait of older adults. Journal of Gerontology :Medical Sciences doi: 10.1093/geona/glx21

Contrast Multiplier vs. Age



This summary plot of contrast multiplier vs. age for various population ages shows how much the contrast of a task needs to be increased to compensate for reduced image quality on the eye's retina, because of filtering changes in the aged human lens. For example, an average (50% population curve) 60 y/o requires about 2.3 times as much contrast to have the same image contrast on the retina as does a 20 y/o. If 95% of 60 y/o are to be accommodated, the contrast needs to be increased by 5.5 times. (Reference: ANSI/IES RP-28-20, Figure 2-1)

Falls and stair negotiation in older people and their relationship with vision The prevalence and morbidity of falls (NIH National Library of Medicine, National Center for Biotechnology Information). Falls are a common and very serious problem for older adults, with approximately one-third of community-dwelling, healthy adults aged 65 years and over falling at least once per year, and with up to half of these people experiencing multiple falls. Annual falls rates increase to about 50% in people aged 85 years and over. Approximately 25% of falls result in an injury ranging from minor bruising to hip fracture. Hip fractures are a particularly severe consequence of falling, with the 1-year mortality rate following hip fracture being about 25%. In addition, 80% of surveyed older women suggested that they would rather be dead than experience the loss of independence and quality of life that results from a hip fracture and subsequent admission to a nursing home. Falls and hip fractures are mentioned as a contributing factor in 40% of admissions to long-term nursing and residential home care. Furthermore, even non-injurious falls have significant consequences, as they can lead to a fear of falling, which, in turn, results in a self-imposed restriction of functional activity, decreased mobility and independence, social isolation, deteriorating health, depression and reduced quality of life. **Incidences of falling in older people have been consistently linked to problems with step or stair negotiation.** Changes in visual acuity may be more associated with falls than the actual level of visual acuity, and other aspects of vision (such as visual field assessments, contrast sensitivity and stereoacuity are likely to be more important risk factors than visual acuity for falls.

According to CDC data, 38.6% of senior falls occur on level ground, but a significant 5.5% of all senior falls occur on stairs or steps.

Falls in Older Adults - Older People's Health Issues Merck Manuals https://www.merckmanuals.com › home › falls-in-older-...After a fall, injuries are common and tend to be more severe as people age. Over half of all falls result in at least a slight injury, such as a bruise, sprained ligament, or strained muscle. More serious injuries include broken bones, torn ligaments, deep cuts, and damage to organs such as the kidney or the liver.

The information cited in Cohen and Pauls (2006) is still valuable. The information provided above is focus on age-related changes to vision and the risk factor for falls on stairs due to these changes.

Contrast at the edge of stair treads defines where to safely step and helps prevent falls. Cohen and Paul also note that increasing quantity of lighting alone is not sufficient to increase the visibility of the edge of the stair tread. "In addition to lighting, there are other important factors in visibility of steps, including careful choice of stairway covering materials to avoid patterns that tend to camouflage the step nosings and the critical leading edges of treads. **and to use highly contrasting tread markings.**"

The Illuminating Engineering Society's Recommended Practice for Lighting and the Visual Environment for Older Adults and the Visually Impaired (IES-RP-28-20) notes the following concerning the use of reflectance contrast for increasing visibility: Value contrast should be a design consideration in the selection of finishes for corridors, stairs, lobbies and spaces that become part of the path of egress. Contrast helps to define the space and the elements within the space, e.g., doorways, changes of floor level or direction, and obstructions such as columns, to increase visibility and the occupant's confidence. Everyone's sight benefits from value contrast in low-light conditions, regardless of age or visual acuity.The

IES also recommends that “*All stairs should have clearly marked edge strips, staircase borders, and handrails to meet the needs of older people and persons with low vision*.”

Similar to what has been recommended by Cohen and Pauls and the Illuminating Engineering Society, this proposal would increase the safety of stairways by increasing the visual contrast (and thus the luminance contrast) by requiring contrast stripes on the nosing or leading edges of stairs. The difference in reflectance between the edge stripe and the rest of the stair tread will increase the visibility of the edge of the stair. These contrasting stripes would be one to two inches wide on the edge of nosing the stair but would allow 3” wide nosing on concrete stairs to provide adequate attachment to the tread. This proposal is written the same format as the requirement as IBC Section 1011.5.4.1 Nonuniform height risers. However the distinguishing difference between stripes on nonuniform height risers and those proposed for all other stairs is “nonuniform height risers shall have a distinctive marking stripe, different from any other nosing marking provided on the stair flight.”

The description of the marking stripes are written to be in alignment with ANSI/ICC 117.1 Accessibility Standard Section 504.6 "Visual Contrast". Additionally this proposal modifies both Section 1011.5.4.1 and 1011.7.1 on the geometrical description of the contrasting marking stripe. Originally the stripe is defined as being one to two inches wide, this proposal more clearly defines the stripes as being one to two inches in depth and having a width that extends the width of the stair tread.

Bibliography: United State Government Report #P25-1141)

National Eye Institute, Low Vision 2010.

Journal of Gerontology Medical Sciences Research Article: doi: 10.1093/geona/glx21.

CDC ,Older Adult Falls Data | Fall Prevention | Injury Center | CDC

ANSI/IES RP-28-20. Recommended Practice: Lighting and the Visual Environment for Older Adults and the Visually Impaired. Illuminating Engineering Society. New York.

NIH National Library of Medicine, National Center for Biotechnology Information.

CDC data: Significant number of falls for Seniors occurred on stairs and steps.

Falls in Older Adults - Older People's Health Issues Merck Manuals https://www.merckmanuals.com › home › falls-in-older-.

Cohen, Harvey and Pauls, Jake. Warnings and Markings for Stairs and Pedestrian Terrain. Handbook on Warnings. In: Michael Wogalter (Ed.),Lawrence Erlbaum, Inc., 2006, pp. 711-722.

Cost Impact: Increase

Estimated Immediate Cost Impact:

The lowest cost method for adding a stripe to stairs is painting a stripe. However to provide conservatively high estimate we have used the cost of adding a metal nosing strip to the tread of each stair and on the nosing of the landing above a stair. From estimates of costs published on the internet the costs of aluminum stair nosing are $6 to $21 per linear foot. https://kofflersales.com/product/metal-stair-nosing Similar costs are found on Grainger’s and Lowes websites.

Using a medium costs of $12.50/linear foot, the material cost of adding an aluminum nosing to a 4 foot wide tread is $50/stair. According one home improvement website, “A beginner can install a nosing on a tread in 15 to 30 minutes.” https://www.thespruce.com/installing-a-stair-nosing-strip-1822570 According to the US Bureau of Labor Statistics, the Mean Labor wage for carpenter, US average May 2022 is $ 27.99/hr https://www.bls.gov/oes/current/oes472031.htm Thus the labor cost is $14 per step to install a $50 nosing strip for a total installed cost of $64/stair tread. With 50% overhead and profit for carpenters (2020 RS Means), total cost is $96 per installed 4 foot wide nosing. For a 12 foot tall story, with 6 inch risers per step, there are 24 nosings with an installed cost of 24 x $96 = $2,304 per story.

Estimated Immediate Cost Impact Justification (methodology and variables):

Adding striping to stairs increases the cost of stairs by 1.8%. However, this cost is offset by the societal savings associated with avoiding trip and fall hazards on stairways.

Estimated Life Cycle Cost Impact:

Overall life cycle impact is negative meaning that society has an overall benefit from the increased visibility of change of level in stairs.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

In Cohen and Pauls Warnings and Markings for Stairs and Pedestrian Terrain (see bibliography), they cite that "Stair-related injuries alone were estimated to have a societal cost of nearly 50 billion dollars in 1995."

E74-24

E75-24

IBC: 1011.8; IFC: [BE] 1011.8

Proponents: Peter Zvingilas, State of Connecticut, SECTBO

2024 International Building Code

Revise as follows:

1011.8 Vertical rise. A *flight* of *stairs* shall not have a vertical rise greater than ~~12 feet (3658 mm)~~ 12 feet 7 inches (3835 mm) between floor levels or landings.

Exception: *Spiral stairways* used as a *means of egress* from *technical production areas*.

2024 International Fire Code

Revise as follows:

[BE] 1011.8 Vertical rise. A *flight* of *stairs* shall not have a vertical rise greater than ~~12 feet (3658 mm)~~ 12 feet 7 inches (3835 mm) between floor levels or landings.

Exception: *Spiral stairways* used as a *means of egress* from technical production areas.

Reason: The IRC changed from 12 feet to 12 feet 7 inches but did not change in the IBC. A vertical rise between floors of 12 feet 7 inches, this would create consistency in both books.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal does not increase cost of construction. See the reason statement.

E75-24

E76-24

IBC: 1011.11; IFC: [BE] 1011.11

Proponents: William Conner, Bill Conner Associates LLC, American Society of Theatre Consultants (bill@bcaworld.com)

2024 International Building Code

Revise as follows:

1011.11 Handrails.
Flights of stairways shall have *handrails* on each side and shall comply with Section 1014. Where glass is used to provide the *handrail*, the *handrail* shall comply with Section 2407.

Exceptions:

1. *Flights of stairways* within *dwelling units* and *flights* of *spiral stairways* are permitted to have a *handrail* on one side only.
2. Decks, patios and walkways that have a single change in elevation where the landing depth on each side of the change of elevation is greater than what is required for a landing do not require *handrails*.
3. In Group R-3 occupancies, a change in elevation consisting of a single riser at an entrance or egress door does not require *handrails*.
4. Changes in room elevations of three or fewer risers within *dwelling units* and *sleeping units* in Groups R-2 and R-3 do not require *handrails*.
5. Where a platform lift is in a stationary position and the floor of the platform lift serves as the upper landing of a *stairway*, *handrails* shall not be required on the *stairway*, provided that all of the following criteria are met:
   5.1. The *stairway* contains not more than two risers.
   5.2. A handhold, positioned horizontally or vertically, is located on one side of the *stairway* adjacent to the top landing.
   5.3. The handhold is located not less than 34 inches (864 mm) and not more than 42 inches (1067 mm) above the bottom landing of the *stairway*.
   5.4. The handhold gripping surface complies with Section 1014.4, and is not less than 4.5 inches (114 mm) in length.
6. <u>A flight of stairs between a stage and the audience seating area and in view of the audience is permitted to have a handrail on one side where the stairs are not required for egress.</u>

2024 International Fire Code

Revise as follows:

[BE] 1011.11 Handrails.
Flights of *stairways* shall have *handrails* on each side and shall comply with Section 1014. Where glass is used to provide the *handrail*, the *handrail* shall comply with Section 2407 of the International Building Code.

Exceptions:

1. *Flights* of *stairways* within *dwelling units*, and *flights* of *spiral stairways* are permitted to have a *handrail* on one side only.
2. Decks, patios and walkways that have a single change in elevation where the landing depth on each side of the change of elevation is greater than what is required for a landing do not require *handrails*.
3. In Group R-3 occupancies, a change in elevation consisting of a single riser at an entrance or egress door does not require *handrails*.
4. Changes in room elevations of three or fewer risers within *dwelling units* and *sleeping units* in Group R-2 and R-3 do not require *handrails*.

5. Where a platform lift is in a stationary position and the floor of the platform lift serves as the upper landing of a *stairway*, *handrails* shall not be required on the *stairway*, provided that all of the following criteria are met:
   5.1. The *stairway* contains not more than two risers.
   5.2. A handhold, positioned horizontally or vertically, is located on one side of the *stairway* adjacent to the top landing.
   5.3. The handhold is located not less than 34 inches (864 mm) and not more than 42 inches (1067 mm) above the bottom landing of the *stairway*.
   5.4. The handhold gripping surface complies with Section 1014.4 and is not less than 4.5 inches (114 mm) in length.
6. <u>A flight of stairs between a stage and the audience seating area and in view of the audience is permitted to have a handrail on one side where the stairs are not required for egress.</u>

Reason: All egress requirements are met without these stairs. The handrails on the inside or center side of stairs to stages are a sightline obstruction. These railings are frequently omitted or removed by users currently. There is still a handrail on one side for a very low utilization stair.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

While there may be a very tiny decrease, within the scope of building a stage and auditorium, the cost is insignificant.

E76-24

E77-24 Part I

IBC: 1011.12, 1011.12.1, 1011.12.2; IFC: [BE] 1011.12, [BE] 1011.12.1, [BE] 1011.12.2

Proponents: Jeffrey Evans, Codified Life Safety, Codified Life Safety (jevans@codifiedlifesafety.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE IBC EGRESS CODE COMMITTEE. PART II WILL BE HEARD BY THE FIRE/WILDLAND-URBAN INTERFACE CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Building Code

Revise as follows:

~~1011.12~~ 1209.4 ~~Stairway to roof~~ Roof spaces.
In *buildings* four or more *stories above grade plane*, one *stairway* shall extend to the roof surface unless the roof has a slope steeper than four units vertical in 12 units horizontal (33-percent slope). Stairways, ship's ladders, alternating tread devices, and ladders required by this section shall be in accordance with Section 1011.

Exception: Other than where required by Section ~~1011.12.1~~ 1209.4.1, in *buildings* without an *occupiable roof* access to the roof from the top *story* shall be permitted to be by an *alternating tread device*, a ship's ladder or a permanent ladder.

~~1011.12.1~~ 1209.4.1 Stairway to elevator equipment.
Roofs and *penthouses* containing elevator equipment that must be accessed for maintenance are required to be accessed by a *stairway*.

~~1011.12.2~~ 1209.4.2 Roof access.
Where a *stairway* is provided to a roof, access to the roof shall be provided through a *penthouse* complying with Section 1511.2.

Exception: In *buildings* without an *occupiable roof* , access to the roof shall be permitted to be a roof hatch or trap door not less than 16 square feet (1.5 m^2) in area and having a minimum dimension of 2 feet (610 mm).

2024 International Fire Code

Revise as follows:

[BE] ~~1011.12 Stairway to roof~~.
~~In buildings four or more stories above *grade plane*, one *stairway* shall extend to the roof surface, unless the roof has a slope steeper than 4 units vertical in 12 units horizontal (33-percent slope).~~

~~**Exception:** Other than where required by Section 1011.12.1, in buildings without an *occupiable roof*, access to the roof from the top story shall be permitted to be by an *alternating tread device*, a ship's ladder or a permanent ladder.~~

[BE] ~~1011.12.1~~ 504.3.1 Stairway to elevator equipment. Roofs and penthouses containing elevator equipment that must be accessed for maintenance are required to be accessed by a *stairway*.

[BE] ~~1011.12.2~~ 504.3.2 Roof access.
Where a *stairway* is provided to a roof, access to the roof shall be provided through a penthouse complying with Section 1511.2 of the International Building Code.

Exception: In buildings without an *occupiable roof*, access to the roof shall be permitted to be a roof hatch or trap door not less than 16 square feet (1.5 m^2) in area and having a minimum dimension of 2 feet (610 mm).

E77-24 Part I

E77-24 Part II

IFC: 504.3

Proponents: Jeffrey Evans, Codified Life Safety, Codified Life Safety (jevans@codifiedlifesafety.com)

2024 International Fire Code

Revise as follows:

504.3 ~~Stairway access~~ Access to roof.
In ~~New~~ new buildings four or more stories above grade plane, ~~except those with a roof slope greater than 4 units vertical in 12 units horizontal (33.3-percent slope), shall be provided with a *stairway* to the roof~~one *stairway* shall extend to the roof surface, unless the roof has a slope steeper than 4 units vertical in 12 units horizontal (33-percent slope). ~~*Stairway* access to the roof shall be in accordance with Section 1011.12~~ Stairways, ship's ladders, alternating tread devices, and ladders required by this section shall be in accordance with Section 1011. Such *stairway* shall be marked at street and floor levels with a sign indicating that the *stairway* continues to the roof. Where the roof is a *vegetative roof*, includes a *landscaped roof* area, or is used or for other purposes, stairways shall be provided as required for such occupancy classification.

> **Exception:** Other than where required by Section ~~1011.12.1~~ 504.3.1, in buildings without an *occupiable roof*, access to the roof from the top story shall be permitted to be by an *alternating tread device*, a ship's ladder or a permanent ladder.

Reason: In order to align with other code provisions requiring access to unoccupied spaces, the provisions requiring unoccupied roof access are proposed to be moved to IBC Section 1209/IFC Section 504.3, with reference to Section 1011 for how the elements of such access are to be provided. Whereas Section 1011 is dedicated to specifications for *how* stairways, alternating tread devices, ship's ladders, and ladders are to be provided, it does not make sense to include provisions on *when* stairways are required in this section, particularly when sections addressing building access are provided elsewhere. Further, as it is understood that the provisions for roof access (notably not referred to as roof egress) are intended to facilitate building maintenance, rooftop equipment repair, and fire department access, it is misleading for the provisions to be located in the means of egress chapter. Means of egress for occupiable roofs is already appropriately addressed in Sections 1004.7, 1006.1, 1006.3, and 1009.2.1.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

> This proposal relocates the provisions to a more logical place in the code aligning with similar provisions. There is no change to the technical content of the provisions. By modifying the section numbers only, there will be no cost impact when approving this proposal.

E77-24 Part II

E78-24

IBC: 1013.6, 1013.6.1, 1013.6.2 (New), FIGURE 1013.6.2 (New), 1013.6.2.1 (New), 1013.6.3 (New), 1013.6.2, 1013.6.3; IFC: [BE] 1013.6, [BE] 1013.6.1, 1013.6.2 (New), FIGURE 1013.6.2 (New), 1013.6.2.1 (New), 1013.6.3 (New), [BE] 1013.6.2, [BE] 1013.6.3

Proponents: Scott Brody, None (sbrody96@gmail.com)

2024 International Building Code

Revise as follows:

1013.6 Externally illuminated exit signs.
Externally illuminated exit signs shall comply with Sections 1013.6.1 through ~~1013.6.3~~ 1013.6.5.

1013.6.1 ~~Graphics~~ Exit text.
Every textual exit sign and directional exit sign shall have plainly legible letters not less than 6 inches (152 mm) high with the principal strokes of the letters not less than $^{3}/_{4}$ inch (19.1 mm) wide. The word "EXIT" shall have letters having a width not less than 2 inches (51 mm) wide, except the letter "I," and the minimum spacing between letters shall be not less than $^{3}/_{8}$ inch (9.5 mm). Signs larger than the minimum established in this section shall have letter widths, strokes and spacing in proportion to their height.The word "EXIT" shall be in high contrast with the background and shall be clearly discernible when the means of exit sign illumination is or is not energized. If a chevron directional indicator is provided as part of the exit sign, the construction shall be such that the direction of the chevron directional indicator cannot be readily changed.Exit text shall be permitted to be displayed in multiple languages. In these situations, and in jurisdictions utilizing non-Latin scripts, the size of text, and its placement with respect to directional indicators, shall be *approved*.

Add new text as follows:

1013.6.2 Exit symbols. Graphical symbol exit signs shall be based on Figure 1013.6.2 and the symbol shall be a minimum of 5.91 inches (150 mm) high.

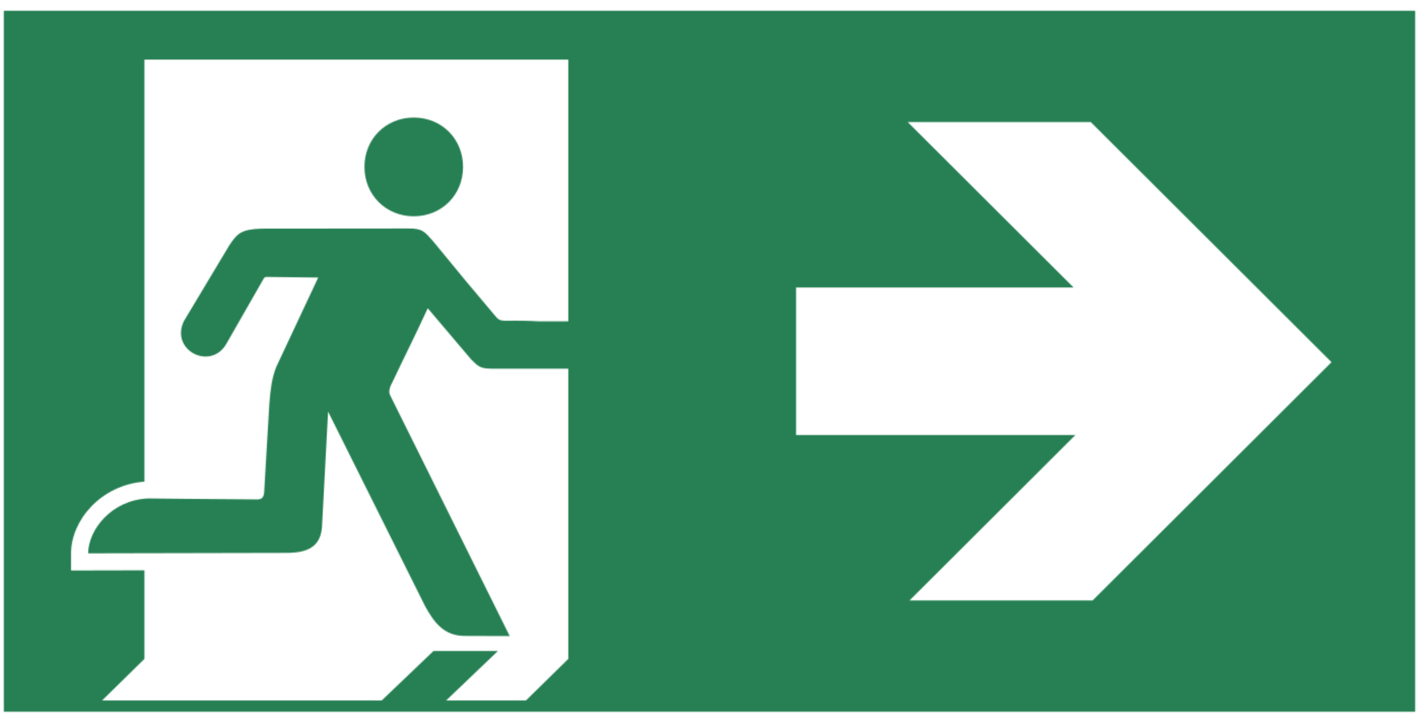


FIGURE 1013.6.2 Graphic exit symbol

1013.6.2.1 Detail proportions and color requirements. The proportions of the graphic exit symbol, and the size and positioning of any arrow, shall be in accordance with UL 924. The color of the doorway and arrow shall be white. The background and person moving through the doorway shall be green.

1013.6.3 Textual and graphic symbol exit signs. Exit signs shall include the graphic symbol or a combination of the text and graphic symbol. Where text and symbol are both provide they shall be displayed simultaneously. The text shall not obstruct the symbol or arrow. The exit text and symbols shall be on one sign or two adjacent signs.

Revise as follows:

~~1013.6.2~~ 1013.6.4 Exit sign illumination.
The face of an exit sign illuminated from an external source shall have an intensity of not less than 5 footcandles (54 lux).

~~1013.6.3~~ 1013.6.5 Power source.
Exit signs shall be illuminated at all times. To ensure continued illumination for a duration of not less than 90 minutes in case of primary power loss, the sign illumination means shall be connected to an emergency power system provided from storage batteries, unit equipment or an on-site generator. The installation of the *emergency power system* shall be in accordance with Chapter 27. Group I-2, Condition 2 exit sign illumination shall not be provided by unit equipment batteries only.

> **Exception:** *Approved* exit sign illumination types that provide continuous illumination independent of external power sources for a duration of not less than 90 minutes, in case of primary power loss, are not required to be connected to an emergency electrical system.

2024 International Fire Code

Revise as follows:

[BE] 1013.6 Externally illuminated exit signs.
Externally illuminated exit signs shall comply with Sections 1013.6.1 through ~~1013.6.3~~ 1013.6.5.

[BE] 1013.6.1 ~~Graphics~~ Exit text. Every textual exit sign and directional exit sign shall have plainly legible letters not less than 6 inches (152 mm) high with the principal strokes of the letters not less than $^3/_4$ inch (19.1 mm) wide. The word “EXIT” shall have letters having a width not less than 2 inches (51 mm) wide, except the letter “I,” and the minimum spacing between letters shall be not less than $^3/_8$ inch (9.5 mm). Signs larger than the minimum established in this section shall have letter widths, strokes and spacing in proportion to their height.The word “EXIT” shall be in high contrast with the background and shall be clearly discernible when the means of exit sign illumination is or is not energized. If a chevron directional indicator is provided as part of the exit sign, the construction shall be such that the direction of the chevron directional indicator cannot be readily changed.Exit text shall be permitted to be displayed in multiple languages. In these situations, and in jurisdictions utilizing non-Latin scripts, the size of text, and its placement with respect to directional indicators, shall be *approved*.

Add new text as follows:

1013.6.2 Exit symbols. Graphical symbol exit signs shall be based on Figure 1013.6.2 and the symbol shall be a minimum of 5.91 inches (150 mm) high.

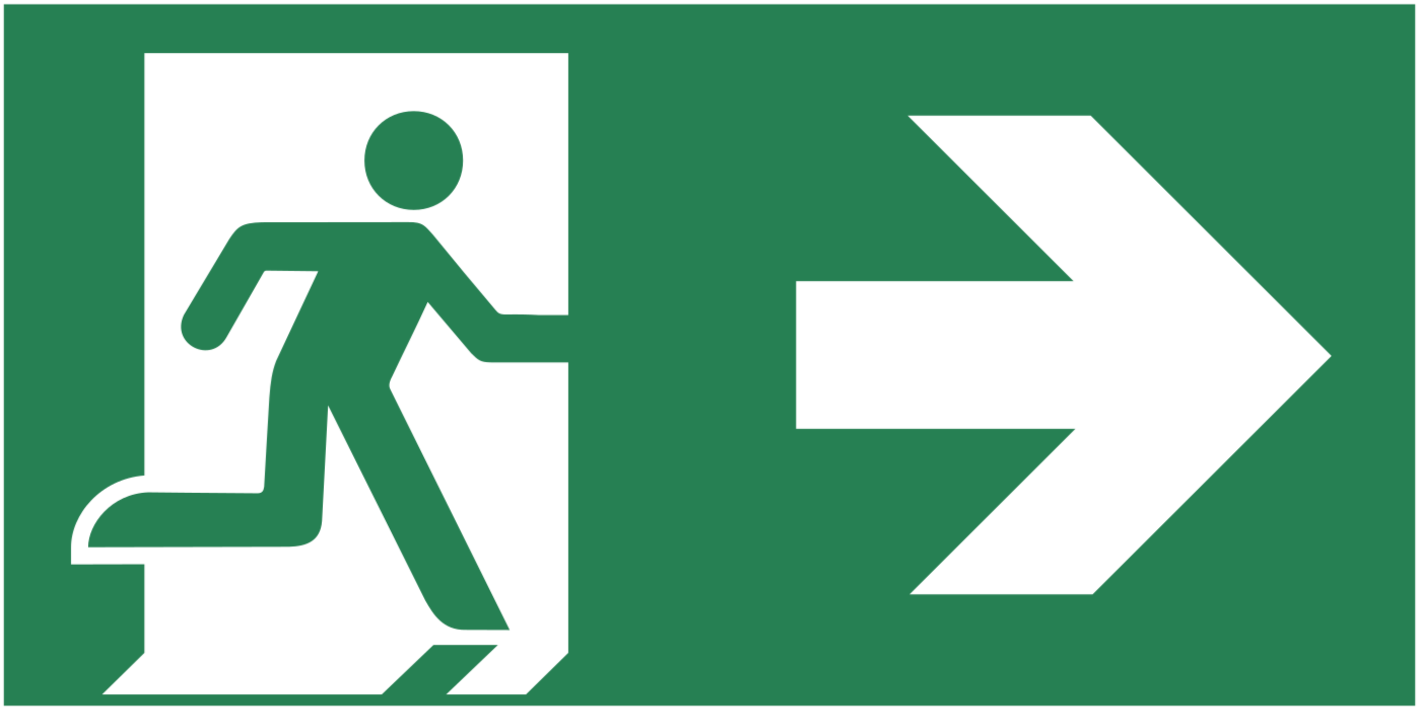


FIGURE 1013.6.2 Graphic exit symbol

1013.6.2.1 Detail proportions and color requirements. The proportions of the graphic exit symbol, and the size and positioning of any arrow, shall be in accordance with UL 924. The color of the doorway and arrow shall be white. The background and person moving through the doorway shall be green.

1013.6.3 Textual and graphic symbol exit signs. Exit signs shall include the graphic symbol or a combination of the text and graphic symbol. Where text and symbol are both provide they shall be displayed simultaneously. The text shall not obstruct the symbol or arrow. The exit text and symbols shall be on one sign or two adjacent signs.

Revise as follows:

[BE] ~~1013.6.2~~ 1013.6.4 Exit sign illumination.
The face of an exit sign illuminated from an external source shall have an intensity of not less than 5 footcandles (54 lux).

[BE] ~~1013.6.3~~ 1013.6.5 Power source.
Exit signs shall be illuminated at all times. To ensure continued illumination for a duration of not less than 90 minutes in case of primary power loss, the sign illumination means shall be connected to an emergency power system provided from storage batteries, unit equipment or an on-site generator. The installation of the emergency power system shall be in accordance with Section 1203. Group I-2, Condition 2 exit sign illumination shall not be provided by unit equipment batteries only.

Exception: *Approved* exit sign illumination types that provide continuous illumination independent of external power sources for a duration of not less than 90 minutes, in case of primary power loss, are not required to be connected to an emergency electrical system.

Attached Files

- **10382 Exit sign code change narrative without vessels.pdf**
  https://www.cdpaccess.com/proposal/10382/30651/files/download/4773/

Reason: Fixes violations of Code Council Policy #49-21, because the current language:

- Precludes the code from being adopted in certain situations internationally.

· Conflicts with International Law: World Trade Organization Technical Barriers to Trade Agreement Article 2.4

Improves safety because:

o The human brain is better at recalling information when it is presented visually.

o Symbols have faster glance recognition versus words.

o Foreigners, small children, and people with certain disabilities can better understand symbolic communication.

o People in nations using the I-codes will gain exposure to the exit symbol used in most of the world, thus they will be better prepared for emergencies while traveling abroad.

o The ISO arrow is far more legible at a distance vs the tiny chevron directional indicator referenced in the current code.

o Large ISO-type arrows can be more clearly X'd out on dynamic exit signs, which may be coming in the future.

o The proposed language also encourages and incentivizes placing door numbers on signs, which make it easier for emergency services to know what door to arrive at, without the caller having to go outside, look for a door number, and potentially get locked out.

My proposal thus takes advantage of the benefits of symbols, while providing reasonable options for supplemental text to support symbol learning where this type of exit sign has not yet been introduced (mainly the US).

Bibliography: See attachment for bibliography and further justification.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

An example of the cost of an exit sign is $20. The total cost for the building is dependent on the number of exit signs required. If you can save even a small amount on each sign, that could be a significant savings for the building.

Estimated Immediate Cost Impact Justification (methodology and variables):

Because this change provides increased flexibility, it is expected costs will be lower in some cases. This is especially true for prefabricated structures, for example jet bridges, which would not have to be imported with separate exit signs for the US market.

For ordinary externally illuminated exit signs, there is potential for cost savings because customers will be able to shop on the global marketplace for ISO signs, vs the smaller market for text signs. This could result in even higher savings in non-English speaking places using this code, because there may be a limited number of manufacturers selling signs in languages with few speakers.

For exit text and symbol signs, the costs would depend on what the AHJ requires. For example, if the AHJ only mandates small exit text, a label could be placed on top of the sign, which could cost in the range of cents more per sign. If the AHJ requires larger text, the sign could wind up larger than the existing standard. Since many sign producers charge based on the surface area of the sign, costs could be expected to be higher than existing norms. However, there would still be 0$ required cost to the builder since they retain the option to continue using text only signs. In the event custom information is added to the sign, such as door numbers, this would be expected to be more expensive than the current sign configuration. It would also generally require larger signs. Since this is only being proposed as an option, it would result in no additional cost if the building owner did not wish to exercise such rights.

Because of the multitude of factors impacting safety, and various conditions in different nations, it is not possible to definitively quantify the safety costs vs benefits of ISO exit signs, vs the current IFC standard.

Since most exit signs are internally illuminated, and these changes apply only to externally illuminated signs, the overall cost impact can be expected to be limited.

E78-24

E79-24

IBC: 1014.4, 1014.5; IFC: [BE] 1014.4, [BE] 1014.5

Proponents: David Cooper, Stair Manufacturing and Design Consultants, Stairbuilders and Manufacturers Association, SMA (coderep@stairways.org)

2024 International Building Code

Revise as follows:

1014.4 Handrail graspability.
Required *handrails* shall comply with Section 1014.4.1 or shall provide equivalent graspability.

~~Exception~~ Exceptions:

1. In Group R-3 occupancies; within *dwelling units* in Group R-2 occupancies; and in Group U occupancies that are accessory to a Group R-3 occupancy or accessory to individual *dwelling units* in Group R-2 occupancies; *handrails* shall be Type I in accordance with Section 1014.4.1, Type II in accordance with Section 1014.4.2 or shall provide equivalent graspability.
2. Where handrails are provided along walking surfaces with slopes not steeper than 1:20, *handrails* shall be Type I in accordance with Section 1014.4.1, Type II in accordance with Section 1014.4.2 or shall provide equivalent graspability.

1014.4.1 Type I.
Handrails with a circular cross section shall have an outside diameter of not less than $1^{1}/_{4}$ inches (32 mm) and not greater than 2 inches (51 mm). Where the *handrail* is not circular, it shall have a perimeter dimension of not less than 4 inches (102 mm) and not greater than $6^{1}/_{4}$ inches (160 mm) with a maximum cross-sectional dimension of $2^{1}/_{4}$ inches (57 mm) and minimum cross-sectional dimension of 1 inch (25 mm). Edges shall have a minimum radius of 0.01 inch (0.25 mm).

1014.4.2 Type II.
Handrails with a perimeter greater than $6^{1}/_{4}$ inches (160 mm) shall provide a graspable finger recess area on both sides of the profile. The finger recess shall begin within a distance of $^{3}/_{4}$ inch (19 mm) measured vertically from the tallest portion of the profile and achieve a depth of not less than $^{5}/_{16}$ inch (8 mm) within $^{7}/_{8}$ inch (22 mm) below the widest portion of the profile. This required depth shall continue for not less than $^{3}/_{8}$ inch (10 mm) to a level that is not less than $1^{3}/_{4}$ inches (45 mm) below the tallest portion of the profile. The width of the *handrail* above the recess shall be not less than $1^{1}/_{4}$ inches (32 mm) to not greater than $2^{3}/_{4}$ inches (70 mm). Edges shall have a minimum radius of 0.01 inch (0.25 mm).

Revise as follows:

1014.5 Continuity.
Handrail gripping surfaces shall be continuous, without interruption by newel posts or other obstructions.

Exceptions:

1. Within a *dwelling* unit that is not an *Accessible unit* or *Type A unit*, the continuity of handrail gripping surfaces is allowed to be interrupted by a newel post at a turn or landing.
2. Within a *dwelling unit*, the use of a volute, turnout, starting easing or starting newel is allowed over the lowest tread.
3. ~~Handrail brackets or balusters~~Supports attached to the bottom surface of the *handrail* that do not project horizontally beyond the sides of the *handrail* within $1^{1}/_{2}$ inches (38 mm) of the bottom of ~~the~~Type I *handrails* shall not be considered obstructions. For each $^{1}/_{2}$ inch (12.7 mm) of additional handrail perimeter dimension of Type I handrails above 4 inches (102 mm), the vertical clearance dimension of $1^{1}/_{2}$ inches (38 mm) shall be permitted to be reduced by $^{1}/_{8}$ inch (3.2 mm). The entire length of Type II handrails shall be permitted to be obstructed provided any horizontal projection of the supports beyond the sides of the handrail are below the required recess.
4. ~~Where *handrails* are provided along walking surfaces with slopes not steeper than 1:20, the bottoms of the handrail gripping surfaces shall be permitted to be obstructed along their entire length where they are integral to crash rails or bumper *guards*.~~

4~~5~~. *Handrails* serving stepped *aisles* or ramped *aisles* are permitted to be discontinuous in accordance with Section 1030.16.1.

2024 International Fire Code

Revise as follows:

[BE] 1014.4 Handrail graspability.
Required *handrails* shall comply with Section 1014.4.1 or shall provide equivalent graspability.

Exception Exceptions:

1. In Group R-3 occupancies; within *dwelling units* in Group R-2 occupancies; and in Group U occupancies that are accessory to a Group R-3 occupancy or accessory to individual *dwelling units* in Group R-2 occupancies; *handrails* shall be Type I in accordance with Section 1014.4.1, Type II in accordance with Section 1014.4.2 or shall provide equivalent graspability.
2. Where handrails are provided along walking surfaces with slopes not steeper than 1:20, *handrails* shall be Type I in accordance with Section 1014.4.1, Type II in accordance with Section 1014.4.2 or shall provide equivalent graspability.

[BE] 1014.4.1 Type I. *Handrails* with a circular cross section shall have an outside diameter of not less than $1^{1}/_{4}$ inches (32 mm) and not greater than 2 inches (51 mm). Where the *handrail* is not circular, it shall have a perimeter dimension of not less than 4 inches (102 mm) and not greater than $6^{1}/_{4}$ inches (160 mm) with a maximum cross-sectional dimension of $2^{1}/_{4}$ inches (57 mm) and minimum cross-sectional dimension of 1 inch (25 mm). Edges shall have a minimum radius of 0.01 inch (0.25 mm).

[BE] 1014.4.2 Type II. *Handrails* with a perimeter greater than $6^{1}/_{4}$ inches (160 mm) shall provide a graspable finger recess area on both sides of the profile. The finger recess shall begin within a distance of $^{3}/_{4}$ inch (19 mm) measured vertically from the tallest portion of the profile and achieve a depth of not less than $^{5}/_{16}$ inch (8 mm) within $^{7}/_{8}$ inch (22 mm) below the widest portion of the profile. This required depth shall continue for not less than $^{3}/_{8}$ inch (10 mm) to a level that is not less than $1^{3}/_{4}$ inches (45 mm) below the tallest portion of the profile. The width of the *handrail* above the recess shall be not less than $1^{1}/_{4}$ inches (32 mm) to not greater than $2^{3}/_{4}$ inches (70 mm). Edges shall have a minimum radius of 0.01 inch (0.25 mm).

Revise as follows:

[BE] 1014.5 Continuity.
Handrail gripping surfaces shall be continuous, without interruption by newel posts or other obstructions.

Exceptions:

1. Within a *dwelling* unit that is not an *Accessible unit* or *Type A unit*, the continuity of handrail gripping surfaces is allowed to be interrupted by a newel post at a turn or landing.
2. Within a *dwelling unit*, the use of a volute, turnout, starting easing or starting newel is allowed over the lowest tread.
3. ~~Handrail brackets or balusters~~Supports attached to the bottom surface of the *handrail* that do not project horizontally beyond the sides of the *handrail* within $1^{1}/_{2}$ inches (38 mm) of the bottom of ~~the~~Type I *handrails* shall not be considered obstructions. For each $^{1}/_{2}$ inch (12.7 mm) of additional handrail perimeter dimension of Type I handrails above 4 inches (102 mm), the vertical clearance dimension of $1^{1}/_{2}$ inches (38 mm) shall be permitted to be reduced by $^{1}/_{8}$ inch (3.2 mm). The entire length of Type II handrails shall be permitted to be obstructed provided any horizontal projection of the supports beyond the sides of the handrail are below the required recess.
4. ~~Where *handrails* are provided along walking surfaces with slopes not steeper than 1:20, the bottoms of the handrail gripping surfaces shall be permitted to be obstructed along their entire length where they are integral to crash rails or bumper *guards*.~~

4~~5~~. *Handrails* serving stepped *aisles* or ramped *aisles* are permitted to be discontinuous in accordance with Section 1030.16.1.

Reason: Overview:

This proposal offers changes to both **1014.5 Continuity** and **1014.4 Handrail graspability** to provide a gripping surface at in hallways of Health Care and Nursing Facilities where it is currently not required by the code.

Although handrails are not required the code allows for imposters to be provided at critical locations where they are needed. Crash rails and bumper guards are in fact used as handrails and relied upon by the occupants of hospitals, nursing homes and health care facilities for the functions of guidance and support as defined in the I-Codes. They are common in hallways throughout these facilities where the slope is not steeper than 1:20. These elements are typically larger, more visible and inviting to the occupants that are most frequently in need of mobility aids. The code offers no provision for a graspable surface but instead, in the absence of such, elicits a deceptive invitation to potential accident by default. These crash rails and bumper guards are typically taller in vertical dimension and larger in perimeter restricting access to the bottom of the rail to attain a grasp. Consequently, the current exception 4 to handrail continuity eliminates any graspable surface by allowing the entire bottom of the rail to be completely obstructed. The option to completely obstruct the bottom of the handrail has been justified as being critical to cost effective installation of the needed crash rails and bumper guards.

Handrail Graspability:

The new exception 2 to handrail graspability is added to ensure that although not required, where handrails are provided along horizontal walking surfaces that are sloped less than 1:20, a functional gripping surface is provided. Although handrails are not required at these locations, they are in fact used as handrails as defined in the I-Codes:

> **Handrail.** A horizontal or slopping rail intended for grasping by the hand for guidance or support.

Exception 2 provides for the use of Type II handrails that have been in the I-Codes for more than 20 years. Type II handrails provide a power span grip surface that is equivalent to 2-inch diameter Type I handrail, been in the I-codes for more than 20 years. Type II handrails have the distinct advantage of a continuous gripping surface that is not interrupted by supports that cause the typical grip and release hand-hopping at each support that is prevalent when trying to maintain continuous contact with the bottom gripping surface critical to the functionality of Type I handrails.

Continuity:

Changes to Exception 3…

Handrails are often supported by elements that may be panels or other objects not best described as brackets or balusters and the substitution of the general term “supports” clarifies the intent of the requirement. Currently exception 3 is worded to address the limitations of small perimeter handrails that require access to the bottom of the handrail to gain a functional grip. This should only apply to Type I handrails that must rely upon grasping the bottom of the handrail. We have inserted specific references to Type I profiles.

Type II handrails are larger in perimeter and have specific recesses designed to provide grip surfaces that need not rely on grasping the bottom of the handrail. They are not dependent upon wrapping the fingers around the bottom surface of the handrail. The new sentence inserted at the end of exception 3 clearly recognizes the unique difference between Type I and Type II handrails. Type II handrails provide an uninterrupted gripping surface not attainable with Type I gripping surfaces that are interrupted by supports attached to the bottom of the handrail.

Changes to Exception 4

Exception 4 has been deleted to assure that where provided the rail that is used as a handrail provides no less than the functionality of a Type II handrail. The design of a Type II gripping surface can easily permit obstruction of the surface below the graspable recesses and allow for the rail to also function as a crash rail or bumper guard that needs to be larger in height and perimeter prohibiting use of a Type I gripping surface as a reasonable or cost-effective solution. However, if desired this proposal does not restrict the use of Type I handrails. This change will provide for the safety of occupants without an increase in the cost of construction. Rail profiles are molded of wood or extruded from other materials. The cost is not affected by the change of profile and will not affect the cost of installation.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Handrails shapes are extruded or moulded in a lineal process where the shape does not affect cost other than the difference in material. Less material would be used in an extrusion to create the required recesses of Type II profiles. Wood mouldings would use the same amount of material but remove more when shaped to create the required recesses.

E79-24

E80-24

IBC: 1014.4.1; IFC: [BE] 1014.4.1

Proponents: Thomas Zuzik Jr, RailingCodes.com, National Ornamental & Miscellaneous Metals Association (NOMMA.org) (coderep@railingcodes.com)

2024 International Building Code

1014.4 Handrail graspability.
Required *handrails* shall comply with Section 1014.4.1 or shall provide equivalent graspability.

> **Exception:** In Group R-3 occupancies; within *dwelling units* in Group R-2 occupancies; and in Group U occupancies that are accessory to a Group R-3 occupancy or accessory to individual *dwelling units* in Group R-2 occupancies; *handrails* shall be Type I in accordance with Section 1014.4.1, Type II in accordance with Section 1014.4.2 or shall provide equivalent graspability.

Revise as follows:

1014.4.1 Type I.
Handrails with a circular cross section shall have an outside diameter of not less than $1^1/_4$ inches (32 mm) and not greater than 2 inches (51 mm). Where the *handrail* is not circular, it shall have a perimeter dimension of not less than 4 inches (102 mm) and not greater than $6^1/_4$ inches (160 mm) with a maximum cross-sectional dimension of $2^1/_4$ inches (57 mm) and a minimum ~~cross-sectional~~ horizontal width dimension of 1 inch (25 mm). Edges shall have a minimum radius of 0.01 inch (0.25 mm).

2024 International Fire Code

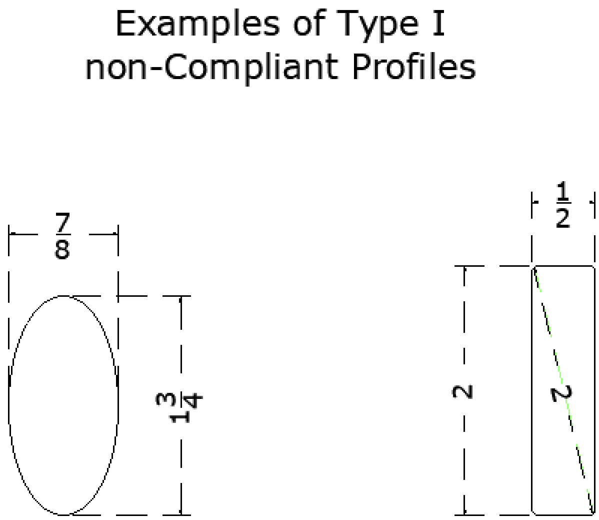
[BE] 1014.4 Handrail graspability.
Required *handrails* shall comply with Section 1014.4.1 or shall provide equivalent graspability.

> **Exception:** In Group R-3 occupancies; within *dwelling units* in Group R-2 occupancies; and in Group U occupancies that are accessory to a Group R-3 occupancy or accessory to individual *dwelling units* in Group R-2 occupancies; *handrails* shall be Type I in accordance with Section 1014.4.1, Type II in accordance with Section 1014.4.2 or shall provide equivalent graspability.

Revise as follows:

[BE] 1014.4.1 Type I. *Handrails* with a circular cross section shall have an outside diameter of not less than $1^1/_4$ inches (32 mm) and not greater than 2 inches (51 mm). Where the *handrail* is not circular, it shall have a perimeter dimension of not less than 4 inches (102 mm) and not greater than $6^1/_4$ inches (160 mm) with a maximum cross-sectional dimension of $2^1/_4$ inches (57 mm) and a minimum ~~cross-sectional~~ horizontal width dimension of 1 inch (25 mm). Edges shall have a minimum radius of 0.01 inch (0.25 mm).

Reason: In the 2012 model IBC, section 1012.3.1 Type I. handrails added the new clarifying text of "and minimum cross-sectional dimension of 1-inch (25mm).", to the end of the existing 2 1/4-inch maximum cross-sectional, text. This new minimum cross section dimension of 1-inch was added to specifically to limit the use of thinner Type I handrail profiles being installed in a vertical direction as shown in Sketch RC-02 below.



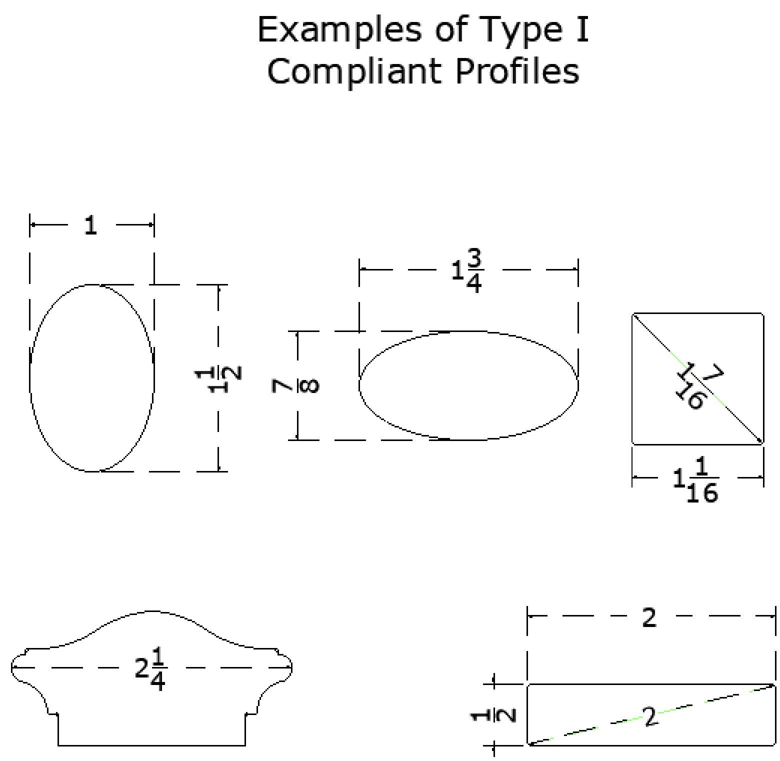
SKETCH RC-02

Of late a limited number of AHJ have been interpreting the minimum limit to be a 2nd dimensional measurement for both horizontal and vertical.

When the author of this proposed modification to clarify the minimum 1-inch dimension was on the hearing floor and testified in favor of E98-09/10, for the addition of the 1-inch minimum width, it was in support to prevent thinner width vertical handrail profiles, from being installed, not to add a 2nd vertical height dimensional requirement, that a limited number of AHJ are now questioning if applies.

Sketch RC-01 shows a group of compliant Type I handrail profiles, of which 2 of the profiles when turned vertical would not comply as

depicted in Sketch RC-02 above.



SKETCH RC-01

The proposed deletion of term cross-sectional and replacement with the term horizontal, this author believes eliminates the new arising questions about the minimum and better aligns with what this author believes was the intent of the minimum dimension.

To better explain this point, the following quote is from the original proposal E98-09/10 reason statement.

- "Try doing a chin up or pull up on a 1-1/2" diameter tube versus a 3/8" x 2" steel bar having the 2 inch dimension oriented vertically."

Additionally, since the addition of the new text in the 2012 model IBC, the ICC A117.1 has published the 2017 edition with no addition to the text for a minimum cross-sectional, nor was a proposal submitted for this minimum to be added in the current A117.1 cycle started in 2022.

Bibliography:

- ICC Model 2009 IBC
  - Section 1012.3.1 Type I. Handrails
- ICC Model 2012 IBC
  - Section 1012.3.1 Type I. Handrails
- ICC Model 2024 IBC
  - Section 1014.4.1 Type I. Handrails
- ICC A117.1
  - Section 505.7 Cross section. Handrails
  - Section 505.7.2 Noncircular cross sections.
- 2010 ADA Standard
  - Section 505.7 Cross section. Handrails
  - Section 505.7.2 Noncircular cross sections.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

There is no cost impact to the built environment with this code change, as this proposal is cleaning up terminology for required elements of the code for Type I handrails.

E80-24

E81-24

IBC: 1014.4.1; IFC: [BE] 1014.4.1

Proponents: David Cooper, Stair Manufacturing and Design Consultants, Stairbuilders and Manufacturers Association, SMA (coderep@stairways.org)

2024 International Building Code

Revise as follows:

1014.4.1 Type I.
Handrails with a circular cross section shall have an outside diameter of not less than $1^1/_4$ inches (32 mm) and not greater than 2 inches (51 mm). Where the *handrail* is not circular, it shall have a perimeter dimension of not less than 4 inches (102 mm) and not greater than $6^1/_4$ inches (160 mm) with a maximum cross-sectional dimension of $2^1/_4$ inches (57 mm). The minimum horizontal cross section shall be 1 inch (25 mm) and a the height of the maximum vertical cross-section shall be not less than of 5/8 inch (16 mm) ~~and minimum cross-sectional dimension of 1 inch (25 mm)~~. Edges shall have a minimum radius of 0.01 inch (0.25 mm).

2024 International Fire Code

Revise as follows:

[BE] 1014.4.1 Type I. *Handrails* with a circular cross section shall have an outside diameter of not less than $1^1/_4$ inches (32 mm) and not greater than 2 inches (51 mm). Where the *handrail* is not circular, it shall have a perimeter dimension of not less than 4 inches (102 mm) and not greater than $6^1/_4$ inches (160 mm) with a maximum cross-sectional dimension of $2^1/_4$ inches (57 mm). The minimum horizontal cross section shall be 1 inch (25 mm) and a the height of the maximum vertical cross-section shall be not less than of 5/8 inch (16 mm) ~~and minimum cross-sectional dimension of 1 inch (25 mm)~~. Edges shall have a minimum radius of 0.01 inch (0.25 mm).

Attached Files

- **E98 - 09-10 Type 1 code change.pdf**
  https://www.cdpaccess.com/proposal/9669/29918/files/download/4115/

Reason: The current text related to non-circular profiles is being interpreted such that the handrail profile must comply with both the maximum cross-section and minimum cross section regardless of the orientation of the handrail. This was not the intent of the original proposal E98-09/10, included here, as approved for inclusion in the 2012 IBC. The intent was to eliminate the possible use of thin profiles in the vertical orientation.

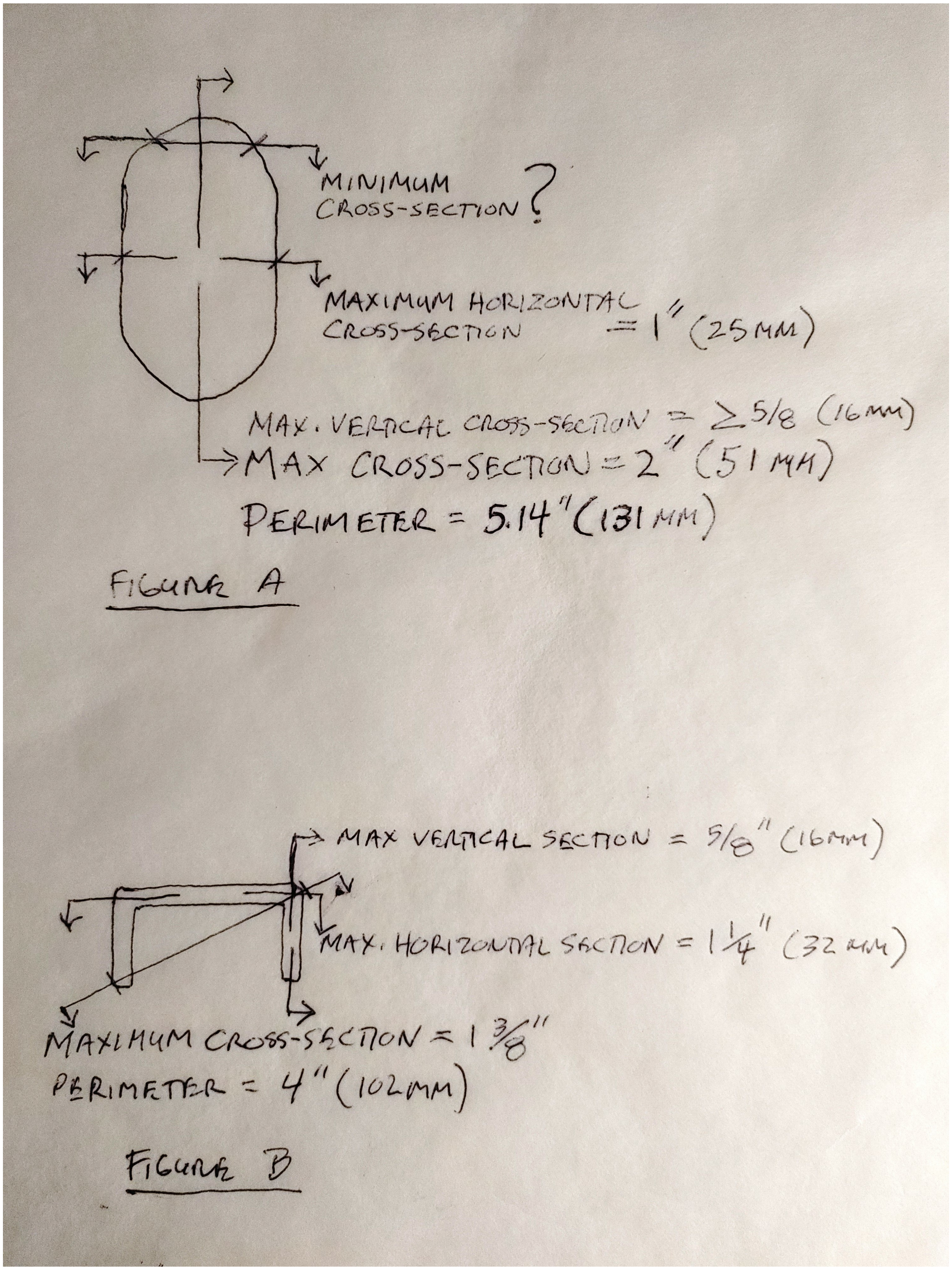
A minimum cross section can be determined at any point in any direction. Consider shapes with large corner radii, ovals, or elliptical sections. Such profiles in both the horizontal and vertical orientation provide suitable access to the bottom of the rail to attain graspability. However, the minimum cross section could be taken at the narrow end of an ellipse or oval as in Figure A. An oval with a 1 inch maximum horizontal cross-section would have a minimum cross-section of far less than an inch at any either end and be reason to reject one of the most graspable non-circular Type I handrail profiles.

Requiring the maximum vertical cross-section to be not less than 5/8 inch restricts thin profiles that would be objectionable when transverse pressure is applied but allows for common channels as in Figure B and traditional metal profiles with long accepted functionality.

The intent of the proponent of E98-09/10 would have been more aptly served had the cross-section language been limited to the horizontal cross-section and a vertical cross-section as proposed here. These dimensions combined with the perimeter range of 4 – 6 ¼ inches and the maximum cross-section provide the necessary controls essential to graspability of Type I non-circular profiles without inhibiting freedom of design.

The 1-inch minimum cross section was never proposed for the IRC where Type II profiles are prominent. Type II rails have the advantage of graspable recesses located to engage the finger and thumb in a power span grip that does not require access to the bottom of the handrail. This is especially important where the handrail typically serves as the top of the guard and is often supported by balusters/guard in-fill, more than just brackets that interrupt the bottom surface. By providing a minimum width for a Type I non-circular profile the supports at the bottom of the handrail may be less objectionable which is a serious issue with any Type one profiles causing hand hoping rather than a continuous grasp.

This change is essential to correct an anomaly in the interpretation of the graspability of non-circular type I handrail profiles.



Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal provides additional technical requirements to better regulate the shape of Type I handrails however the added requirements have no material affect upon the cost of construction.

E82-24

IBC: 1014.5, 1014.6, 1014.8; IFC: [BE] 1014.5, [BE] 1014.6, BE] 1014.8

Proponents: Thomas Zuzik Jr, RailingCodes.com, National Ornamental & Miscellaneous Metals Association (NOMMA.org) (coderep@railingcodes.com)

2024 International Building Code

Revise as follows:

~~1014.8~~1014.5 Clearance.
Clear space between a *handrail* and a wall or other surface shall be not less than $1\frac{1}{2}$ inches (38 mm). A *handrail* and a wall or other surface adjacent to the *handrail* shall be free of any sharp or abrasive elements.

Exceptions:

1. A decrease in the clearance due to the curvature or angle of handrail returns shall be allowed.
2. Mounting flanges not more than $\frac{1}{2}$-inch (12.7 mm) in thickness at the returned ends of handrails shall be allowed.

~~1014.5~~ 1014.6 Continuity. Handrail gripping surfaces shall be continuous~~, without interruption by newel posts or other obstructions.~~ along their length and shall not be obstructed along their tops or sides. Horizontal projections shall occur $1\frac{1}{2}$ inches (38 mm) minimum below the bottom of the handrail's gripping surface and the bottoms of required handrails shall not be obstructed for more than 20 percent of their length, within $1\frac{1}{2}$ inches (38 mm) below the bottom of the handrail's gripping surface.

Exceptions:

1. Within a *dwelling* unit that is not an *Accessible unit* or *Type A unit*, the continuity of handrail gripping surfaces is allowed to be interrupted by a newel post at a turn or landing.
2. Within a *dwelling unit*, the use of a volute, turnout, starting easing or starting newel is allowed over the lowest tread.
3. ~~Handrail brackets or balusters attached to the bottom surface of the *handrail* that do not project horizontally beyond the sides of the *handrail* within $1\frac{1}{2}$ inches (38 mm) of the bottom of the *handrail* shall not be considered obstructions.~~ For each $\frac{1}{2}$ inch (12.7 mm) of additional handrail perimeter dimension above 4 inches (102 mm), the vertical clearance dimension of $1\frac{1}{2}$ inches (38 mm), on the bottom of handrail gripping surfaces, shall be permitted to be reduced by $\frac{1}{8}$ inch (3.2 mm).
4. Where *handrails* are provided along walking surfaces with slopes not steeper than 1:20, the bottoms of the handrail gripping surfaces shall be permitted to be obstructed along their entire length where they are integral to crash rails or bumper *guards*.
5. *Handrails* serving stepped *aisles* or ramped *aisles* are permitted to be discontinuous in accordance with Section 1030.16.1.

1014.7 Handrail extensions.
Handrails shall return to a wall, *guard* or the walking surface or shall be continuous to the *handrail* of an adjacent *flight* of stairs or ramp run. Where *handrails* are not continuous between *flights*, the *handrails* shall extend horizontally not less than 12 inches (305 mm) beyond the top landing nosing and continue to slope for the depth of one tread beyond the bottom tread nosing. At *ramps* where *handrails* are not continuous between runs, the *handrails* shall extend horizontally above the landing 12 inches (305 mm) minimum beyond the top and bottom of ramp runs. The extensions of *handrails* shall be in the same direction of the *flights* of stairs at stairways and the ramp runs at *ramps* and shall extend the required minimum length before any change in direction or decrease in the clearance required by Section 1014.5 or 1014.8 .

Exceptions:

1. *Handrails* within a *dwelling unit* that is not required to be accessible need extend only from the top riser to the bottom riser.
2. *Handrails* serving *aisles* in rooms or spaces used for assembly purposes are permitted to comply with the handrail extensions in accordance with Section 1030.16.

3. *Handrails* for *alternating tread devices* and ships ladders are permitted to terminate at a location vertically above the top and bottom risers. *Handrails* for *alternating tread devices* are not required to be continuous between *flights* or to extend beyond the top or bottom risers.

Revise as follows:

~~1014.6~~ 1014.8 Fittings.
Handrails shall not rotate within their fittings.

2024 International Fire Code

Revise as follows:

[BE] ~~1014.8~~1014.5 Clearance. Clear space between a *handrail* and a wall or other surface shall be not less than $1^1/_2$ inches (38 mm). A *handrail* and a wall or other surface adjacent to the *handrail* shall be free of any sharp or abrasive elements.

Exceptions:

1. A decrease in the clearance due to the curvature or angle of handrail returns shall be allowed.
2. Mounting flanges not more than $^1/_2$-inch (12.7 mm) in thickness at the returned ends of handrails shall be allowed.

[BE] ~~1014.5~~ 1014.6 Continuity.
Handrail gripping surfaces shall be continuous~~, without interruption by newel posts or other obstructions.~~ along their length and shall not be obstructed along their tops or sides. Horizontal projections shall occur $1^1/_2$ inches (38 mm) minimum below the bottom of the handrail's gripping surface and the bottoms of required handrails shall not be obstructed for more than 20 percent of their length, within $1^1/_2$ inches (38 mm) below the bottom of the handrail's gripping surface.

Exceptions:

1. Within a dwelling unit that is not an Accessible unit or Type A unit, the continuity of handrail gripping surfaces is allowed to be interrupted by a newel post at a turn or landing.
2. Within a *dwelling unit*, the use of a volute, turnout, starting easing or starting newel is allowed over the lowest tread.
3. ~~Handrail brackets or balusters attached to the bottom surface of the *handrail* that do not project horizontally beyond the sides of the *handrail* within $1^1/_2$ inches (38 mm) of the bottom of the *handrail* shall not be considered obstructions.~~ For each $^1/_2$ inch (12.7 mm) of additional handrail perimeter dimension above 4 inches (102 mm), the vertical clearance dimension of $1^1/_2$ inches (38 mm), on the bottom of handrail gripping surfaces, shall be permitted to be reduced by $^1/_8$ inch (3.2 mm).
4. Where *handrails* are provided along walking surfaces with slopes not steeper than 1:20, the bottoms of the handrail gripping surfaces shall be permitted to be obstructed along their entire length where they are integral to crash rails or bumper guards.
5. *Handrails* serving stepped *aisles* or ramped *aisles* are permitted to be discontinuous in accordance with Section 1030.16.1.

[BE] 1014.7 Handrail extensions.
Handrails shall return to a wall, guard or the walking surface or shall be continuous to the handrail of an adjacent *flight* of stairs or *ramp* run. Where handrails are not continuous between *flights*, the handrails shall extend horizontally not less than 12 inches (305 mm) beyond the top landing nosing and continue to slope for the depth of one tread beyond the bottom tread nosing. At *ramps* where handrails are not continuous between runs, the handrails shall extend horizontally above the landing 12 inches (305 mm) minimum beyond the top and bottom of *ramp* runs. The extensions of handrails shall be in the same direction of the *flights* of stairs at stairways and the *ramp* runs at *ramps* and shall extend the required minimum length before any change in direction or decrease in the clearance required by Section 1014.5 or 1014.8.

Exceptions:

1. *Handrails* within a *dwelling unit* that is not required to be accessible need extend only from the top riser to the bottom riser.
2. *Handrails* serving *aisles* in rooms or spaces used for assembly purposes are permitted to comply with the handrail extensions in accordance with Section 1030.16.

3. *Handrails* for *alternating tread devices* and ship's ladders are permitted to terminate at a location vertically above the top and bottom risers. *Handrails* for *alternating tread devices* are not required to be continuous between *flights* or to extend beyond the top or bottom risers.

Revise as follows:

[BE] ~~1014.6~~ 1014.8 Fittings. *Handrails* shall not rotate within their fittings.

Reason: This code change proposal is first reorganizing the order of some of the handrail Sections to be more in common with the flow of use and enforcement.

- Section 1014.8 Clearance is moved up in order and renumbered to 1014.5.
- Section 1014.6 Fittings is moved down in the order and renumbered to 1014.8. Section
- Section 1014.5 Continuity is moved down one in the order and renumbered to 1014.6.

Next the renumbered Section 1014.6 Continuity, has been revised to better clarify within the code the following requirements.

- The first sentence has been edited to be clearer and align with the text in ICC 2017 A117.1 Section 505.6 gripping surfaces, and also aligns with the clear text within the 2010ADA for obstructions on the top and sides of the handrail profile.
- This code change brings a known requirement currently buried in the text to light and clearly establishes the minimum $1^1/_2$ inch vertical clearance that the code requires between the underside of the handrails gripping surface and any projections to either side of the handrail.
- The new conditional text for the 20% obstruction limit is a long-standing requirement within both the 2010ADA and the ANSI & ICC's A117.1 current and prior additions. As thus, the adding of this conditional text is in line with standard handrail fabrication requirements already being followed for more than a few decades.
  - What the text brings to the IBC is a uniformity between the 2 long-standing standards and the base building code.
- By incorporating the 20% obstruction language into the main text of 1014.6 Continuity, the first sentence in exception 3 can be removed, as it is no longer needed for brackets or balusters.
- The new additional text proposed in the second sentence of exception 3, better clarifies the allowed decrease for both the bracket projections from the sides and the distance for the 20% stipulation.

This code change proposal better aligns the text of the IBC with how handrails are required to be fabricated and installed on projects.

Bibliography:

- ICC model 2024 International Building Code (IBC)
  - Section 1014 Handrails
- ICC 2017 A117.1 Accessible and Usable Buildings and Facilities
  - Section 505 Handrails
- 2010ADA - ADA Standards for Accessible Design (https://ada.gov/)
  - Section 505 Handrails

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

At first glance this proposal may seem like it has a cost affect on construction, however the majority of the proposal is all editorial in nature with clarifications on requirements already within the scope of the code and or required within the ICC's A117.1 standard and the Federal 2010ADA requirements.

E82-24

E83-24

IBC: 1014.7; IFC: [BE] 1014.7

Proponents: Thomas Zuzik Jr, RailingCodes.com, National Ornamental & Miscellaneous Metals Association (NOMMA.org) (coderep@railingcodes.com)

2024 International Building Code

Revise as follows:

1014.7 Handrail extensions.
Handrails shall return to a wall, *guard* or the walking surface or shall be continuous to the *handrail* of an adjacent *flight* of stairs or ramp run. Where *handrails* are not continuous between *flights*, the *handrails* shall extend horizontally not less than 12 inches (305 mm) beyond the top landing nosing and continue to slope for the depth of one tread beyond the bottom tread nosing. At *ramps* where *handrails* are not continuous between runs, the *handrails* shall extend horizontally above the landing 12 inches (305 mm) minimum beyond the top and bottom of ramp runs. The extensions of *handrails* shall be in the same direction of the *flights* of stairs at stairways and the ramp runs at *ramps* and shall extend the required minimum length before any change in direction ~~or~~ and decrease in the clearance required by Section 1014.5 ~~or~~ and 1014.8.

Exceptions:

1. *Handrails* within a *dwelling unit* that is not required to be accessible need extend only from the top ~~riser~~ nosing to the bottom ~~riser~~ nosing, within the flight.
2. *Handrails* serving *aisles* in rooms or spaces used for assembly purposes are permitted to comply with the handrail extensions in accordance with Section 1030.16.
3. *Handrails* for *alternating tread devices* and ships ladders are permitted to terminate at a location vertically above the top and bottom risers. *Handrails* for *alternating tread devices* are not required to be continuous between *flights* or to extend beyond the top or bottom risers.

2024 International Fire Code

Revise as follows:

[BE] 1014.7 Handrail extensions. Handrails shall return to a wall, guard or the walking surface or shall be continuous to the handrail of an adjacent *flight* of stairs or *ramp* run. Where handrails are not continuous between *flights*, the handrails shall extend horizontally not less than 12 inches (305 mm) beyond the top landing nosing and continue to slope for the depth of one tread beyond the bottom tread nosing. At *ramps* where handrails are not continuous between runs, the handrails shall extend horizontally above the landing 12 inches (305 mm) minimum beyond the top and bottom of *ramp* runs. The extensions of *handrails* shall be in the same direction of the *flights* of stairs at stairways and the ramp runs at *ramps* and shall extend the required minimum length before any change in direction ~~or~~ and decrease in the clearance required by Section 1014.5 ~~or~~ and 1014.8.

Exceptions:

1. *Handrails* within a *dwelling unit* that is not required to be accessible need extend only from the top ~~riser~~ nosing to the bottom ~~riser~~ nosing, within the flight.
2. *Handrails* serving *aisles* in rooms or spaces used for assembly purposes are permitted to comply with the handrail extensions in accordance with Section 1030.16.
3. *Handrails* for *alternating tread devices* and ship's ladders are permitted to terminate at a location vertically above the top and bottom risers. *Handrails* for *alternating tread devices* are not required to be continuous between *flights* or to extend beyond the top or bottom risers.

Reason: In the last code cycle E76-21 worked to align the handrail extensions requirements within the IBC with the requirements of the 2010ADA and 2017 ICC A117.1 standard.

However, 2 points that were brought up during testimony one at the Committee Action Hearings and the second at the Public Comment Hearings were not able to be completed.

In the current text "or" is located within in 2 parts of the text and they should be "and".

- Both are located in the last sentence of 1014.7 Handrail extensions.
  - The requirement within the text has 3 parts that need to be met for the full minimum extension length to be compliant, and remove conflict with the 2010ADA & 2017 A117.1.
  - No change in direction, hence "before any change in direction" the ~~or~~ needs to be removed afterwards and replaced with <u>and,</u> because this is first of the 3 requirements, not one option of 3 choices.
  - next the text "required by Section 1014.5 or 1014.8.", this should have read "required by Section 1014.5 and 1014.8."
    - This is the 2nd important change, as the handrail extension need to meet all 3 of these additional requirements for the full 12 inches before any reductions in clearance or changes in direction.
    - If you watch the videos of both the committee & public comment Hearings listed in the Biography of this proposal, you will clearly see this was the intent and an oversight in the text that needed to be cleaned up this cycle.
- Additionally, though measuring point of the handrail extension was corrected from riser to nosing during the public comment hearings in the main body of the code language, it was not caught in exception 1, thus, the term riser needs to be replaced with the term nosing to be in continuity with the rest of the building code, and the additional text added to the end clarifies within the flight.

Bibliography:

- E76-21 Prior code change cycle - ICC monograph
- ICC 2024 International Building Code
- 2010ADA - ADA Standards for Accessible Design (https://ada.gov/)
- 2017 ICC A117.1 Accessible and Usable Buildings and Facilities
- E76-21 Committee Action Hearings https://www.cdpaccess.com/videos/4370/
- E76-21 Public Comment Hearings https://www.cdpaccess.com/videos/4761/

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

There is no cost impact to the built environment with this code change, as this proposal is cleaning up terminology for required elements of the code.

E83-24

E84-24

IBC: 1014.7; IFC: [BE] 1014.7

Proponents: Eirene Knott, BRR Architecture, BRR Architecture (eirene.knott@brrarch.com)

2024 International Building Code

Revise as follows:

1014.7 Handrail extensions.
Handrails shall return to a wall, *guard* or the walking surface or shall be continuous to the *handrail* of an adjacent *flight* of stairs or ramp run. Where *handrails* are not continuous between *flights*, the *handrails* shall extend horizontally not less than 12 inches (305 mm) beyond the top landing nosing and continue to slope for the depth of one tread beyond the bottom tread nosing. At *ramps* where *handrails* are not continuous between runs, the *handrails* shall extend horizontally above the landing 12 inches (305 mm) minimum beyond the top and bottom of ramp runs. The extensions of *handrails* shall be in the same direction of the *flights* of stairs at stairways and the ramp runs at *ramps* and shall extend the required minimum length before any change in direction or decrease in the clearance required by Section 1014.5 or 1014.8.44

Exceptions:

1. *Handrails* within a *dwelling unit* that is not required to be accessible need extend only from the top riser to the bottom riser.
2. *Handrails* serving *aisles* in rooms or spaces used for assembly purposes are permitted to comply with the handrail extensions in accordance with Section 1030.16.
3. *Handrails* for *alternating tread devices* and ships ladders are permitted to terminate at a location vertically above the top and bottom risers. *Handrails* for *alternating tread devices* are not required to be continuous between *flights* or to extend beyond the top or bottom risers.
4. Handrails that are not required need extend only from the top riser to the bottom riser.

2024 International Fire Code

Revise as follows:

[BE] 1014.7 Handrail extensions.
Handrails shall return to a wall, guard or the walking surface or shall be continuous to the handrail of an adjacent *flight* of stairs or *ramp* run. Where handrails are not continuous between *flights*, the handrails shall extend horizontally not less than 12 inches (305 mm) beyond the top landing nosing and continue to slope for the depth of one tread beyond the bottom tread nosing. At *ramps* where handrails are not continuous between runs, the handrails shall extend horizontally above the landing 12 inches (305 mm) minimum beyond the top and bottom of *ramp* runs. The extensions of handrails shall be in the same direction of the *flights* of stairs at stairways and the *ramp* runs at *ramps* and shall extend the required minimum length before any change in direction or decrease in the clearance required by Section 1014.5 or 1014.8.

Exceptions:

1. *Handrails* within a *dwelling unit* that is not required to be accessible need extend only from the top riser to the bottom riser.
2. *Handrails* serving *aisles* in rooms or spaces used for assembly purposes are permitted to comply with the handrail extensions in accordance with Section 1030.16.
3. *Handrails* for *alternating tread devices* and ship's ladders are permitted to terminate at a location vertically above the top and bottom risers. *Handrails* for *alternating tread devices* are not required to be continuous between *flights* or to extend beyond the top or bottom risers.
4. Handrails that are not required need extend only from the top riser to the bottom riser.

Reason: There are times when a handrail is not required, yet a designer or owner may decide to provide one. For example, per Section

1012.8, if a ramp has a rise of less than 6 inches, only one handrail is required. If a designer chooses to provide a handrail on both sides, do both handrails have to comply with 1014 or does only one need the extension or do any need the extension? There are some code officials that believe that if the handrail is provided, it must comply, whether or not the handrail is required. This language simply clarifies that if the handrail is not required, the extensions are also not required.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Technically, this could reduce the cost of construction if handrail extensions are not required to be provided when the handrail is not required.

E84-24

E85-24

IBC: 1014.8; IFC: [BE] 1014.8

Proponents: Thomas Zuzik Jr, RailingCodes.com, National Ornamental & Miscellaneous Metals Association (NOMMA.org) (coderep@railingcodes.com)

2024 International Building Code

Revise as follows:

1014.8 Clearance.
Clear space between a *handrail* and a wall or other surface shall be not less than $1^1/_2$ inches (38 mm). A *handrail* and a wall or other surface adjacent to the *handrail* shall be free of any sharp or abrasive elements.

~~**Exceptions:**~~

1. ~~A decrease in the clearance due to the curvature or angle of handrail returns shall be allowed.~~
2. ~~Mounting flanges not more than $^1/_2$ inch (12.7 mm) in thickness at the returned ends of handrails shall be allowed.~~

2024 International Fire Code

Revise as follows:

[BE] 1014.8 Clearance. Clear space between a *handrail* and a wall or other surface shall be not less than $1^1/_2$ inches (38 mm). A *handrail* and a wall or other surface adjacent to the *handrail* shall be free of any sharp or abrasive elements.

~~**Exceptions:**~~

1. ~~A decrease in the clearance due to the curvature or angle of handrail returns shall be allowed.~~
2. ~~Mounting flanges not more than $^1/_2$ inch (12.7 mm) in thickness at the returned ends of handrails shall be allowed.~~

Reason: During the 2021 code cycle, code proposal E77-21 added the 2 exceptions into section 1014.8 Clearances with the intention to clarify that these 2 conditions are allowed to be done. However, they have always been allowed to be done in the IBC after the minimum handrail extension is met first. These exceptions now allow for these conditions prior to the minimum handrail extension being met.

The conflict these exceptions have created in the IBC is that neither of these exceptions are allowed to be done prior to the minimum extension length being met, first per Sections 505.5 & 505.6 in the 2017 ICC A117.1 Standard, and prior additions, and second the same Sections 505.5 & 505.6 in the 2010ADA - ADA Standards for Accessible Design.

Additionally, approved code change E76-21 was submitted by this author to specifically clarify in the model 2024 IBC so that the model IBC would no longer be in conflict with these requirements of A117.1 & 2010ADA, and this approved code change last cycle specifically allows these conditions to be done after the minimum extension length is met per Section 1014.7 which added the text, **"and shall extend the required minimum length before any change in direction or decrease in the clearance required by Section 1014.5 or 1014.8.".**

With the clarification last code cycle on handrail extensions (E76-21) approved, these 2 exceptions will only create the loophole in compliance by allowing an exception, that is not allowed by 2010ADA, nor A117.1 within the minimum length of the handrail extension and was specifically at the heart of E76-21 to correct compliance conflicts.

The author understands that the model IBC, A117.1 standard and the 2010ADA are 3 independent documents, however, of the 3, the model IBC has the widest local inspection review being performed, and by aligning the requirements within the model IBC with the a117.1 standard and 2010ADA, not only improves the percentage of compliance with handrails on stair flights and ramps, but removes conflict when all 3 documents have the same requirements of compliance.

We respectfully ask that you approve this proposal to delete the exceptions as they are not needed and only create a looping conflict between the model IBC, 2017 A117.1 & 2010ADA.

Bibliography:

- E76-21 Prior code change cycle - ICC monograph
- E77-21 Prior code change cycle - ICC monograph
- ICC 2024 International Building Code
- 2010ADA - ADA Standards for Accessible Design (https://ada.gov/)
- 2017 ICC A117.1 Accessible and Usable Buildings and Facilities
- E76-21 Committee Action Hearings https://www.cdpaccess.com/videos/4370/
- E76-21 Public Comment Hearings https://www.cdpaccess.com/videos/4761/
- E77-21 Committee Action Hearings https://www.cdpaccess.com/videos/4373/

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposed code change does not change any cost, as it only aligns and clarifies the IBC with the required parameters within A117.1 & 2010ADA.

E85-24

E86-24

IBC: 1014.10; IFC: [BE] 1014.10

Proponents: Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org)

2024 International Building Code

Revise as follows:

1014.10 Intermediate handrails.
Stairways with a required width of greater than 60 inches, shall have intermediate *handrails* located in such a manner that all portions of the *stairway* minimum width or required capacity are within 30 inches (762 mm) of a *handrail*. On monumental *stairs*, where intermediate handrails are required, *handrails* shall be located along the most direct path of egress travel.

2024 International Fire Code

Revise as follows:

[BE] 1014.10 Intermediate handrails. *Stairways* with a required width of greater than 60 inches, shall have intermediate *handrails* located in such a manner that all portions of the *stairway* minimum width or required capacity are within 30 inches (762 mm) of a *handrail*. On monumental *stairs*, where intermediate handrails are required, *handrails* shall be located along the most direct path of egress travel.

Reason: The intermediate handrail requirement can be inadvertently read to require an intermediate handrail every 5', or to require a center handrail with a center door. This is a clarification for where they would be required. This is not a technical change.

Where there is sufficient distance for occupants to navigate to the sides of a monumental stairway the most direct path of egress, the centerline of the door to the exit, may not be the natural path.

This modification gives guidance to the building official to allow intermediate handrails to be installed in the correct locations.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC webpage.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is a clarification for the requirements for a central handrail on wider stairways.

E86-24

E87-24

IBC: 1014.10; IFC: [BE] 1014.10

Proponents: David Cooper, Stair Manufacturing and Design Consultants, Stairbuilders and Manufacturers Association, SMA (coderep@stairways.org)

2024 International Building Code

Revise as follows:

1014.10 Intermediate handrails.
Stairways shall have intermediate *handrails* located in such a manner that all portions of the *stairway* minimum width or required capacity are within 30 inches (762 mm) of a *handrail*. Where intermediate *handrails* are required on ~~On monumental~~ *stairs* *in excess of the required width or required capacity*, *handrails* shall be located along the most direct path of egress travel.

2024 International Fire Code

Revise as follows:

[BE] 1014.10 Intermediate handrails. *Stairways* shall have intermediate *handrails* located in such a manner that all portions of the *stairway* minimum width or required capacity are within 30 inches (762 mm) of a *handrail*.Where intermediate *handrails* are required on ~~On monumental~~ *stairs* *in excess of the required width or required capacity*, *handrails* shall be located along the most direct path of egress travel.

Reason: What is a monumental stair? Ask different people and the answers will be varied. "Monumental stair" is not a defined term and interpretation is inconsistent. A search of the IBC shows that **1014.9** is the only place where the term "monumental stairs" is used so it would seem that a better description of the intent of the requirement would be more reasonable than adding a definition for a term that is used in a solitary requirement.

The intent of this requirement is to provide for handrails that are within the reach of the users on wider stairs. The intent of the second sentence of this requirement is to assure that functional intermediate handrails are provided for stairways that are designed with an aesthetic of exaggerated width in proportion to the required width /egress capacity.

Eliminating the vague and often misunderstood term of "Monumental" and inserting text to describe the condition will allow for consistent interpretation and enforcement.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The substitution language replaces a misunderstood term that lacks clear definition without technical change to the intent of the code. The change is of no consequence to the methods or cost of construction.

E87-24

E88-24

IBC: 1015.2; IFC: [BE] 1015.2

Proponents: David Cooper, Stair Manufacturing and Design Consultants, Stairbuilders and Manufacturers Association, SMA (coderep@stairways.org)

2024 International Building Code

Revise as follows:

1015.2 Where required.
Guards shall be ~~located along~~ provided for those portions of open-sided walking surfaces, such as *mezzanines*, *equipment platforms*, *aisles*, *stairs*, *ramps* and landings, that are located more than 30 inches (762 mm) measured vertically to the floor or grade below at any point within 36 inches (914 mm) horizontally to the edge of the open side and at the perimeter of *occupiable roofs* . *Guards* shall be adequate in strength and attachment in accordance with Section 1607.9.

Exceptions: *Guards* are not required for the following locations:

1. On the loading side of loading docks or piers.
2. On the audience side of *stages* and raised *platforms*, including *stairs* leading up to the *stage* and raised *platforms*.
3. On raised *stage* and *platform* floor areas, such as runways, *ramps* and side *stages* used for entertainment or presentations.
4. At vertical openings in the performance area of *stages* and *platforms*.
5. At elevated walking surfaces appurtenant to *stages* and *platforms* for access to and utilization of special lighting or equipment.
6. Along vehicle service pits not accessible to the public.
7. In assembly seating areas at cross *aisles* in accordance with Section 1030.17.2.
8. On the loading side of station platforms on fixed guideway transit or passenger rail systems.
9. Portions of an *occupiable roof* located less than 30 inches (762 mm) measured vertically to adjacent unoccupiable roof areas where *approved guards* are present at the perimeter of the roof.
10. At portions of an *occupiable roof* where an *approved* barrier is provided.

2024 International Fire Code

Revise as follows:

[BE] 1015.2 Where required. *Guards* shall be ~~located along~~ provided for those portions of open-sided walking surfaces, such as *mezzanines*, equipment platforms, *aisles*, *stairs*, *ramps* and landings, that are located more than 30 inches (762 mm) measured vertically to the floor or grade below at any point within 36 inches (914 mm) horizontally to the edge of the open side and at the perimeter of *occupiable roofs* . *Guards* shall be adequate in strength and attachment in accordance with Section 1607.9 of the International Building Code.

Exception: *Guards* are not required for the following locations:

1. On the loading side of loading docks or piers.
2. On the audience side of stages and raised platforms, including *stairs* leading up to the stage and raised platforms.
3. On raised stage and platform floor areas, such as runways, *ramps* and side stages used for entertainment or presentations.
4. At vertical openings in the performance area of stages and platforms.
5. At elevated walking surfaces appurtenant to stages and platforms for access to and utilization of special lighting or equipment.

6. Along vehicle service pits not accessible to the public.
7. In assembly seating areas at cross *aisles* in accordance with Section 1030.17.2.
8. On the loading side of station platforms on fixed guideway transit or passenger rail systems.
9. Portions of an *occupiable roof* located less than 30 inches (762 mm) measured vertically to adjacent unoccupiable roof areas where approved guards are present at the perimeter of the roof.
10. At portions of an *occupiable roof* where an *approved* barrier is provided.

Reason: The change to the first sentence correlates with a similar change implemented in the 2021 IRC as shown below.

> **R312.1.1 Where required.** Guards shall be ***provided for those portions*** of open-sided walking surfaces, including ***floors***, stairs, ramps, and landings that are located more than 30 inches (762 mm) measured vertically to the floor or grade below at any point within 36 inches (914 mm) horizontally to the edge of the open side. Insect screening shall not be considered as a guard. (***emphasis added***)

Many guards are provided in areas where the elevation of the open sided walking surface is not constant. As in the IRC this change to the IBC clarifies the intent of the code to provide a guard only on that portion of an elevated surface exceeding the specified height above the floor or grade below.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0; This could decrease the cost of construction because less material and labor would be necessary however a guard would still be required at these locations, e.g. a portion of a guard above an inclined grade or at the lower portion of a stair or ramp where a handrail would still be required.

Estimated Immediate Cost Impact Justification (methodology and variables):

I cannot imagine there is anyway to quantify how much this will decrease the cost of construction which would likely be of little consequence.

E88-24

E89-24

IBC: 1015.2; IFC: [BE] 1015.2

Proponents: John Grenier, National Council of Structural Engineers' Associations (NCSEA) (jgrenier@greniereng.com)

2024 International Building Code

Revise as follows:

1015.2 Where required. *Guards* shall be located along open-sided walking surfaces, such as *mezzanines*, *equipment platforms*, *aisles*, *stairs*, *ramps* and landings, that are located more than 30 inches (762 mm) measured vertically to the floor or grade below at any point within 36 inches (914 mm) horizontally to the edge of the open side, ~~and~~ at the perimeter of occupiable roofs, and at walking surfaces near retaining walls in accordance with Section 1807.2.5. *Guards* shall be adequate in strength and attachment in accordance with Section 1607.9.

Exceptions: *Guards* are not required for the following locations:

1. On the loading side of loading docks or piers.
2. On the audience side of *stages* and raised *platforms*, including *stairs* leading up to the *stage* and raised *platforms*.
3. On raised *stage* and *platform* floor areas, such as runways, *ramps* and side *stages* used for entertainment or presentations.
4. At vertical openings in the performance area of *stages* and *platforms*.
5. At elevated walking surfaces appurtenant to *stages* and *platforms* for access to and utilization of special lighting or equipment.
6. Along vehicle service pits not accessible to the public.
7. In assembly seating areas at cross *aisles* in accordance with Section 1030.17.2.
8. On the loading side of station platforms on fixed guideway transit or passenger rail systems.
9. Portions of an *occupiable roof* located less than 30 inches (762 mm) measured vertically to adjacent unoccupiable roof areas where *approved guards* are present at the perimeter of the roof.
10. At portions of an *occupiable roof* where an *approved* barrier is provided.

2024 International Fire Code

Revise as follows:

[BE] 1015.2 Where required. *Guards* shall be located along open-sided walking surfaces, such as *mezzanines*, equipment platforms, *aisles*, *stairs*, *ramps* and landings, that are located more than 30 inches (762 mm) measured vertically to the floor or grade below at any point within 36 inches (914 mm) horizontally to the edge of the open side, ~~and~~ at the perimeter of *occupiable roofs*, and at walking surfaces near retaining walls in accordance with Section 1807.2.5 of the International Building Code. *Guards* shall be adequate in strength and attachment in accordance with Section 1607.9 of the International Building Code.

Exception: *Guards* are not required for the following locations:

1. On the loading side of loading docks or piers.
2. On the audience side of stages and raised platforms, including *stairs* leading up to the stage and raised platforms.
3. On raised stage and platform floor areas, such as runways, *ramps* and side stages used for entertainment or presentations.
4. At vertical openings in the performance area of stages and platforms.
5. At elevated walking surfaces appurtenant to stages and platforms for access to and utilization of special lighting or equipment.
6. Along vehicle service pits not accessible to the public.

7. In assembly seating areas at cross *aisles* in accordance with Section 1030.17.2.
8. On the loading side of station platforms on fixed guideway transit or passenger rail systems.
9. Portions of an *occupiable roof* located less than 30 inches (762 mm) measured vertically to adjacent unoccupiable roof areas where approved guards are present at the perimeter of the roof.
10. At portions of an *occupiable roof* where an *approved* barrier is provided.

Reason: 1. To clarify that walls and retaining walls associated with a building or a site, also require Guards to protect against falls.

2. Section **1807.2.5 Guards** was added to the 2024 IBC via code change proposal S157-22. The proposed new language in Section 1015.2 will be a pointer to that section.

3. The 2021 IBC Commentary states "Where one or more sides of a walking surface are open to the floor level or grade below, a guard system must be provided to minimize the possibility of occupants accidentally falling to the surface below". The pointer to section 1807.2.5 is important to eliminate potential confusion and possible misunderstanding that walls and retaining walls are not governed by the IBC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The requirement for guards at retaining walls is in Section 1807.2.5, so this is just pointing to that guard requirement.

E89-24

E90-24

IBC: 1015.2; IFC: [BE] 1015.2

Proponents: David Renn, PE, SE, City and County of Denver, Colorado Chapter Code Development Committee (david.renn@denvergov.org)

2024 International Building Code

Revise as follows:

1015.2 Where required.

Guards shall be located along open-sided walking surfaces, such as *mezzanines*, *equipment platforms*, *aisles*, *stairs*, *ramps* and landings, that are located more than 30 inches (762 mm) measured vertically to the floor or grade below at any point within 36 inches (914 mm) horizontally to the edge of the open side and at the perimeter of *occupiable roofs*. *Guards* shall be adequate in strength and attachment in accordance with Section 1607.9.

Exceptions: *Guards* are not required for the following locations:

1. On the loading side of loading docks or piers.
2. On the audience side of *stages* and raised *platforms*, including *stairs* leading up to the *stage* and raised *platforms*.
3. On raised *stage* and *platform* floor areas, such as runways, *ramps* and side *stages* used for entertainment or presentations.
4. At vertical openings in the performance area of *stages* and *platforms*.
5. At elevated walking surfaces appurtenant to *stages* and *platforms* for access to and utilization of special lighting or equipment.
6. Along vehicle service pits not accessible to the public.
7. In assembly seating areas at cross *aisles* in accordance with Section 1030.17.2.
8. On the loading side of station platforms on fixed guideway transit or passenger rail systems.
9. Portions of an *occupiable roof* located less than 30 inches (762 mm) measured vertically to adjacent unoccupiable roof areas where ~~*approved*~~ *guards* are present at the perimeter of the roof.
10. At portions of an *occupiable roof* where an *approved* barrier is provided.

2024 International Fire Code

Revise as follows:

[BE] 1015.2 Where required.

Guards shall be located along open-sided walking surfaces, such as *mezzanines*, equipment platforms, *aisles*, *stairs*, *ramps* and landings, that are located more than 30 inches (762 mm) measured vertically to the floor or grade below at any point within 36 inches (914 mm) horizontally to the edge of the open side and at the perimeter of *occupiable roofs* . *Guards* shall be adequate in strength and attachment in accordance with Section 1607.9 of the International Building Code.

Exception: *Guards* are not required for the following locations:

1. On the loading side of loading docks or piers.
2. On the audience side of stages and raised platforms, including *stairs* leading up to the stage and raised platforms.
3. On raised stage and platform floor areas, such as runways, *ramps* and side stages used for entertainment or presentations.
4. At vertical openings in the performance area of stages and platforms.
5. At elevated walking surfaces appurtenant to stages and platforms for access to and utilization of special lighting or equipment.

6. Along vehicle service pits not accessible to the public.
7. In assembly seating areas at cross *aisles* in accordance with Section 1030.17.2.
8. On the loading side of station platforms on fixed guideway transit or passenger rail systems.
9. Portions of an *occupiable roof* located less than 30 inches (762 mm) measured vertically to adjacent unoccupiable roof areas where ~~approved~~ guards are present at the perimeter of the roof.
10. At portions of an *occupiable roof* where an *approved* barrier is provided.

Reason: Section 1015.1 requires guards to comply with the provisions of 1015.2 through 1015.7, which include very specific requirements like minimum height and opening limitations. However, Exception 9 to 1015.2 introduces the term "approved guard". "Approved" is a defined term that means "acceptable to the building official". By using this term, the building official is now allowed to increase or decrease the specific requirements for a guard - maybe reducing the height to 36" instead of 42", maybe increasing height to 48", maybe allowing larger openings.

I don't believe the intent of this section is to allow a guard at the edge of a roof, that is intended to minimize the possibility of a fall from the roof, to be allowed to have different requirements than specifically required in 1015 for guards. This could set up a potentially dangerous situation, such as a building official allowing 21" openings as allowed near rooftop mechanical equipment instead of requiring the typical 4" maximum opening that would prevent a child from falling through the guard.

This proposal simply removes the word "approved" from "approved guard", so the minimum requirements for guards are provided.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal makes revisions that align the code with the intent of the code, which I believe is currently being enforced, so there will be no cost impact.

E90-24

E91-24

IBC: 1015.3; IFC: [BE] 1015.3

Proponents: David Cooper, Stair Manufacturing and Design Consultants, Stairbuilders and Manufacturers Association, SMA (coderep@stairways.org)

2024 International Building Code

Revise as follows:

1015.3 Height.
Required *guards* shall be not less than 42 inches (1067 mm) high, measured vertically as follows:

1. From the adjacent walking surfaces.
2. On *stairways* and stepped *aisles*, from the line connecting the *nosings*.
3. On *ramps* and ramped *aisles*, from the ramp surface at the guard.

Exceptions:

1. For occupancies in Group R-3 not more than three *stories* above grade in height and within individual *dwelling units* in occupancies in Group R-2 not more than three *stories* above grade in height with separate *means of egress*, required *guards* shall be not less than 36 inches (914 mm) in height measured vertically above the adjacent walking surfaces.
2. For occupancies in Groups R-2 and R-3, within the interior conditioned space of individual *dwelling units*, where the open-sided walking surface is located not more than 25 feet (7.62 meters) measured vertically to the floor or walking surface below, required *guards* shall not be less than 36 inches (914 mm) in height measured vertically above the adjacent walking surface.
3. For occupancies in Group R-3, and within individual *dwelling units* in occupancies in Group R-2, *guards* on the open sides of *stairs* shall have a height not less than 34 inches (864 mm) measured vertically from a line connecting the *nosings* .
4. For occupancies in Group R-3, and within individual *dwelling units* in occupancies in Group R-2, where the top of the *guard* serves as a *handrail* on the open sides of *stairs*, the top of the *guard* shall be not less than 34 inches (864 mm) and not more than 38 inches (965 mm) measured vertically from a line connecting the l *nosings* .
5. For occupancies in Group R-3, and within individual dwelling units in occupancies in Group R-2, where the top of the guard on the open side of stairs serves as a handrail, the height of the guard transition at the top of a flight is permitted to be less than the required guard height for a distance over the landing not greater than 12 inches (305 mm) as measured horizontally from the landing nosing.

~~5~~6. The *guard* height in assembly seating areas shall comply with Section 1030.17 as applicable.

~~6~~7. Along *alternating tread devices* and ships ladders, *guards* where the top rail serves as a *handrail* shall have height not less than 30 inches (762 mm) and not more than 34 inches (864 mm), measured vertically from a line connecting the leading edge of the treads.

~~7~~8. In Group F occupancies where *exit access stairways* serve fewer than three *stories* and such *stairways* are not open to the public, and where the top of the *guard* also serves as a *handrail*, the top of the *guard* shall be not less than 34 inches (864 mm) and not more than 38 inches (965 mm) measured vertically from a line connecting the nosings.

2024 International Fire Code

Revise as follows:

[BE] 1015.3 Height.
Required *guards* shall be not less than 42 inches (1067 mm) high, measured vertically as follows:

1. From the adjacent walking surfaces.

2. On *stairways* and stepped *aisles*, from the line connecting the *nosings*.
3. On *ramps* and ramped *aisles*, from the *ramp* surface at the *guard*.

Exceptions:

1. For occupancies in Group R-3 not more than three *stories* above grade in height and within individual *dwelling units* in occupancies in Group R-2 not more than three *stories* above grade in height with separate *means of egress*, required *guards* shall be not less than 36 inches (914 mm) in height measured vertically above the adjacent walking surfaces.
2. For occupancies in Groups R-2 and R-3, within the interior conditioned space of individual *dwelling units*, where the open-sided walking surface is located not more than 25 feet (7.62 meters) measured vertically to the floor or walking surface below, required *guards* shall not be less than 36 inches (914 mm) in height measured vertically above the adjacent walking surface.
3. For occupancies in Group R-3, and within individual *dwelling units* in occupancies in Group R-2, *guards* on the open sides of *stairs* shall have a height not less than 34 inches (864 mm) measured vertically from a line connecting the *nosings* .
4. For occupancies in Group R-3, and within individual *dwelling units* in occupancies in Group R-2, where the top of the *guard* serves as a *handrail* on the open sides of *stairs*, the top of the *guard* shall be not less than 34 inches (864 mm) and not more than 38 inches (965 mm) measured vertically from a line connecting the l *nosings* .

<u>5. For occupancies in Group R-3, and within individual dwelling units in occupancies in Group R-2, where the top of the guard on the open side of stairs serves as a handrail, the height of the guard transition at the top of a flight is permitted to be less than the required guard height for a distance over the landing not greater than 12 inches (305 mm) as measured horizontally from the landing nosing.</u>

~~5~~<u>6</u>. The *guard* height in assembly seating areas shall comply with Section 1030.17 as applicable.

~~6~~<u>7</u>. Along *alternating tread devices* and ships ladders, *guards* where the top rail serves as a *handrail* shall have height not less than 30 inches (762 mm) and not more than 34 inches (864 mm), measured vertically from a line connecting the leading edge of the treads.

~~7~~<u>8</u>. In Group F occupancies where *exit access stairways* serve fewer than three *stories* and such *stairways* are not open to the public, and where the top of the *guard* also serves as a *handrail*, the top of the *guard* shall be not less than 34 inches (864 mm) and not more than 38 inches (965 mm) measured vertically from a line connecting the nosings.

Reason: In the residencies cited in the new exception the required handrail/stair guard height is 34 – 38 inches. The handrail/stair guard often intersects an adjacent landing guard at the top of a flight. The guard at an open sided landing measured from the walking surface of the landing has a minimum height of 36 inches but has no maximum. Typically guards at a landing may be at a height of as much as 42 inches. The typical difference in height between handrail and level guard is 4 -8 inches directly over the top riser. At this point the handrail must be 34-38".

However, the floor surface at the nosing of the landing, from which guard height is determined, extends as much as 1 1/4 inches beyond the top riser. The resulting landing guard is typically 4 - 8 inches higher than the handrail that is required to be continuous to a point directly over the top riser. This presents a conflict in determining whether the guard height or the handrail height is to be accommodated at this intersection of handrail and guard. This can especially problematic when the occupant has children and requests the handrail be positioned as low as possible.

In most situations a continuous transition is preferred to achieve integrity of the design for safety, structural and aesthetic concerns. However, the strictest interpretation of the code only provides for a more vertical transition from as low as 34 inches to 42 inches to achieve both handrail and guard height requirements. Although an exception to handrail height allows for a handrail fitting to exceed the required handrail height it is often better to allow the handrail height to remain constant and afford an inconsequential reduction of the required guard height for a short distance.

Some might apply the opening limitation requirements when interpreting this situation however, this is not always the case. This proposal will allow for consistent interpretation of a smooth transition of the handrail/guard of the stair with the guard at an open sided landing and extension of the handrail at constant height. The horizontal dimension of 12 inches provides the necessary distance to configure an extension of the handrail without undue compromise of the guard's function to minimize the possibility of a fall to the floor or grade below. See figures 1 & 2.

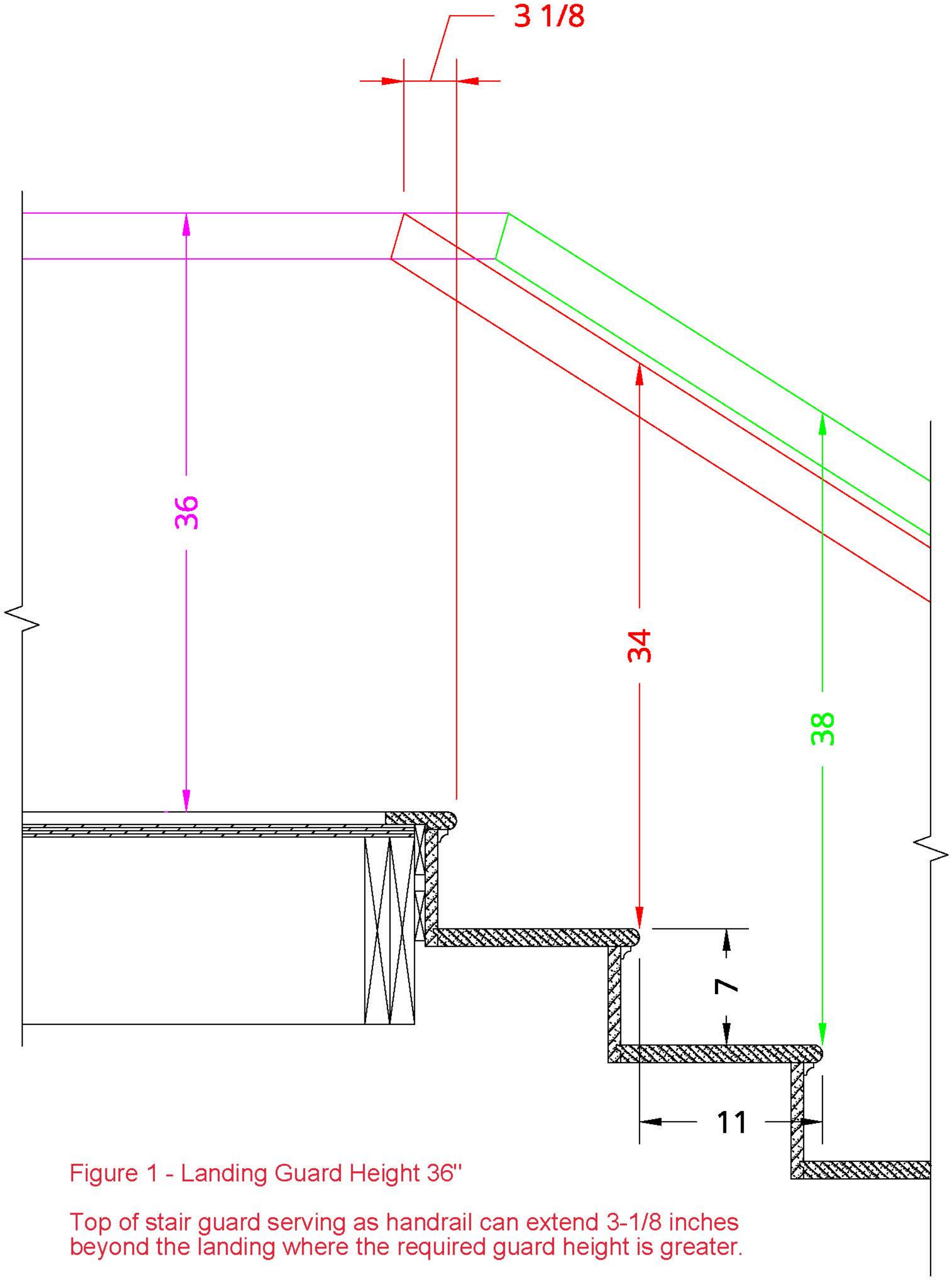


Figure 1 - Landing Guard Height 36"

Top of stair guard serving as handrail can extend 3-1/8 inches beyond the landing where the required guard height is greater.

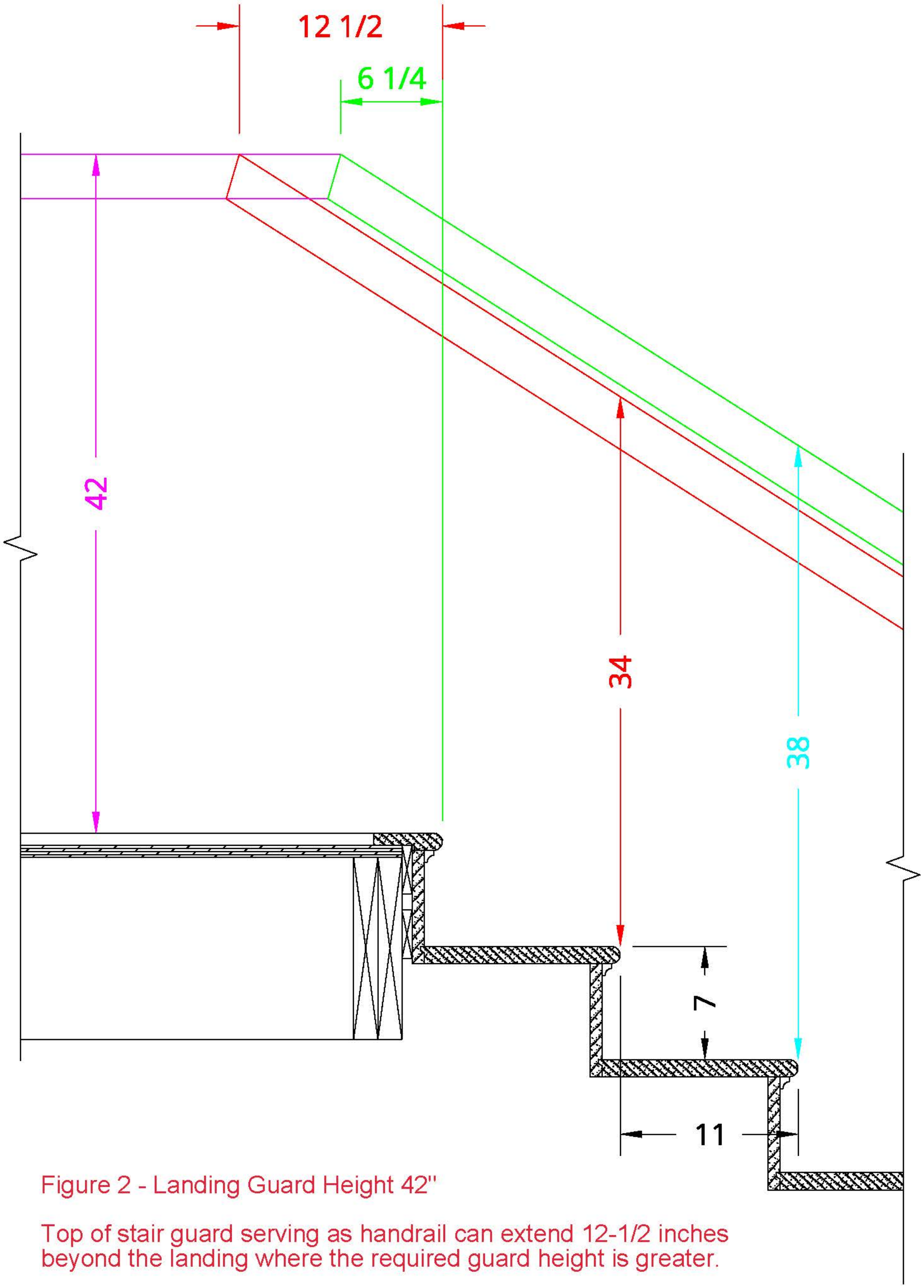


Figure 2 - Landing Guard Height 42"

Top of stair guard serving as handrail can extend 12-1/2 inches beyond the landing where the required guard height is greater.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The technical changes only provide for an alternate location of the related elements. There is no change in the material or labor required that has any consequence upon the cost of construction.

E91-24

E92-24

IBC: 1015.4, ASTM Chapter 35 (New); IFC: [BE] 1015.4, ASTM Chapter 80 (New)

Proponents: David Cooper, Stair Manufacturing and Design Consultants, Stairbuilders and Manufacturers Association, SMA (coderep@stairways.org); Thomas Zuzik Jr, RailingCodes.com, National Ornamental & Miscellaneous Metals Association (NOMMA.org) (coderep@railingcodes.com)

2024 International Building Code

Revise as follows:

1015.4 Opening limitations.
Required *guards* shall not have openings that allow passage of a sphere 4 inches (102 mm) in diameter from the walking surface to the required *guard* height.The required opening limitation shall not be exceeded when a load of 16.5 pounds is applied with a cone in accordance with Test method D of ASTM E935.

Exceptions:

1. From a height of 36 inches (914 mm) to 42 inches (1067 mm), *guards* shall not have openings that allow passage of a sphere $4^3/_8$ inches (111 mm) in diameter.
2. The triangular openings at the open sides of a *stair*, formed by the riser, tread and bottom rail shall not allow passage of a sphere 6 inches (152 mm) in diameter.
3. At elevated walking surfaces for access to and use of electrical, mechanical or plumbing systems or equipment, *guards* shall not have openings that allow passage of a sphere 21 inches (533 mm) in diameter.
4. In areas that are not open to the public within occupancies in Group I-3, F, H or S, and for *alternating tread devices* and ships ladders, *guards* shall not have openings that allow passage of a sphere 21 inches (533 mm) in diameter.
5. In assembly seating areas, *guards* required at the end of *aisles* in accordance with Section 1030.17.4 shall not have openings that allow passage of a sphere 4 inches (102 mm) in diameter up to a height of 26 inches (660 mm). From a height of 26 inches (660 mm) to 42 inches (1067 mm) above the adjacent walking surfaces, *guards* shall not have openings that allow passage of a sphere 8 inches (203 mm) in diameter.
6. Within individual *dwelling units* and *sleeping units* in Group R-2 and R-3 occupancies, *guards* on the open sides of *stairs* shall not have openings that allow passage of a sphere $4^3/_8$ (111 mm) inches in diameter.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

E935-00	Standard Test Methods for Performance of Permanent Railing Systems and Rails for Buildings

2024 International Fire Code

Revise as follows:

[BE] 1015.4 Opening limitations.
Required *guards* shall not have openings that allow passage of a sphere 4 inches (102 mm) in diameter from the walking surface to the required *guard* height. The required opening limitation shall not be exceeded when a load of 16.5 pounds is applied with a cone in accordance with Test method D of ASTM E935.

Exceptions:

1. From a height of 36 inches (914 mm) to 42 inches (1067 mm), *guards* shall not have openings that allow passage of a sphere $4^3/_8$ inches (111 mm) in diameter.

2. The triangular openings at the open sides of a *stair*, formed by the riser, tread and bottom rail shall not allow passage of a sphere 6 inches (152 mm) in diameter.
3. At elevated walking surfaces for access to and use of electrical, mechanical or plumbing systems or equipment, *guards* shall not have openings that allow passage of a sphere 21 inches (533 mm) in diameter.
4. In areas that are not open to the public within occupancies in Group I-3, F, H or S, and for *alternating tread devices* and ship's ladders, *guards* shall not have openings that allow passage of a sphere 21 inches (533 mm) in diameter.
5. In assembly seating areas, *guards* required at the end of *aisles* in accordance with Section 1030.17.4 shall not have openings that allow passage of a sphere 4 inches (102 mm) in diameter up to a height of 26 inches (660 mm). From a height of 26 inches (660 mm) to 42 inches (1067 mm) above the adjacent walking surfaces, *guards* shall not have openings that allow passage of a sphere 8 inches (203 mm) in diameter.
6. Within individual *dwelling units* and *sleeping units* in Group R-2 and R-3 occupancies, *guards* on the open sides of *stairs* shall not have openings that allow passage of a sphere $4^3/_8$ (111 mm) inches in diameter.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428-2959

E935-00 **Standard Test Methods for Performance of Permanent Railing Systems and Rails for Buildings**

Staff Analysis: A review of the standard proposed for inclusion in the code, ASTM E935-00, Standard Test Methods for Performance of Permanent Railing Systems and Rails for Buildings, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

There is a 2021 edition to ASTM 935. The proposal references the 2000 edition. This standard would be subject to the administrative update proposal next cycle.

Reason: The issue of how to regulate opening limitation when the rigidity of in-fill elements is a factor has been a problem discussed in several cycles of the code without resolution. Most recently in the last cycle in both IBC-S and IRC. Enforcement is all over the map with sundry interpretive methods of enforcement that are clearly not defined in the code. They range from hanging weights to plucking the members like tuning a stringed instrument. All involved; manufacturer, installer and enforcement agree that the code needs to address the issue and provide guidance to ensure consistent determination of compliance.

Let's be clear opening limitations are a dimensional requirement and not a structural load. We have a structural live load requirement that addresses structural integrity. Opening limitations restrict the opening in an effort to minimize the possibility of fall-through accidents. However, it is reasonable to assume that flexible in-fill elements should be closer together in consideration of some kind of load that could separate the elements beyond the required opening limitation. The design live load requirement might be a place to start realizing this load would induce failure of the in-fill and any greater load would not be consequent to in-fill spread. If the guard has failed there is no guard to minimize the possibility of a fall-through. The in-fill design load is 50 pounds per square ft however the area between infill members is only a small portion of a square foot so it is reasonable to assume that only a portion of the load is applicable. A decrease in the load/square foot in proportion to the size of the area between any two in-fill elements has been reasoned in each of the more recent proposals and modifications from the last cycle and is included here. Past proposals agree with dividing the load but have disagreed with how to apply the load and measure the opening limitation.

There is no reason to reinvent the wheel. An existing ASTM test is expressly for this purpose. This proposal simply references the Test Method D cone test for in-fill spread first published in ASTM E935-91 and again in ASTM E935-00. (Test Method D was not included in subsequent additions of the standard for "lack of use". In conversation with those responsible they informed us it would be reinstituted if used.) The load of 16.5 pounds was quantified through documented in-house testing. The full report is referenced in the bibliography at the link provided.

Furthermore, for those wishing to know more than the summary information, in the last code Cycle, the two proposals took a closer look at the widely misinterpreted operation of measuring opening limitation within a guard's infill. One looked to specifically clarify that opening limitation is a measurement and not a load test in the IRC, and the second under S102-22 looked at adding a load requirement in the IBC only to the spreading of wire rope cables used for guard infill. This current proposal builds upon both these prior proposals but provides a much simpler method of verification for the spreading of all types of infill and is based on the decades old E935-91 ASTM standard, first published in 1983, then updated in 1991 with the infill spread test method D, that has been used by quality fabricators since its inception but has never previously been adopted into the model codes.

S102-22 IBC PROPOSAL:

The proponents of S102-22 in the last cycle focused on a singular type of infill, wire cables, and not all infill as this code requirement should. We believe that S102-22 as originally written was flawed and incomplete. It only applied the requirement to a single infill material type, and the logic used to establish the basis for the prescribed loads, that of dividing the load by the number of wire cables within 12 inches lacked documentation or explanation for the prescribed load or its application.

This current proposal adds an infill spread requirement into the model code based on the published ASTM testing method written specifically for the testing of infill spreading within metal guard systems and applying this method to all guard materials and types.

ESTABLISHED ASTM TESTING METHOD

In the ASTM E935-00 Standard edition the method for testing infill spread is provided and titled as; “Test Method D – Application of Horizontal Static Load to Determine Resistance to Cone Penetration by Infill Area of Baluster and Panel Railing Systems.”

The "Test Method D" criteria specifies a cone, not a sphere, that is 25-percent larger than the maximum permissible spacing between balusters and other infill elements. The cone allows for smooth separation and consistent measurement of the opening limitation as the load is applied and accurate final measurement of the spread at the maximum required load. Both the cone and the ASTM standards methodology provides for the accurate validation of the code required measurement of the opening limitation dimension, and under what would be the maximum load prior to failure of the guard in-fill. This is not a structural load requirement but rather a test method for confirmation of compliance with the infill opening limitation dimensions of the model codes.

CORRELATING THE CONE TEST AND THE OPENING LIMIT DIMENSION

The proponents last cycle of S102-22 focused on wire cables, as they are the most scrutinized type of infill for infill spreading concerns and the tensioning parameters. For this reason, we are limiting the rest of our discussion for the reason statement to the most common wire cable used in the built environment 1/8-1x19, one of the most flexible types of infill used in guard systems today. Though this proposal adds the requirement to all infill, by far flexible cable infill is the most affected type of infill the new model code requirement will affect.

S102-22 prescribed a method to divide a 50lb load by the number of cables within 12-inches to establish a minimum tension to prevent a sphere from passing. This translates into a few numbers with the first number being based on 3 wire cables translating into 16.66 lbs, next 4 wire cables translate into 12.5 lbs and 5 wire cables translate into 10 lbs. The authors of S102-22 did not however provide any documentation as to how any of these numbers were validated. The proponent of the current proposal, through a compilation of in-house testing to validate engineered calculations for the 16.5lb load required in this proposal has correlated this number for the smallest 4-inch limit from results of the cone infill penetration method from ASTM E935-00 Part D, on 1/8-1x19 wire cables installed in a sample guard system with 3-inch on-center spacing of the cables and 36-inches clear span between stabilizers. The tension of the cables is also directly affected by the length of the cable and a chart is provided further down in this reason statement. The tension during testing can be directly correlated to those listed in the chart.

SAFE INFILL – SAFE CABLE DESIGN LOADS DETERMINE THE LOAD TO BE APPLIED

The tensioning, stiffness and resistance of the infill is directly related to the material and with wire cable this is directly related to safe cable design loads. With 1/8-1x19 stainless steel wire cable the listed minimum break point is 1,869 lbs. Simply, the wire cable will break at approximately 1,869 lbs. Thus, industry-based safety factors are designated as Safe workload and Maximum Cable Pretension for Cable Rail Installations.

The Safe workload limit is based on 20% of the break load and Maximum Cable Pretension for Cable Rail installations is 25% of the break load. This translates into a 373 lbs safe workload and 467 lbs Maximum Pretension Load for 1/8-1x19 SS wire cable. A chart of other cable sizes and types are listed on the website link provided.

The chart shown below shows the tension required for each 1/8-1x19 ss wire cable to meet the proposed 16.5 lbs load presented in this current proposal for cable. The tensions shown are based on 3-inch centerlines on the cable installation. The left column provides the clear open free span between stabilizers. Both cable length and clear span between stabilizers of the framework that makes up the structure holding the cables in place and in tension, directly affects the tension required to meet the cone penetration designated within this proposal. The chart depicts the loads and shows when safe workloads are exceeded.

Free Span (in)	Cable Length (ft)									
	5	10	15	20	25	30	40	50	60	70
34.5"	208	248	261	268	272	275	278	289	337	371
36"	224	262	275	281	285	288	299	326	372	-
37.5"	240	276	289	295	307	317	329	362	-	-
39"	255	290	302	325	340	349	361	-	-	-
40.5"	270	304	336	359	373	-	-	-	-	-
42"	285	328	372	-	-	-	-	-	-	-

Bibliography: ASTM E935-91 & E935-00

ASTM E935-xx Current edition approved Aug. 1, 2021. Published September 2021. Originally approved in 1983. Last previous edition approved in 2013 as E935–13ε1.

ICC ES AC273 Current edition editorially revised May 2021. Originally approved in 2004. Last previous edition approved in June 2017.

S102-22

S102-22 Public Comment 1

S102-22 Public Comment 2

https://stairways.org/guard-opening-limitations/

Cost Impact: Increase

Estimated Immediate Cost Impact:

A typical job of 50 lineal feet of cable rail may require additional vertical elements to reduce the span costing an additional $250.00.
5 intermediate ¼ inch x 1 ¼ inch stainless steel cable supports installed at $50.00 each = $50.00

Estimated Immediate Cost Impact Justification (methodology and variables):

This code change provides a method for determination of the opening limitation in guards with flexible infill and does not directly change any requirements for guard construction. However where the more flexible materials such as 1/8-1x19 stainless steel wire cable the spans may need to be reduced. This will not affect the cost of wood, metal, or glass balustrades that comply with all other code requirements for guard construction.

E92-24

E93-24

IBC: TABLE 1017.2; IFC: [BE] TABLE 1017.2

Proponents: Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org)

2024 International Building Code

1017.2 Limitations.

Exit access travel distance shall not exceed the values given in Table 1017.2.

Revise as follows:

TABLE 1017.2 EXIT ACCESS TRAVEL DISTANCE[a]

OCCUPANCY	WITHOUT AUTOMATIC SPRINKLER SYSTEM (feet)	WITH AUTOMATIC SPRINKLER SYSTEM (feet)	
	NS	S, S13R	S13D
A, E, F-1, M, ~~R,~~ S-1	200~~[e]~~	250~~[b]~~	NP
R-1	NP	250	NP
R-2, R-3[c], R-4[c]	NP	250	200
I-1	~~Not Permitted~~ NP	250~~[b]~~	NP
B	200	300~~[e]~~	NP
F-2, S-2, U	300	400~~[e]~~	NP
H-1	~~Not Permitted~~ NP	75[b]~~[d]~~	NP
H-2	~~Not Permitted~~ NP	100[b]~~[d]~~	NP
H-3	~~Not Permitted~~ NP	150[b]~~[d]~~	NP
H-4	~~Not Permitted~~ NP	175[b]~~[d]~~	NP
H-5	~~Not Permitted~~ NP	200~~[e]~~	NP
I-2, I-3	~~Not Permitted~~ NP	200~~[e]~~	NP
I-4	150	200~~[e]~~	NP

For SI: 1 foot = 304.8 mm. NP = Not Permitted.

NS = Buildings not equipped throughout with an automatic sprinkler system; S = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1; S13R = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.2; S13D = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Sections 903.2.8 and 903.3.1.3.

a. See the following sections for modifications to exit access travel distance requirements:

Section 402.8: For the distance limitation in malls.

Section 407.4: For the distance limitation in Group I-2.

Sections 408.6.1 and 408.8.1: For the distance limitations in Group I-3.

Section 411.2: For the distance limitation in special amusement areas.

Section 412.6: For the distance limitations in aircraft manufacturing facilities.

Section 1006.2.2.2: For the distance limitation in refrigeration machinery rooms.

Section 1006.2.2.3: For the distance limitation in refrigerated rooms and spaces.

Section 1006.3.4: For buildings with one exit.

Section 1017.2.2: For increased distance limitation in Groups F-1 and S-1.

Section 1017.2.3: For increased distance limitation in Group H-5.

Section 1030.7: For increased limitation in assembly seating.

Section 3103.4: For temporary structures.

Section 3104.9: For pedestrian walkways.

~~b. Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2. See Section 903 for occupancies where automatic sprinkler systems are permitted in accordance with Section 903.3.1.2.c. Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.~~

b.~~d~~ Group H occupancies equipped throughout with an automatic sprinkler system in accordance with Section 903.2.5.1.

c. ~~Group R-3 and R-4 buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.3. See Section 903.2.8 for occupancies where automatic sprinkler systems are permitted in accordance with Section 903.3.1.3.~~The exit access travel distance shall only apply in a Group R-3 and R-4 occupancy located in a mixed occupancy building.

2024 International Fire Code

[BE] 1017.2 Limitations.

Exit access travel distance shall not exceed the values given in Table 1017.2.

Revise as follows:

[BE] TABLE 1017.2 EXIT ACCESS TRAVEL DISTANCE[a]

OCCUPANCY	WITHOUT AUTOMATIC SPRINKLER SYSTEM (feet)	WITH AUTOMATIC SPRINKLER SYSTEM (feet)	
	NS	S, S13R	S13D
A, E, F-1, M, ~~R,~~ S-1	200	250~~[b, e]~~	NP
R-1	NP	250	NP
R-2, R-3[c], R-4[c]	NP	250	200
I-1	~~Not Permitted~~ NP	250~~[b]~~	NP
B	200	300~~[e]~~	NP
F-2, S-2, U	300	400~~[e]~~	NP
H-1	~~Not Permitted~~ NP	75[b]~~[d]~~	NP
H-2	~~Not Permitted~~ NP	100[b]~~[d]~~	NP
H-3	~~Not Permitted~~ NP	150[b]~~[d]~~	NP
H-4	~~Not Permitted~~ NP	175[b]~~[d]~~	NP
H-5	~~Not Permitted~~ NP	200~~[e]~~	NP
I-2, I-3	~~Not Permitted~~ NP	200~~[e]~~	NP
I-4	150	200~~[e]~~	NP

For SI: 1 foot = 304.8 mm. NP = Not Permitted.

NS = Buildings not equipped throughout with an automatic sprinkler system; S = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1; S13R = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.2; S13D = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Sections 903.2.8 and 903.3.1.3.

a. See the following sections for modifications to exit access travel distance requirements:

Section 402.8 of the International Building Code: For the distance limitation in malls.

Section 407.4 of the International Building Code: For the distance limitation in Group I-2.

Sections 408.6.1 and 408.8.1 of the International Building Code: For the distance limitations in Group I-3.

Section 411.2 of the International Building Code: For the distance limitation in special amusement areas.

Section 412.6 of the International Building Code: For the distance limitations in aircraft manufacturing facilities.

Section 1006.2.2.2: For the distance limitation in refrigeration machinery rooms.

Section 1006.2.2.3: For the distance limitation in refrigerated rooms and spaces.

Section 1006.3.4: For buildings with one exit.

Section 1017.2.2: For increased distance limitation in Groups F-1 and S-1.

Section 1017.2.3: For increased distance limitation in Group H-5.

Section 1030.7: For increased limitation in assembly seating.

Section 3103.4 of the International Building Code: For temporary structures.

Section 3104.9 of the International Building Code: For pedestrian walkways.

~~b. Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2. See Section 903 for occupancies where automatic sprinkler systems are permitted in accordance with Section 903.3.1.2.~~

~~c. Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.~~

b~~d~~. Group H occupancies equipped throughout with an automatic sprinkler system in accordance with Section 903.2.5.1.

~~e. Group R-3 and R-4 buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.3. See Section 903.2.8 for occupancies where automatic sprinkler systems are permitted in accordance with Section 903.3.1.3.~~

c. The exit access travel distance shall only apply in a Group R-3 and R-4 occupancy located in a mixed occupancy building.

Reason: The intent of this group of proposal is to make the tables in Chapter8 and 10 consistent with the revisions to Table 504.3, 504.4, 506.2 – using S13, S13R, S13D and NP for sprinkler requirements. This would clarify what happens when an NFPA 13D sprinkler system is used. This is not intent to change current allowances; just to clarify what requirements are applicable for an NFPA13D system.

Discussion during the BCAC calls has indicated that it is needed to identifying specific code sections so that everyone has the same understanding.

Group R-4 requirements do not always have to be stated as Section 310.5 states “Group R-4 occupancies shall meet the requirements for construction as defined for Group R-3, except as otherwise provided for in this code.” However, since a lot of people miss that, we are including R-4 in the proposed applicable footnotes.

Townhouses are defined as attached dwelling units that extend from foundation to grade and are open on at least two sides. If a townhouse is 3 stories or less, it can choose to comply with the IBC or IRC (Section 101.2). The IRC Section P2904 is similar to an NFPA 13D system. If the IBC is used, townhouses subdivided by firewalls into 1 or 2 units per building is a Group R-3 (Section 310.4) and townhouses subdivided by fire partitions (Section 420.2) are a Group R-2 (Section 310.3). This is important to clarify because all townhouses can use a 13D sprinkler system: Section 903.2.8 references 903.3, and 903.1.3.3 specifically stating that “Automatic sprinkler systems installed in … and townhouses shall be permitted to be installed throughout in accordance with NFPA 13D.” To make this obvious in the tables, a reference to 903.2.8 and 903.1.3.3 are added in the footnote.

Specifics for this change –

- adds the S13, S13R, S13D and NS in the table titles and footnotes with the section references for sprinklers.
- add columns for NFPA13D and rows to separate out Group R requirements.
- Footnotes b, c and e are redundant and deleted.

- The new footnote is added to coordinate with the singe exit allowance in Section 1006.3.4 Item 4.
- “NP” instead of “not permitted” is for consistency in table styles.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC webpage.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is a clarification of requirements for Group R where an NFPA13D system is permitted. There are no changes to construction requirements.

E93-24

E94-24

IBC: 1017.2.3; IFC: [BE] 1017.2.3

Proponents: William Koffel, Koffel Associates, Inc., Semiconductor Industry Association (wkoffel@koffel.com)

2024 International Building Code

Revise as follows:

1017.2.3 Group H-5 increase.
The maximum exit access travel distance shall be 300 feet (91 m) in the *fabrication areas* of Group H-5 occupancies where all of the following conditions are met:

1. The width of the *fabrication area* is 300 feet (91 m) or greater.
2. The area of the *fabrication area* is 220,000 square feet (18 600 m^2) or greater.
3. The height of the *fabrication area*, measured between the raised metal floor and the clean filter ceiling, is 16 feet (48 768 mm) or greater.
4. The supply ventilation rate is 20 cubic feet per minute per square foot (0.556 $m^3/min/m^2$) or greater and shall remain operational.
5. <u>A smoke detection system with remote indication and manual shutoff capability at the emergency control station is required.</u>

2024 International Fire Code

Revise as follows:

[BE] 1017.2.3 Group H-5 increase.
The maximum *exit access* travel distance shall be 300 feet (91 m) in the fabrication areas of Group H-5 occupancies where all of the following conditions are met:

1. The width of the *fabrication area* is 300 feet (91 m) or greater.
2. The area of the *fabrication area* is 220,000 square feet (18 600 m^2) or greater.
3. The height of the *fabrication area*, measured between the raised metal floor and the clean filter ceiling, is 16 feet (48 768 mm) or greater.
4. The supply ventilation rate is 20 cubic feet per minute per square foot (0.556 $m^3/min/m^2$) or greater and shall remain operational.
5. <u>A smoke detection system with remote indication and manual shutoff capability at the emergency control station is required.</u>

Reason: The modeling that was done to support the increased travel distance assumed that the ventilation would continue to operate. the proposal requires that smoke detection activate a remote indication at the emergency control station where manual shut-down of the ventilation system can occur, when appropriate. Related changes have been submitted to Chapter 9 of the IBC and Chapter 6 of the IMC to allow for the manual shutdown of the HVAC system as required by this proposal.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The increased travel distance was based upon modeling which assumed that the ventilation system would continue to operate. This proposal, as well as the related changes to Chapter 9 of the IBC and Chapter 6 of the IMC, allow for the system to continue to operate provided manual shutdown capability is provided.

E94-24

E95-24

IBC: TABLE 1020.2; IFC: [BE] TABLE 1020.2

Proponents: Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org)

2024 International Building Code

1020.2 Construction.
Corridors shall be fire-resistance rated in accordance with Table 1020.2. The *corridor* walls required to be fire-resistance rated shall comply with Section 708 for *fire partitions*.

Exceptions:

1. A *fire-resistance rating* is not required for *corridors* in an occupancy in Group E where each room that is used for instruction has not less than one door opening directly to the exterior and rooms for assembly purposes have not less than one-half of the required means of egress doors opening directly to the exterior. Exterior doors specified in this exception are required to be at ground level.
2. A *fire-resistance rating* is not required for *corridors* contained within a *dwelling unit* or *sleeping unit* in an occupancy in Groups I-1 and R.
3. A *fire-resistance rating* is not required for *corridors* in *open parking garages*.
4. A *fire-resistance rating* is not required for *corridors* in an occupancy in Group B that is a space requiring only a single *means of egress* complying with Section 1006.2.
5. *Corridors* adjacent to the *exterior walls* of *buildings* shall be permitted to have unprotected openings on unrated *exterior walls* where unrated walls are permitted by Table 705.5 and unprotected openings are permitted by Table 705.9.

Revise as follows:

TABLE 1020.2 CORRIDOR FIRE-RESISTANCE RATING

OCCUPANCY	OCCUPANT LOAD SERVED BY CORRIDOR	REQUIRED FIRE-RESISTANCE RATING (hours)		
		Without automatic sprinkler system	With automatic sprinkler system	
		NS	S, S13R	S13D
H-1, H-2, H-3	All	~~Not Permitted~~ NP	1~~[e]~~	NP
H-4, H-5	Greater than 30	~~Not Permitted~~ NP	1~~[e]~~	NP
A, B, E, F, M, S, U	Greater than 30	1	0	NP
R	Greater than 10	~~Not Permitted~~ NP	0.5~~[e]/1[d]~~	1[c]
I-2[a]	All	~~Not Permitted~~ NP	0	NP
I-1, I-3	All	~~Not Permitted~~ NP	1[b~~, e~~]	NP
I-4	All	1	0	NP

NP = Not Permitted.

NS = Buildings not equipped throughout with an automatic sprinkler system; S = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1; S13R = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.2; S13D = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.3.

a. For requirements for occupancies in Group I-2, see Sections 407.2 and 407.3.

b. For a reduction in the fire-resistance rating for occupancies in Group I-3, see Section 408.8.

~~c. Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 where allowed.~~

~~d. Group R-3 and R-4 buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.3. See Section 903.2.8 for occupancies where automatic sprinkler systems are permitted in accordance with Section 903.3.1.3.~~

<u>c. The corridor fire resistance rating shall only apply to exit access corridors outside of the unit in a Group R-3 and R-4 occupancy located in a mixed occupancy building.</u>

2024 International Fire Code

[BE] 1020.2 Construction.

Corridors shall be *fire-resistance rated* in accordance with Table 1020.2. The *corridor* walls required to be *fire-resistance rated* shall comply with Section 708 of the International Building Code for *fire partitions*.

Exceptions:

1. A *fire-resistance rating* is not required for *corridors* in an occupancy in Group E where each room that is used for instruction has not less than one door opening directly to the exterior and rooms for assembly purposes have not less than one-half of the required *means of egress* doors opening directly to the exterior. Exterior doors specified in this exception are required to be at ground level.
2. A *fire-resistance rating* is not required for *corridors* contained within a *dwelling unit* or *sleeping unit* in an occupancy in Groups I-1 and R.
3. A *fire-resistance rating* is not required for *corridors* in open parking garages.
4. A *fire-resistance rating* is not required for *corridors* in an occupancy in Group B that is a space requiring only a single *means of egress* complying with Section 1006.2.
5. *Corridors* adjacent to the *exterior walls* of buildings shall be permitted to have unprotected openings on unrated *exterior walls* where unrated walls are permitted by Table 705.5 of the International Building Code and unprotected openings are permitted by Table 705.9 of the International Building Code.

Revise as follows:

[BE] TABLE 1020.2 CORRIDOR FIRE-RESISTANCE RATING

OCCUPANCY	OCCUPANT LOAD SERVED BY CORRIDOR	REQUIRED FIRE-RESISTANCE RATING (hours)		
		Without automatic sprinkler system	With automatic sprinkler system	
		<u>NS</u>	<u>S, S13R</u>	<u>S13D</u>
H-1, H-2, H-3	All	~~Not Permitted~~ <u>NP</u>	1[e]	<u>NP</u>
H-4, H-5	Greater than 30	~~Not Permitted~~ <u>NP</u>	1[e]	NP
A, B, E, F, M, S, U	Greater than 30	1	0	NP
R	Greater than 10	~~Not Permitted~~ <u>NP</u>	0.5~~[e]/1[d]~~	<u>1[c]</u>
I-2[a]	All	~~Not Permitted~~ <u>NP</u>	0	NP
I-1, I-3	All	~~Not Permitted~~ <u>NP</u>	1[b, ~~e~~]	NP
I-4	All	1	0	NP

a. For requirements for occupancies in Group I-2, see Sections 407.2 and 407.3 of the International Building Code.

b. For a reduction in the fire-resistance rating for occupancies in Group I-3, see Section 408.8 of the International Building Code.

~~c. Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 where allowed.~~

~~d. Group R-3 and R-4 buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.3. See Section 903.2.8 for occupancies where automatic sprinkler systems are permitted in accordance with Section 903.3.1.3.~~

c. <u>The corridor fire resistance rating shall only apply to exit access corridors outside of the unit in a Group R-3 and R-4 occupancy located in a mixed occupancy building.</u>

Reason: The intent of this group of proposal is to make the tables in Chapter8 and 10 consistent with the revisions to Table 504.3, 504.4, 506.2 – using S13, S13R, S13D and NP for sprinkler requirement. This would clarify what happens when an NFPA 13D sprinkler system is used. This is not intent to change current allowances; just to clarify what requirements are applicable for an NFPA13D system.

Discussion during the BCAC calls has indicated that it is needed to identifying specific code sections so that everyone has the same understanding.

Group R-4 requirements do not always have to be stated as Section 310.5 states “Group R-4 occupancies shall meet the requirements for construction as defined for Group R-3, except as otherwise provided for in this code.” However, since a lot of people miss that, we are including R-4 in the proposed applicable footnotes.

Townhouses are defined as attached dwelling units that extend from foundation to grade and are open on at least two sides. If a townhouse is 3 stories or less, it can choose to comply with the IBC or IRC (Section 101.2). The IRC Section P2904 is similar to an NFPA 13D system. If the IBC is used, townhouses subdivide by firewalls into 1 or 2 units per building is a Group R-3 (Section 310.4) and townhouses subdivided by fire partitions (Section 420.2) are a Group R-2 (Section 310.3). This is important to clarify because all townhouses can use a 13D sprinkler system: Section 903.2.8 references 903.3, and 903.1.3.3 specifically stating that “Automatic sprinkler systems installed in … and townhouses shall be permitted to be installed throughout in accordance with NFPA 13D.” To make this obvious in the tables, a reference to 903.2.8 and 903.1.3.3 are added in the footnote.

Specifics for this change –

- adds the S13, S13R, S13D and NS in the table titles and footnotes with the section references for sprinklers.
- add column for NFPA13D.
- Footnote c and d are redundant and deleted.
- The new footnote is added to coordinate with the singe exit allowance in Section 1006.3.4 Item 4.
- “NP” instead of “not permitted” is for consistency in table styles.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).
BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC webpage.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is a clarification of requirements for Group R where an NFPA13D system is permitted. There are no changes to construction requirements.

E95-24

E96-24

IBC: TABLE 1020.2; IFC: [BE] TABLE 1020.2

Proponents: Richard Walke, Creative Technology Inc., SAFTIFIRST (richwalke61@gmail.com)

2024 International Building Code

Revise as follows:

TABLE 1020.2 CORRIDOR FIRE-RESISTANCE RATING

OCCUPANCY	OCCUPANT LOAD SERVED BY CORRIDOR	REQUIRED FIRE-RESISTANCE RATING (hours)	
		Without automatic sprinkler system	With automatic sprinkler system
H-1, H-2, H-3	All	Not Permitted	1[c]
H-4, H-5	Greater than 30	Not Permitted	1[c]
A, B, ~~E,~~ F, M, S, U	Greater than 30	1	0
E	All	1	1
R	Greater than 10	Not Permitted	0.5[c]/1[d]
I-2[a]	All	Not Permitted	0
I-1, I-3	All	Not Permitted	1[b, c]
I-4	All	1	0

a. For requirements for occupancies in Group I-2, see Sections 407.2 and 407.3.

b. For a reduction in the fire-resistance rating for occupancies in Group I-3, see Section 408.8.

c. Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 where allowed.

d. Group R-3 and R-4 buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.3. See Section 903.2.8 for occupancies where automatic sprinkler systems are permitted in accordance with Section 903.3.1.3.

2024 International Fire Code

Revise as follows:

[BE] TABLE 1020.2 CORRIDOR FIRE-RESISTANCE RATING

OCCUPANCY	OCCUPANT LOAD SERVED BY CORRIDOR	REQUIRED FIRE-RESISTANCE RATING (hours)	
		Without automatic sprinkler system	With automatic sprinkler system
H-1, H-2, H-3	All	Not Permitted	1[c]
H-4, H-5	Greater than 30	Not Permitted	1[c]
A, B, ~~E,~~ F, M, S, U	Greater than 30	1	0
E	All	1	1
R	Greater than 10	Not Permitted	0.5[c]/1[d]
I-2[a]	All	Not Permitted	0
I-1, I-3	All	Not Permitted	1[b, c]
I-4	All	1	0

a. For requirements for occupancies in Group I-2, see Sections 407.2 and 407.3 of the International Building Code.

b. For a reduction in the fire-resistance rating for occupancies in Group I-3, see Section 408.8 of the International Building Code.

c. Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 where allowed.

d. Group R-3 and R-4 buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.3. See Section 903.2.8 for occupancies where automatic sprinkler systems are permitted in accordance with Section 903.3.1.3.

Reason: This proposal is intended add a requirement for a 1 hr fire-resistance rating on corridor walls in sprinkled E Occupancies. It emulates an amendment which was made when the City of Chicago adopted the International Building Code.

The City of Chicago suffered a tragic loss of ninety-two students and three nuns during the Our Lady of the Angels School Fire on December 1, 1958. Many of these lives were lost due to flames and smoke blocking their normal means of egress. No doubt this fire and the tragic loss of life was on the minds of the City Council members when amending their code. And it should be on our minds when considering this proposal. There is no more important a responsibility we as a collective group should have here this week than to protect the lives of our children and grandchildren through requirements for safe building construction methods.

The need for rated corridors was removed for the sprinkled occupancies during the transition from the legacy codes to the International Building Code. Since that time, if I have heard it once, I have heard it one hundred times, “We need to reinstate the requirement for rated corridors in our schools.” So here is our opportunity.

When voting on this proposal, please keep in mind the chaotic environment which would exist in a school fire. Even though the students and facility do practice fire drills, an actual fire is far different. The practiced means of egress may not be available due to fire, smoke and toxic gases. So having the redundancy of sprinklers and fire-resistance-rated construction certainly increases the likely-hood of a safe ending to a school fire. Please vote to reinstate the requirement for protecting corridors in sprinkled E occupancies. Do it for the children!

Cost Impact: Increase

Estimated Immediate Cost Impact:

The average additional installed cost of constructing a 1 hr fire-resistance-rated gypsum board wall as compared to a non-rated gypsum board wall is approximately $1 to $2 / sq ft. The average additional installed cost of constructing a 1 hr fire-resistance-rated concrete masonry unit (CMU) wall as compared to a non-rated CMU wall is approximately $2 to $4 / sq ft. In addition to the additional cost of construction the wall, the various breaches will need to be likewise protected in accordance with Sections 714, 715, 716 and 717 of the International Building Code. Below is the average cost for installing this additional protection:

1. Based on industry and manufacturer input, the average cost of an installed firestop system is $50 to $60 per penetration.
2. Based on industry and manufacturer input, the average cost of an installed joint system is $25 to $40 per lineal foot.
3. Based on industry and manufacturer input, the average increase in cost of an installed 20 minute without hose stream door versus a non-rated door is $50 to $100 per door.
4. Based on industry and manufacturer input, the average increase in cost of an installed 20 or 45 minute fire-protection glazing versus a non-rated glazing is $25 to $40 per sq ft of opening.
5. Based on industry and manufacturer input, the average cost of an installed fire, smoke or combination fire/smoke damper is $300 to $500, $1,000 to $1,500 and $1,000 to $1,500 per damper, respectively.

Estimated Immediate Cost Impact Justification (methodology and variables):

This cost includes average materials and labor costs for the above items. The cost range includes protecting both sides of wall assembly where appropriate. In the end, the exact increase in cost is based on the specific building design in question.

E96-24

E97-24

IBC: SECTION 202 (New), SECTION 202, 1022.1, 1022.3 (New), 1023.3.1, 1022.3.2 (New), 1022.3.2.1 (New), 1022.3.2.2 (New), 1022.3.2.3 (New), 1008.3, 1024.5; IFC: SECTION 202 (New), SECTION 202, [BE] 1022.1, 1022.3 (New), [BE] 1023.3.1, 1022.3.2 (New), 1022.3.2.1 (New), 1022.3.2.2 (New), 1022.3.2.3 (New), [BE] 1008.3, [BE] 1024.5

Proponents: Jenifer Gilliland, Seattle Department of Construction and Inspections, Washington Association of Building Officials Technical Code Development Committee (jenifer.gilliland@seattle.gov); Micah Chappell, Seattle Department of Construction and Inspections, Washington Association of Building Officials Technical Code Development Committee (micah.chappell@seattle.gov); Angela Haupt, City of Kirkland, Washington Association of Building Officials, Technical Code Development Committee (ashaupt@kirklandwa.gov)

2024 International Building Code

Add new definition as follows:

EXIT PATHWAY.
An exit component that serves to meet one or more means of egress design requirements and is open to sky.

Revise as follows:

[BE] EXIT. That portion of a *means of egress* system between the *exit access* and the *exit discharge* or *public way*. Exit components include exterior exit doors at the *level of exit discharge*, *interior exit stairways* and *ramps*, *exit passageways*, exit pathways, *exterior exit stairways* and *ramps* and *horizontal exits*.

1022.1 General.
Exits shall comply with Sections 1022 through 1027 and the applicable requirements of Sections 1003 through 1015. An *exit* shall not be used for any purpose that interferes with its function as a *means of egress*. Once a given level of *exit* protection is achieved, such level of protection shall not be reduced until arrival at the *exit discharge.* ~~Exits shall be continuous from the point of entry into the *exit* to the *exit discharge*~~.

Add new text as follows:

1022.3 Exit continuity.
Exits shall be continuous from the point of entry into the *exit* to the *exit discharge*. The path within *exits* is permitted to consist of any combination of *interior exit stairways*, *interior exit ramps*, *exit passageways*, *exit pathways*, *exterior exit stairways*, and *exterior exit ramps.*

Revise as follows:

~~**1023.3.1**~~ **1022.3.1 Extension.** Where an *exit passageway* is used to provide continuity of an *exit*, ~~*interior exit stairways* and *ramps* are extended to an *exit discharge* or a *public way* by an *exit passageway*,~~ the *interior* or exterior *exit stairway* and *ramp* shall be separated from the *exit passageway* by a *fire barrier* constructed in accordance with Section 707 or a *horizontal assembly* constructed in accordance with Section 711, or both. The *fire-resistance rating* of the exit passageway shall be not less than that required for the *interior exit stairway* and *ramp*. A *fire door assembly* complying with Section 716 shall be installed in the *fire barrier* to provide a *means of egress* from the *interior* or exterior *exit stairway* and *ramp* to the *exit passageway*. Openings in the *fire barrier* other than the *fire door assembly* are prohibited. Penetrations of the *fire barrier* are prohibited.

Exceptions:

1. Penetrations of the *fire barrier* in accordance with Section 1023.5 shall be permitted.
2. Separation between an *interior exit stairway* or *ramp* and the *exit passageway* extension shall not be required where there are no openings into the *exit passageway* extension.
3. Separation between an *interior exit stairway* or *ramp* and the *exit passageway* extension shall not be required where the *interior exit stairway* and the *exit passageway* extension are pressurized in accordance with Section 909.20.4.

Add new text as follows:

1022.3.2 Exit pathways. *Exit pathways* shall be permitted to serve as an exit component in the *means of egress* system where they connect *interior* or *exterior exit stairways and ramps* of the same *building* and comply with the requirements in Section 1022.3.2.1 through 1022.3.2.3.

1022.3.2.1 Construction and openings. The floor, walls, and openings of the *exit pathway* shall be constructed in accordance with Section 1024 for *exit passageways* for a minimum horizontal distance of 10 feet from the edges of *exit pathway* and a minimum vertical distance of 10 feet from the floor of the *exit pathway*.

1022.3.2.2 Location. The *exit pathway* shall have a minimum *fire separation distance* of 10 feet (3048 mm) measured at right angles from the exterior edge of the *exit pathway*, to:

1. The closest interior *lot line*.
2. The centerline of a street, an alley, or *public way*.
3. An imaginary line between two *buildings* on the lot.

1022.3.2.3 Path marking. *Exit pathways* shall be delineated or marked to clearly indicate the path of travel.

Revise as follows:

1008.3 Illumination required by an emergency electrical system. An emergency electrical system shall be provided to automatically illuminate the following areas in the event of a power supply failure:

1. In rooms or spaces that require two or more exits or access to exits:
   - 1.1. *Aisles*.
   - 1.2. *Corridors*.
   - 1.3. *Exit access stairways* and *ramps*.
2. In *buildings* that require two or more exits or access to exits:
   - 2.1. Interior *exit access stairways* and *ramps*.
   - 2.2. Interior and *exterior exit stairways* and *ramps*.
   - 2.3 *Exit pathways*
   - ~~2.3.~~ 2.4. Exit passageways.
   - ~~2.4.~~ 2.5. Vestibules and areas on the level of discharge used for *exit discharge* in accordance with Section 1028.2.
   - ~~2.5.~~ 2.6. Exterior landings as required by Section 1010.1.5 for exit doorways that lead directly to the *exit discharge*.
3. In other rooms and spaces:
   - 3.1. Electrical equipment rooms.
   - 3.2. *Fire command centers*.
   - 3.3. Fire pump rooms.
   - 3.4. Generator rooms.
   - 3.5. Public restrooms with an area greater than 300 square feet (27.87 m^2).

1024.5 Openings.
Exit passageway opening protectives shall be in accordance with the requirements of Section 716.
Except as permitted in Section 402.8.7, openings in exit passageways other than unprotected exterior openings shall be limited to those necessary for *exit access* to the *exit passageway* from normally occupied spaces and for egress from the *exit passageway*.

Where an *interior exit stairway* or *ramp* is extended to an *exit discharge* or a *public way* by an *exit passageway*, the *exit passageway* shall comply with Section ~~1023.3.1~~ 1022.3.1.

Elevators shall not open into an *exit passageway*.

2024 International Fire Code

Add new definition as follows:

EXIT PATHWAY. An exit component that serves to meet one or more means of egress design requirements and is open to sky.

Revise as follows:

[BE] EXIT. That portion of a *means of egress* system between the *exit access* and the *exit discharge* or *public way*. Exit components include exterior exit doors at the *level of exit discharge*, *interior exit stairways* and *ramps*, *exit passageways*, exit pathways, *exterior exit stairways* and *ramps* and *horizontal exits*.

[BE] 1022.1 General.
Exits shall comply with Sections 1022 through 1027 and the applicable requirements of Sections 1003 through 1015. An *exit* shall not be used for any purpose that interferes with its function as a *means of egress*. Once a given level of exit protection is achieved, such level of protection shall not be reduced until arrival at the *exit discharge*. ~~*Exits* shall be continuous from the point of entry into the *exit* to the *exit discharge*.~~

Add new text as follows:

1022.3 Exit continuity. Exits shall be continuous from the point of entry into the *exit* to the *exit discharge*. The path within *exits* is permitted to consist of any combination of *interior exit stairways*, *interior exit ramps*, *exit passageways*, *exit pathways*, *exterior exit stairways*, and *exterior exit ramps.*

Revise as follows:

[BE] ~~1023.3.1~~ 1022.3.1 Extension.
Where an *exit passageway* is used to provide continuity of an *exit*, ~~*interior exit stairways* and *ramps* are extended to an *exit discharge* or a *public way* by an *exit passageway*,~~ the *interior* or exterior *exit stairway* and *ramp* shall be separated from the *exit passageway* by a *fire barrier* constructed in accordance with Section 707 of the International Building Code or a *horizontal assembly* constructed in accordance with Section 711 of the International Building Code, or both. The *fire-resistance rating* of the exit passageway shall be not less than that required for the *interior exit stairway* and *ramp*. A *fire door assembly* complying with Section 716 of the International Building Code shall be installed in the *fire barrier* to provide a *means of egress* from the *interior* or exterior *exit stairway* and *ramp* to the *exit passageway*. Openings in the *fire barrier* other than the *fire door assembly* are prohibited. Penetrations of the *fire barrier* are prohibited.

Exceptions:

1. Penetrations of the *fire barrier* in accordance with Section 1023.5 shall be permitted.
2. Separation between an *interior exit stairway* or *ramp* and the *exit passageway* extension shall not be required where there are no openings into the *exit passageway* extension.
3. Separation between an *interior exit stairway* or *ramp* and the *exit passageway* extension shall not be required where the *interior exit stairway* and the *exit passageway* extension are pressurized in accordance with Section 909.20.4 of the International Building Code.

Add new text as follows:

1022.3.2 Exit pathways. *Exit pathways* shall be permitted to serve as an exit component in the *means of egress* system where they connect *interior* or *exterior exit stairways and ramps* of the same *building* and comply with the requirements in Section 1022.3.2.1 through 1022.3.2.3.

1022.3.2.1 Construction and openings.
The floor, walls, and openings of the *exit pathway* shall be constructed in accordance with Section 1024 for *exit passageways* for a minimum horizontal distance of 10 feet from the edges of *exit pathway* and a minimum vertical distance of 10 feet from the floor of the *exit pathway*.

1022.3.2.2 Location. The exit pathway shall have a minimum fire separation distance of 10 feet (3048 mm) measured at right angles from the exterior edge of the exit pathway, to:

1. The closest interior lot line.
2. The centerline of a street, an alley, or public way.
3. An imaginary line between two buildings on the lot.

1022.3.2.3 Path marking. *Exit pathways* shall be delineated or marked to clearly indicate the path of travel.

Revise as follows:

[BE] 1008.3 Illumination required by an emergency electrical system.
An emergency electrical system shall be provided to automatically illuminate the following areas in the event of a power supply failure:

1. In rooms or spaces that require two or more exits or access to exits:
   1.1. *Aisles*.
   1.2. *Corridors*.
   1.3. *Exit access stairways* and *ramps*.
2. In *buildings* that require two or more exits or access to exits:
   2.1. Interior *exit access stairways* and *ramps*.
   2.2. Interior and *exterior exit stairways* and *ramps*.
   2.3 Exit pathways
   ~~2.3.~~ 2.4. Exit passageways.
   ~~2.4.~~ 2.5. Vestibules and areas on the level of discharge used for *exit discharge* in accordance with Section 1028.2.
   ~~2.5.~~ 2.6. Exterior landings as required by Section 1010.1.5 for exit doorways that lead directly to the *exit discharge*.
3. In other rooms and spaces:
   3.1. Electrical equipment rooms.
   3.2. *Fire command centers*.
   3.3. Fire pump rooms.
   3.4. Generator rooms.
   3.5. Public restrooms with an area greater than 300 square feet (27.87 m^2).

[BE] 1024.5 Openings. *Exit passageway* opening protectives shall be in accordance with the requirements of Section 716 of the

International Building Code.

Except as permitted in Section 402.8.7 of the International Building Code, openings in *exit passageways* other than unprotected exterior openings shall be limited to those necessary for *exit access* to the *exit passageway* from normally occupied spaces and for egress from the *exit passageway*.

Where an *interior exit stairway* or *ramp* is extended to an *exit discharge* or a *public way* by an *exit passageway*, the *exit passageway* shall comply with Section ~~1023.3.1~~1022.3.1.

Elevators shall not open into an *exit passageway*.

Reason: The design of new buildings on small complex sites with steep or varying grades can result in buildings with multiple levels and entrances, towers of differing heights, parking garages that are partially underground with large roof decks near grade, etc. Complying with *means of egress* requirements can be difficult and some applicants propose using outdoor spaces such as roofs or roof decks as part of an *exit* or to connect *exit* components. There is no obvious code path allowing a surface like a roof or deck that is open to sky to be used to connect exit components without requiring it to be enclosed with an *exit passageway*, which is cost prohibitive.

Proposed Solution: Exit Pathway

This proposal combines *exit* continuity language from other Chapter 10 locations into Section 1022 Exits and adds new sections and definitions to establish a new option for connecting *exit* components, the *exit pathway.* The *exit pathway* has two attributes: it must be open to sky and is an *exit* component. An *exit pathway* is a delineated route that crosses a space that is open to sky and connects *exit* components, in a similar manner to how an *exit passageway* connects two *interior exit stairways* within a building (see Figure 1 below).

The purpose of the changes in each section is as follows:

1022.1 General. The last sentence, **"***Exits* shall be continuous from the point of entry into the *exit* to the *exit discharge,*" is being relocated to section 1022.3 to create a new section, Exit continuity.

1022.3 Exit continuity. This section addresses two important aspects of an *exit*: they must be continuous from beginning to end and an exit can be a combination of several different *exit* components, including the new *exit pathway*.

This proposal also adds *exterior exit stairways and ramps* to the list of exit components that can be daisy-chained together to form the egress path to the exit discharge or public way. Using Figure 1 as an example, if the delineated *exit pathway* crosses the podium of a podium building, in many designs, an *exterior exit stairway* (minus the stair penthouse shown in the figure) is used to get from the podium level to the public way. The language in the current code (1023.3, Exception) would not allow this, yet the level of safety of an *exterior exit stairway* is presumed to be the same as the other *exit* components.

1022.3.1 Extension. The *exit passageway* extension requirement used to separate the *interior or exterior exit stairway and ramp* from the *exit passageway* is being relocated from Section 102**3**.3.1 into Section 102**2**.3.1. *Exit* continuity needs to be maintained through all components of an *exit*, not just *interior exit stairways* and ramps, so the relocation to Section 1022, the general exiting section, is more appropriate.

1022.3.2 *Exit pathways*: Adds scoping language for the new *exit pathway section.*

1022.3.2.1 Construction and openings: The floors and walls of the *exit pathway* would be protected like an *exit passageway,* but there would be no ceiling that needs protection. The exit pathway is protected from fires below by requiring the horizontal assembly required in 1024.3 to extend 10 feet from the edge of the pathway. Where there is a minimum of 10 feet of horizontal separation between the edge of the *exit pathway* and other parts of the building, then no walls would be required. However, where *building* walls are less than 10 feet from the edge of *exit pathway*, they must be protected for a vertical distance of 10 feet (see Figure 2 below).

1022.3.2.2 Location: The hazard of adjacent buildings is mitigated with a requirement to have 10 feet of *fire separation distance* between the edge of the *exit pathway* and the lot line, centerline of the right-of-way, or an imaginary lot line, which is similar to how Section 1027.5 protects exterior stairs.

1022.3.2.3 Path marking: Marking the *exit pathway* is required. It can be disorienting to leave an exit stairway or other area and suddenly find yourself in an open to sky area that isn't at grade. Providing a visual cue for the *exit pathway* will allow people to get to the other exit component efficiently in the event of an emergency.

1008.3 Illumination required by an emergency electrical system: To coordinate with the change requiring illumination made in 1002.3.2.4, *exit pathways* is added as item 2.3, requiring the emergency electrical system to automatically illuminate the pathway if there is a power failure. Ambient lighting is not an effective substitute for artificial lighting especially in dense urban environments. Areas like podium plazas, may get little ambient light because of shadows from neighboring buildings and the top floor of many high-rise buildings are stepped back and of a such height that no other building is nearby that can provide the ambient light necessary to light the *exit pathway*. In recognition of the limitations of ambient lighting, the code hasn't relied on the use of ambient lighting to light the exit discharge since the 2018 IBC.

1024.5 Openings: The reference to 102**3**.3.1 is being changed to 102**2**.3.1 to reflect the relocation of the extension section for *exit passageway*s in 1023 to 1022.3.1. See comments on 1022.3.1.

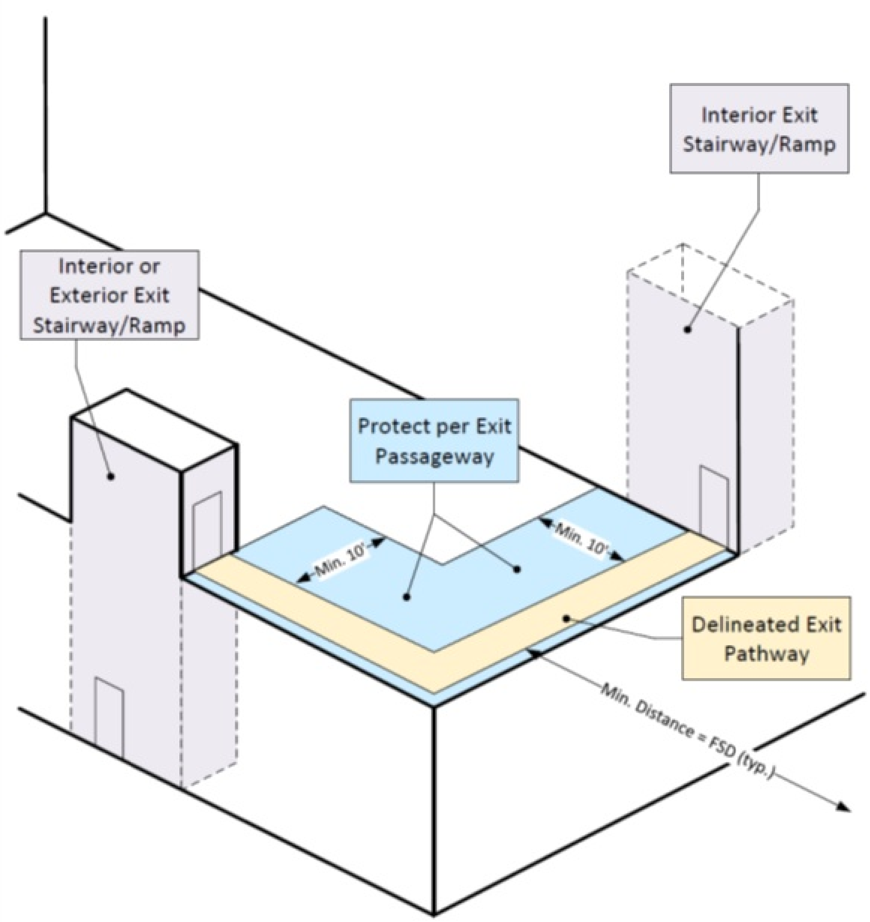


FIGURE 1 – Protection of Exit Pathway Traversing Area Open to Sky

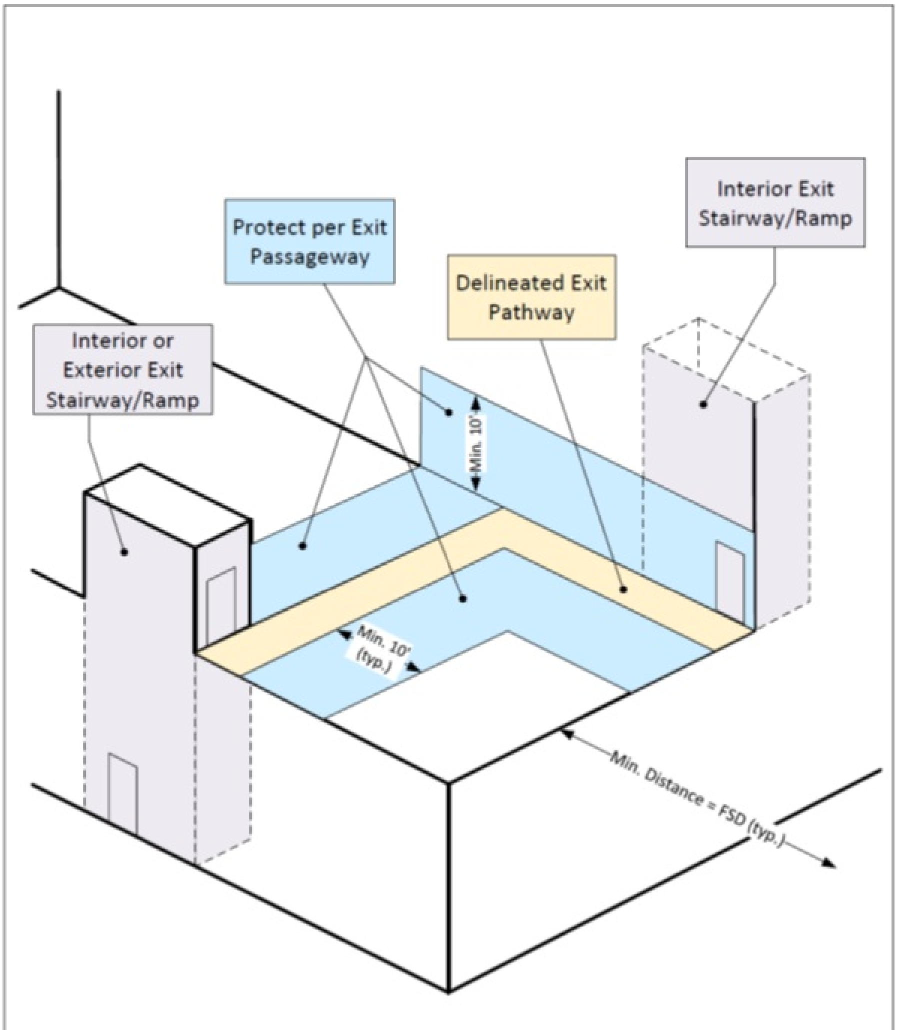


FIGURE 2 – Vertical Wall Protection Near Exit Pathway

Cost Impact: Decrease

Estimated Immediate Cost Impact:

Much depends on what the applicant proposes and what the building official will approve for delineating or marking the exit pathway. Barriers and guards could make sense depending on if amenities are provided on the roof or other outdoor surface. It is more likely that striping and paint will be used. The exit pathway may need to be redone or touched up in the future. A cursory review of online prices for traffic striping paint and pavement marking tape revealed the following:

Paint

HD Supply Solutions: $70.39 to $199.00 per gallon HD Supply Solutions

Pavement marking tape (retroreflective polymer pavement marking tape)

(yellow) 3M Stamark 24"x30 yard: $320 Uline; $416.78 Stop-Painting.com

3M Stamark Surface Preparation Adhesive P50, 1 gallon: $85.07 Industrial General Store

An analysis of the cost of luminous of egress path markings, such as those required by Section 1025, is not included as they are generally not designed for outdoor use.

Estimated Immediate Cost Impact Justification (methodology and variables):

This change provides a new option to use an exit pathway across a roof to connect two exit components and an exterior exit stairway or ramp to be used as one of the connected components. It is not creating a new requirement, so there is no cost impact or most likely a decrease in cost.
Currently, the only way an outdoor portion of a building like a roof or roof deck can be used as part of the *exit* would be to put enclose that portion of the roof in an exit passageway. Exit passageways are required to have fire resistance rated construction on the floor, ceiling and walls for the entire length of the exit passageway. With this change, at a minimum, someone opting to use the exit pathway approach where other portions of the surface are within 10 feet of the pathway or where the pathway is within a fire separation distance of 10 feet would not need to rate its ceiling while still rating its walls and floor. This is a cost reduction because they don't need to rate the of the ceiling of what would normally be required, an exit passageway. In cases where the exit pathway is more than 10 feet away from other items on the roof and adjacent buildings, only the floor of would need to be rated. Again, this represents a cost reduction from full compliance with the requirements of an exit passageway. In addition, many podium buildings have roofs and other outdoor surfaces that may already be appropriately fire resistance rated due to other code requirements and nothing would need to be required other than marking and lighting the path. This is also a cost reduction from full compliance with an exit passageway. Exit passageways are required to be provided with lighting and markings, so the minimal lighting and path marking requirements for the exit pathways would certainly cost the same or possibly less.

There could be costs associated with maintaining the exit pathway markings over time, depending on the material or product approved by the building official.

The lighting would not present increased costs over lighting already required in an exit pathway.

E97-24

E98-24

IBC: 1023.2; IFC: [BE] 1023.2

Proponents: Ali Fattah, City of San Diego Development Services Department, San Diego Area Chapter of ICC (afattah@sandiego.gov)

2024 International Building Code

Revise as follows:

1023.1 General.
Interior exit stairways and *ramps* serving as an exit component in a *means of egress* system shall comply with the requirements of this section. *Interior exit stairways* and *ramps* shall be enclosed and lead directly to the exterior of the *building* or shall be extended to the exterior of the *building* with an *exit passageway* conforming to the requirements of Section 1024, except as permitted in Section 1028.2. An *interior exit stairway* or *ramp* shall not be used for any purpose other than as a *means of egress* and a *circulation path*.

1023.2 Construction.
Enclosures for interior exit *stairways* and *ramps* shall be constructed as *fire barriers* in accordance with Section 707 or *horizontal assemblies* constructed in accordance with Section 711, or both. *Interior exit stairway* and *ramp* enclosures shall have a *fire-resistance rating* of not less than 2 hours where connecting four stories or more and not less than 1 hour where connecting less than four stories. The number of *stories* connected by the interior exit *stairways* or *ramps* shall include any *basements*, but not any *mezzanines*. Enclosures for interior *exit stairways* and *ramps* shall have a *fire-resistance rating* not less than the floor assembly penetrated, but need not exceed 2 hours.

Exceptions:

1. *Interior exit stairways* and *ramps* in Group I-3 occupancies in accordance with the provisions of Section 408.3.8.
2. *Interior exit stairways* within an *atrium* enclosed in accordance with Section 404.6.
3. *Interior exit stairways* in accordance with Section 510.2.
4. <u>Interior exit stairway within and serving individual units in Group R-3 occupancies and not connecting more than 4 stories are not required to enclosed.</u>
5. <u>Interior exit stairway in Group R-3 occupancies, where the interior exit stairway does not serve more than one dwelling unit and where the interior exit stairway does not connect more than 3 stories, are not required to enclosed within the unit it serves.</u>

2024 International Fire Code

[BE] 1023.1 General.
Interior exit stairways and *ramps* serving as an *exit* component in a *means of egress* system shall comply with the requirements of this section. *Interior exit stairways* and *ramps* shall be enclosed and lead directly to the exterior of the building or shall be extended to the exterior of the building with an *exit passageway* conforming to the requirements of Section 1024, except as permitted in Section 1028.2. An *interior exit stairway* or *ramp* shall not be used for any purpose other than as a *means of egress* and a circulation path.

Revise as follows:

[BE] 1023.2 Construction.
Enclosures for *interior exit stairways* and *ramps* shall be constructed as *fire barriers* in accordance with Section 707 of the International Building Code or *horizontal assemblies* constructed in accordance with Section 711 of the International Building Code, or both. *Interior exit stairway* and *ramp* enclosures shall have a *fire-resistance rating* of not less than 2 hours where connecting four stories or more and not less than 1 hour where connecting less than four stories. The number of stories connected by the *interior exit stairways* or *ramps* shall include any *basements*, but not any *mezzanines*. Enclosure for *interior exit stairways* and *ramps* shall have a *fire-resistance rating* not less than the floor assembly penetrated, but need not exceed 2 hours.

Exceptions:

1. *Interior exit stairways* and *ramps* in Group I-3 occupancies in accordance with the provisions of Section 408.3.8.
2. *Interior exit stairways* within an *atrium* enclosed in accordance with Section 404.6.
3. *Interior exit stairways* in accordance with Section 510.2.
4. <u>Interior exit stairway within and serving individual dwelling units in Group R-3 occupancies and not connecting more than 4 stories are not required to enclosed.</u>
5. <u>Interior exit stairway in Group R-3 occupancies, where the interior exit stairway does not serve more than one dwelling unit and where the interior exit stairway does not connect more than 3 stories, are not required to enclosed within the unit it serves.</u>

Reason: The proposed code change is necessary to address a regulatory gap in the IBC. Group R-3 occupancies are scoped out of the IRC when the number of stories exceeds 3 stories and when the means of egress is shared by dwelling units and as a consequence, and when scoped out they, R-3 occupancies would follow a compliance path offered by the IBC.

The IBC regulates three types of stairways: Exit Access stairways per Section 1019, Interior Exit stairways per Section 1023 and Exterior exit stairways per Section 1027. The IBC does not clearly address two unique cases that have arisen recently, one case is a 6 story R-3 dwelling with a single dwelling unit and a second case is a 3 story 2-unit R-3 occupancy with a Group U private Garage on the first story. Do interior stairways serving these two building types need to be enclosed with fire barriers and designed to comply as interior exit stairways is the primary question. This code change seeks to make code revisions to say yes in essence by exempting cases that are not those two.

- Section 1006.3.4 item 4 permits a single exit in an R-3 occupancy.
- Section 1017.2 permits a travel distance of 125 in an R-3 protected with a sprinkler system per Section 903.3.1.1.
- Section 1019.3 exempts exit access stairs within individual dwelling units in Group R-3 connecting 4 stories from being protected with an enclosure.
- Section 1023.2 does not address Group R-3 since Section 1019.3 does not require an enclosure.
- Section 1023.7 exempts exterior exit stairways in exception 4 from protection when serving individual dwelling units in Group R-3 in a Group R-3 not more than 4 stories. This can be interpreted to mean that dwelling units do not share a stair.

The proposed Code change adds two new exceptions to Section 1023.2 to not require an enclosure with a fire barrier for an interior exit stairway connecting not more than 4 stories and a second exception that addresses the case of a multi-story R-3 where the means of egress stair is not shared for example a first story unit discharges directly to grade and a second story unit uses a stairway. While it may appear to be inconsistent that exception 5 sets the limit at 3 stories, the limit is consistent with the philosophy in Section 712 when a shaft is not within a dwelling unit. Exterior stairways, while regulated in similar fashion to interior exit stairways, are different than interior exit stairways in that they do not trap smoke. This code change can be considered an editorial clarification for the IBC to be more direct rather than arriving at the requirement through inference.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This code change is a clarification since single exit buildings may or may not require an interior exit stairway in a 3-story building and exit access stairways are limited by travel distance. The IBC did not envision one of the unique configurations being addressed in this code change.

The proposed code change will require a fire barrier that may be 1- or 2-hour fire resistance rated and 1 hour or 90-minute doors. a 2-hour fire barrier will cost $10,800 per story assuming $300 per lineal foot and 36 ft per story. Doors will cost $1,500 each. So, if a cost estimate is required the increased cost can be approximately $12,300 per story. However, it should be stated that in all cases the common stair will include doors and walls so the cost increase will be minimal and the 6-story house if permitted to be protected as an exit access stairway would be the same.

As a result in reality the increase in the cost of construction should be minimal.

E98-24

E99-24

IBC: 1024.3; IFC: [BE] 1024.3

Proponents: Jeffrey Grove, Coffman Engineers, Coffman Engineers (jeff.grove@coffman.com)

2024 International Building Code

Revise as follows:

1024.3 Construction.

Exit passageway enclosures shall have walls, floors and ceilings of not less than a 1-hour *fire-resistance rating.* The fire-resistance rating of an exit passageway, where extending from an interior exit stairway or ramp, shall not be less than that required for the ~~, and not less than that required for any connecting~~ *interior exit stairway* or *ramp*. Exit passageways shall be constructed as *fire barriers* in accordance with Section 707 or *horizontal assemblies* constructed in accordance with Section 711, or both.

2024 International Fire Code

Revise as follows:

[BE] 1024.3 Construction.

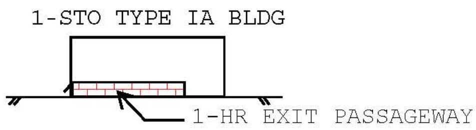
Exit passageway enclosures shall have walls, floors and ceilings of not less than a 1-hour *fire-resistance rating.* The fire-resistance rating of an exit passageway, where extending from an interior exit stairway or ramp, shall not be less than that required for the ~~, and not less than that required for any connecting~~ *interior exit stairway* or *ramp*. Exit passageways shall be constructed as *fire barriers* in accordance with Section 707 or *horizontal assemblies* constructed in accordance with Section 711, or both.

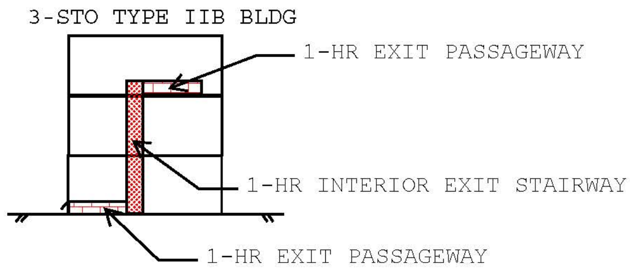
Reason: It is clearly the intent of the Code that an exit passageway, whether required for travel distance or some other reason, may be of minimum one-hour fire-resistance rating, regardless of the type of construction or number of stories in a building. There are many times that this is misinterpreted that if you are located in a Type I building, or several stories up in a structure, that the exit passageway must be two-hour rated.

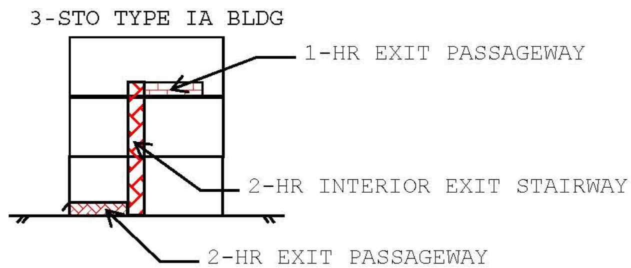
The Code Commentary already states that "Where extending an enclosure for an exit stairway, the rating must not be less than the enclosure for the exit stairway so that the degree of protection is kept at the same level." This proposal is intended to clarify these code provisions.

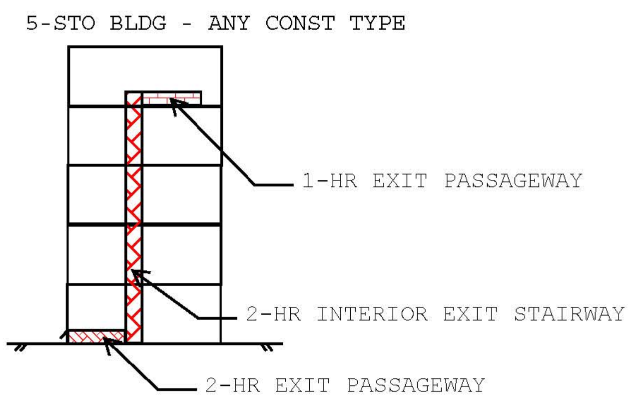
This is a similar proposal as E98-21 which was Approved as Submitted during the Public Comment Hearings, but was ultimately disapproved during the OGCV. To further clarify the intention of this proposal, exhibit schematics have been included with this submission. These examples illustrate this language as follows:

- One-story Type IA building - an exit passageway is required to be a minimum of 1-hour fire-resistance construction, regardless that the building has a required structural fire-resistance greater than 1-hour.
- Three-story Type IIB building - the exit passageway on Level 3 is required to be a minimum of 1-hour fire-resistance construction. The interior exit stairway is required to be of minimum 1-hour fire-resistance construction, and any exit passageways that extend from the stairway are to be of minimum 1-hour fire-resistance construction.
- Three-story Type IA building - the exit passageway on Level 3 is required to be a minimum of 1-hour fire-resistance construction. The interior exit stairway is required to be of minimum 2-hour fire-resistance construction (due to the penetrated 2-hour floor assemblies), and any exit passageways that extend from the stairway are to be of minimum 2-hour fire-resistance construction.
- Five-story building of any construction type - the exit passageway on Level 5 is required to be a minimum of 1-hour fire-resistance construction. The interior exit stairway is required to be of minimum 2-hour fire-resistance construction, and any exit passageways that extend from the stairway are to be of minimum 2-hour fire-resistance construction.









Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposed text clarifies the existing intent for the rating of exit passageway.

E99-24

E100-24

IBC: 1026.2; IFC: [BE] 1026.2

Proponents: Jeff Perras, Code Red Consultants, LLC, Code Red Consultants, LLC (jeffp@crcfire.com)

2024 International Building Code

Revise as follows:

1026.2 Separation.
The separation between buildings or refuge areas connected by a *horizontal exit* shall be provided by a *fire wall* complying with Section 706; or by a *fire barrier* complying with Section 707 or a *horizontal assembly* complying with Section 711, or both. The minimum *fire-resistance rating* of the separation shall be 2 hours. Opening protectives in horizontal *exits* shall also comply with Section 716. Duct and air transfer openings in a *fire wall* or *fire barrier* that serves as a *horizontal exit* shall also comply with Section 717. The *horizontal exit* separation shall extend vertically through all levels of the building unless floor assemblies have a *fire-resistance rating* of not less than 2 hours and do not have unprotected openings.

~~Exception~~ Exceptions:

1. A *fire-resistance rating* is not required at horizontal *exits* between a *building* area and an above-grade *pedestrian walkway* constructed in accordance with Section 3104, provided that the distance between connected buildings is more than 20 feet (6096 mm).
2. No separation is required between portions of an occupiable roof, provided the entire roof has a fire resistance rating of not less than 2 hours.

Horizontal exits constructed as *fire barriers* shall be continuous from *exterior wall* to *exterior wall* so as to divide completely the floor served by the *horizontal exit*.

2024 International Fire Code

Revise as follows:

[BE] 1026.2 Separation.
The separation between buildings or refuge areas connected by a *horizontal exit* shall be provided by a *fire wall* complying with Section 706 of the International Building Code; or by a *fire barrier* complying with Section 707 of the International Building Code or a *horizontal assembly* complying with Section 711 of the International Building Code, or both. The minimum *fire-resistance rating* of the separation shall be 2 hours. Opening protectives in *horizontal exits* shall also comply with Section 716 of the International Building Code. Duct and air transfer openings in a *fire wall* or *fire barrier* that serves as a *horizontal exit* shall also comply with Section 717 of the International Building Code. The *horizontal exit* separation shall extend vertically through all levels of the building unless floor assemblies have a *fire-resistance rating* of not less than 2 hours and do not have unprotected openings.

~~Exception~~ Exceptions:

1. A *fire-resistance rating* is not required at horizontal *exits* between a *building* area and an above-grade *pedestrian walkway* constructed in accordance with Section 3104, provided that the distance between connected buildings is more than 20 feet (6096 mm).
2. No separation is required between portions of an occupiable roof, provided the entire roof has a fire resistance rating of not less than 2 hours.

Horizontal exits constructed as *fire barriers* shall be continuous from *exterior wall* to *exterior wall* so as to divide completely the floor served by the *horizontal exit*.

Reason: There is currently no code perscribed way to utilize a horizontal exit on an occupied roof deck. Designers are required to introduce additional exit stairs or limit the use of these areas to have compliant egress. Occupied roof decks are uniquely different than enclosed interior space with respect to smoke and fire spread, making the rated wall separation unneccesary.

This proposal seeks to eliminate the need for the rated wall assembly on an occupied roof provided the roof of the building is minimally 2 hour fire resistance rated. This rating exceeds the minimum roof rating required by all construction types. The rating also aligns with the rating required by 1026.2 when a horizontal exit does not extend vertically through all levels of the building.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Under the current code, additional exit stairs would be required. With the proposed change the additional stairs could be eliminated but the roof would require a higher rating. Given this is a cost trade off, the proposal would have no impact on the cost of construction.

E100-24

E101-24

IBC: 1026.6 (New); IFC: 1026.6 (New)

Proponents: Joseph Cervantes, Space Age Electronics (joseph.cervantes@1sae.com)

2024 International Building Code

Add new text as follows:

1026.6 Two-way communication. Where a refuge area does not contain a two-way communication system at an elevator landing or within an area of refuge, a two-way communications system shall be installed in an approved location in a public area and shall comply with Sections 1009.8.1, 1009.8.2 and 1009.11.

Exception: Two-way communication systems are not required in Group I-2 and I-3 facilities.

2024 International Fire Code

Add new text as follows:

1026.6 Two-way communication. Where a refuge area does not contain a two-way communication system at an elevator landing or within an area of refuge, a two-way communications system shall be installed in an approved location in a public area and shall comply with Sections 1009.8.1, 1009.8.2 and 1009.11.

Exception: Two-way communication systems are not required in Group I-2 and I-3 facilities.

Reason: This proposal seeks to amend the existing standards by specifying that two-way communication systems must be installed in all horizontal exit compartments. A "horizontal exit" is defined as a passageway leading either to a refuge area in another building at a similar level or through a fire barrier to a refuge area within the same building, providing protection from fire and smoke.

Current codes (1009.3, 1009.8) mandate the installation of these communication systems in elevator landings, areas of refuge (1009.6.5), and locked stairways in high-rise buildings (403.5.3.1). However, in situations where a fire breaks out near an elevator landing, individuals with disabilities or physical limitations who are unable to evacuate and seek shelter in a horizontal exit may find themselves cut off from communication with a constantly attended station or a central station, especially if the system is designed to call directly offsite.

In recognition of this critical safety gap, some jurisdictions in California have already mandated the installation of two-way communication systems in every horizontal exit compartment. This proposal aims to standardize this safety measure across all jurisdictions to ensure consistent protection for individuals who may find themselves in such vulnerable situations during a fire emergency.

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6. https://www.coffman.com/news/horizontal-exits-for-means-of-egress-systems-part-one/
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Cost Impact: Increase

Estimated Immediate Cost Impact:

For New Buildings:
Cost of Two-Way Communication Systems: Approx. $500 per unit.
Installation and Wiring Costs:
2-Hour Fire Resistive Rated Building: Use of circuit integrity cable, which is more expensive. Let's estimate $300-$400 per unit for the cable, plus installation.
1-Hour Fire Resistive Rated Building: Standard twisted pair, non-shielded cable in a mechanically protected raceway. This might cost around $100-$200 per unit, including the raceway.
Labor for Wiring, Programming, Testing, and Commissioning: Assuming a labor rate of $50 per hour, and an estimated 4 hours of work per unit, that's an additional $200.

Total Estimated Cost per Unit for New Buildings:

2-Hour Building: $1,000-$1,100
1-Hour Building: $800-$900

For Existing Buildings:
Cost of Two-Way Communication Systems: Approx. $500 per unit.
Installation and Wiring Costs:
2-Hour Building: Circuit integrity cable costs, plus more complex installation due to retrofitting, estimated at $400-$500.
1-Hour Building: Standard cable in a protected raceway, estimated at $200-$300, considering retrofitting complexities.
Retrofitting Costs: Estimated $500-$1,000 per unit for structural modifications and integration.
Labor for Wiring, Programming, Testing, and Commissioning: Same as new buildings, an additional $200.
Total Estimated Cost per Unit for Existing Buildings:

2-Hour Building: $1,600-$2,200
1-Hour Building: $1,400-$2,000

Summary:
New Buildings: Costs range from $800-$1,100 per unit, depending on the fire resistive rating of the building.
Existing Buildings: Higher costs due to retrofitting, ranging from $1,400-$2,200 per unit.
These figures are estimates and should be used as a general guide. The actual costs will depend on specific building requirements, local labor rates, and market prices for materials.

Estimated Immediate Cost Impact Justification (methodology and variables):

Methodology:
Research and Market Analysis:

Gathered average market prices for two-way communication systems.
Sourced data on the costs of circuit integrity cable for buildings with a 2-hour fire resistive rating and standard cable in mechanically protected raceway for buildings with a 1-hour rating.
Collected information on average labor rates for installation, wiring, programming, testing, and commissioning.
Calculation of Costs:

Calculated material costs based on the required type of wiring for different fire resistive rated buildings.
Estimated labor hours needed for installation, including additional work for retrofitting existing buildings.
Incorporated a buffer in cost estimations to account for variations in market rates and unforeseen installation complexities.

Variables:
Type of Building (New vs. Existing):

New buildings generally incur lower installation costs due to easier accessibility and integration during the construction phase.
Existing buildings typically require additional structural modifications, leading to higher retrofitting costs.
Fire Resistive Rating of the Building:

2-hour fire resistive rated buildings require more expensive circuit integrity cable.
1-hour rated buildings can use standard cable, which is less expensive but requires mechanical protection.
Labor Rates:

The cost of labor can vary significantly based on geographical location, the expertise of the technicians, and market demand.
Size and Complexity of Installation:

Larger buildings or those with complex layouts may require more extensive wiring and more labor hours, increasing costs.
Material Costs:

Prices for two-way communication systems and wiring materials can fluctuate based on supplier, technological advancements, and market demand.

E101-24

E102-24

IBC: 1027.2; IFC: [BE] 1027.2

Proponents: David Renn, PE, SE, City and County of Denver, Colorado Chapter Code Development Committee (david.renn@denvergov.org)

2024 International Building Code

Revise as follows:

1027.2 Use in a means of egress. *Exterior exit stairways* shall not be used as an element of a required *means of egress* for Group I-2 occupancies. For occupancies in other than Group I-2, *exterior exit stairways* and *ramps* shall not be used as an element of a required *means of egress* where serving any of the following: ~~for *buildings* exceeding six *stories above grade plane* or that are *high-rise buildings*~~.

1. An occupied floor or *occupiable roof* located above the sixth *story above grade plane.*
2. An occupied floor or *occupiable roof* located more than 75 feet (22 860 mm) above the lowest level of fire department vehicle access.

2024 International Fire Code

Revise as follows:

[BE] 1027.2 Use in a means of egress. *Exterior exit stairways* shall not be used as an element of a required *means of egress* for Group I-2 occupancies. For occupancies in other than Group I-2, *exterior exit stairways* and *ramps* shall not be used as an element of a required *means of egress* where serving any of the following: ~~for *buildings* exceeding six *stories above grade plane* or that are *high-rise buildings*~~.

1. An occupied floor or *occupiable roof* located above the sixth *story above grade plane.*
2. An occupied floor or *occupiable roof* located more than 75 feet (22 860 mm) above the lowest level of fire department vehicle access.

Reason: Section 1027.2 currently limits the use of exterior exit stairways and ramps based on the height of the building (exceeding six stories above grade plane or a high-rise building). The commentary indicates that this limitation is due to the hazard of using a taller stairway in poor weather and due to some persons not being willing to use such a stairway or ramp due to vertigo (i.e., becoming confused, disoriented, or dizzy at great heights). These reasons are due to the height of the stairway or ramp, not the height of the building. This proposal revises this section to limit exterior exit stairways and ramps based on the height of the floor or occupied roof that they serve (based on number of stories, or high-rise limitation as currently in this section), which aligns with the reasons for this limitation.

This change will allow tall buildings (exceeding six stories or a high rise) to have an exterior exit stairway or ramp that only serves floors or occupied roofs below the current building height limits. For example, a high-rise residential building often has a lower level with spaces such as exterior pool and amenity decks/rooms - these spaces are high occupant load spaces that often will require the story/occupied roof to have 3 exits, instead of 2, and an exterior exit stairway is often a good choice for this third exit since it is only needed on this level. The currently language would not allow this since the building is a high rise, while this proposal would since the stair serves a floor/occupied roof that is less than a high rise. This change is in line with the current intent and purpose of this section.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal aligns the wording in this section with the intent of the section indicated in the commentary, so there should be no cost impact.

E102-24

E103-24

IBC: 1027.2; IFC: [BE] 1027.2

Proponents: Jeffrey Grove, Coffman Engineers, Coffman Engineers (jeff.grove@coffman.com)

2024 International Building Code

Revise as follows:

1027.2 Use in a means of egress. *Exterior exit stairways* shall not be used as an element of a required *means of egress* for Group I-2 occupancies. For occupancies in other than Group I-2, *exterior exit stairways* and *ramps* shall not be used as an element of a required *means of egress* where the highest walking surface of the exterior exit stairway or ramp exceeds 75-feet above the lowest finished grade below the stairway. ~~for *buildings* exceeding six *stories above grade plane* or that are *high-rise buildings*~~.

2024 International Fire Code

Revise as follows:

[BE] 1027.2 Use in a means of egress. *Exterior exit stairways* shall not be used as an element of a required *means of egress* for Group I-2 occupancies. For occupancies in other than Group I-2, *exterior exit stairways* and *ramps* shall not be used as an element of a required *means of egress* where the highest walking surface of the exterior exit stairway or ramp exceeds 75-feet above the lowest finished grade below the stairway. ~~for *buildings* exceeding six *stories above grade plane* or that are *high-rise buildings*~~.

Reason: This change will clarify the intent of Section 1027.2 as identified in the Code Commentary:

“Exterior exit stairways or ramps are not allowed to be required exits in buildings that exceed six stories in height because of the hazard of using such a stairway or ramp in poor weather. Some persons may not be willing to use such a stairway due to vertigo. When confronted with a view from a great height, vertigo sufferers can become confused, disoriented, and dizzy. They could injure themselves, become disoriented, or refuse to move (freeze). In a fire situation, they could become an obstruction in the path of travel, possibly causing panic and injuries to other users of the exit.”

The proposed change more effectively captures this intent by:

- Measuring the maximum height by unit distance rather than by number of stories, which can vary in height by building;
- Eliminating the reference to high-rise buildings, which similarly does not necessarily reflect the height of the stairway and resultant risk of vertigo;
- Removing the ambiguity of the “or” statement in the last sentence – as currently written, an exterior exit stairway in a 6-story high-rise building could be interpreted as permitted or not permitted.
- Specifically addressing the height of the stairway in question rather than the entire building – as currently written, a small exterior exit stairway serving just two stories in a large high-rise building could be interpreted as not permitted, even though this is not the intent of the code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposed text clarifies the existing intent for the maximum height of exterior stairways and ramps by providing a consistent elevation for application, quantified as a unit of distance rather than number of stories. The proposed maximum of 75 feet is approximately the highest height you would have in a typical six-story building and is also consistent with the code-recognized threshold for high-rise buildings. Measuring the 75 feet from the lowest local finished grade below the stair is consistent with the high-rise building height measurement, which is from the lowest level of fire department vehicle access serving the building.

E103-24

E104-24

IBC: 1027.3; IFC: [BE] 1027.3

Proponents: Jeffrey Grove, Coffman Engineers, Coffman Engineers (jeff.grove@coffman.com)

2024 International Building Code

Revise as follows:

1027.3 Open side. *Exterior exit stairways* and *ramps* serving as an element of a required *means of egress* shall ~~be open on~~ have not less than one side~~, except for required structural columns, beams, *handrails* and *guards*. An open side shall have~~ with not less than 35 square feet (3.3 m^2) of aggregate open area adjacent to each floor level and the level of each intermediate landing. The required open area shall be located not less than 42 inches (1067 mm) above the adjacent floor or landing level.

2024 International Fire Code

Revise as follows:

[BE] 1027.3 Open side. *Exterior exit stairways* and *ramps* serving as an element of a required *means of egress* shall ~~be open on~~ have not less than one side~~, except for required structural columns, beams, *handrails* and *guards*. An open side shall have~~ with not less than 35 square feet (3.3 m^2) of aggregate open area adjacent to each floor level and the level of each intermediate landing. The required open area shall be located not less than 42 inches (1067 mm) above the adjacent floor or landing level.

Reason: This change will clarify the intent of Section 1027.3 as identified in the Code Commentary:

“An important factor in exterior exit stairways or ramps is natural ventilation. Sufficient natural ventilation is necessary so that smoke will not be trapped above the stairway or ramp walking surfaces, thereby compromising safe egress.”

The proposed change more effectively captures this intent by removing the language restricting permissible features on the “open side” to only required structural columns, beams, handrails, and guards. So long as the required 35 square feet of aggregate open area is provided at each required level, the presence of additional architectural features on the open side would not prevent the stair from achieving the code-intended level of natural ventilation.

The Code Commentary discusses at length the need for open square footage on the open side. The final paragraph of the Code Commentary for Section 1027.3 even provides an example calculation of open area for a typical exterior exit stair configuration. Nowhere in the Code Commentary are specific features such as columns, beams, handrails, and guards discussed relative to their impact on natural ventilation. By every indication, these features have been specifically called out in Section 1027.3 not because they hinder natural ventilation to a lesser extent than other design features, but rather simply because they are features commonly found on the open side of an exterior exit stairway.

Removing this language from Section 1027.3 will provide more flexibility to building design without increasing the risk to life safety or property.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposed text clarifies the existing intent for the natural ventilation achieved by an exterior exit stairway or ramp to be evaluated based on a measurement of aggregate open area on the required open side, without regard for which other elements are present on that open side.

E104-24

E105-24

IBC: 1027.5; IFC: [BE] 1027.5

Proponents: Angela Haupt, City of Kirkland Washington, Washington Association of Building Officials, Technical code Development Committee (ashaupt@kirklandwa.gov); Micah Chappell, Seattle Department of Construction and Inspections, Washington Association of Building Officials Technical Code Development Committee (micah.chappell@seattle.gov)

2024 International Building Code

Revise as follows:

1027.5 Location.
Exterior exit stairways and *ramps* shall have a minimum *fire separation distance* of 10 feet (3048 mm) measured at right angles from the exterior edge of the *stairway* or *ramps*, ~~including~~ and their landings. ~~, to:~~

~~1. Adjacent *lot lines*.~~

~~2. Other portions of the *building*.~~

~~3. Other buildings on the same lot unless the adjacent building *exterior walls* and openings are protected in accordance with Section 705 based on *fire separation distance*.~~

~~For the purposes of this section, other~~ Other portions of the building shall be treated as separate *buildings* for the purpose of measuring *fire separation distance*.

~~Exception~~ Exceptions:

1. The *exterior walls* and openings of adjacent buildings located on the same lot that are protected in accordance with Section 705 based on *fire separation distance*.
2. Portions of the same building where *exterior walls* and openings are protected in accordance with Section 705 based on *fire separation distance*.
3. *Exterior exit stairways* and *ramps* serving individual *dwelling units* of Group R-3 shall have a minimum *fire separation distance* of 5 feet (1525 mm).

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2024 International Fire Code

Revise as follows:

[BE] 1027.5 Location.
Exterior exit stairways and *ramps* shall have a minimum *fire separation distance* of 10 feet (3048 mm) measured at right angles from the exterior edge of the *stairway* or *ramps*, ~~including~~ and their landings. ~~, to:~~

~~1. Adjacent lot lines.~~

~~2. Other portions of the building.~~

~~3. Other buildings on the same lot unless the adjacent building *exterior walls* and openings are protected in accordance with Section 705 of the International Building Code based on *fire separation distance*.~~

~~For the purposes of this section, other~~ Other portions of the building shall be treated as separate *buildings* for the purpose of measuring *fire separation distance*.

~~Exception~~ Exceptions:

1. The *exterior walls* and openings of adjacent buildings located on the same lot that are protected in accordance with Section 705 of the International Building Code based on *fire separation distance*.
2. Portions of the same building where *exterior walls* and openings are protected in accordance with Section 705 of the International Building Code based on *fire separation distance*.

3. *Exterior exit stairways* and *ramps* serving individual *dwelling units* of Group R-3 shall have a minimum *fire separation distance* of 5 feet (1525 mm).

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Reason: The intention of this proposal is to align the location requirements of *exterior exit stairways* and *ramps* with the definition of *fire separation distance*.

As written, this code section is confusing and contradictory. The section refers *to fire separation distance* which includes a list of what the distance is to be measured to in the definition. The section also provides a separate list that includes some items from the definition, omits others and some items are totally new. The section includes a new term of adjacent *lot lines*, as opposed to the term in the definition of interior *lot lines*. Adjacent lot lines could be referring to lot lines adjacent to other lots, alleys, public ways, etc. That would mean that an exterior exit stairway or ramp would be measured to any actual lot line and not to the center of an alley or public way as the fire separation distance allows.

To improve this code section, the list of items that are to be measured to is removed. Instead the section now relies on the actual *fire separation distance* definition:

[BF] FIRE SEPARATION DISTANCE. The distance measured from the *building* face to one of the following:

1. The closest interior *lot line*.
2. To the centerline of a street, an alley or *public* way.
3. To an imaginary line between two *buildings* on the lot.

The distance shall be measured at right angles from the face of the wall.

The new exception 1 allows less than 10’ from adjacent buildings if walls and openings are protected, as currently specified in Item 3 of the deleted bullet list. The new exception 2 allows less than 10’ from other portions of the building where wall and opening protection is provided, in accordance with Item 2 of the deleted list. Item 1 of the list is not relocated as an exception since it conflicts with the definition of fire separation distance.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This change proposal clarifies what the code already says. It changes confusing language that may have been misinterpreted in the past.

E105-24

E106-24

IBC: 1027.5; IFC: [BE] 1027.5

Proponents: Jeffrey Grove, Coffman Engineers, Coffman Engineers (jeff.grove@coffman.com)

2024 International Building Code

Revise as follows:

1027.5 Location.
Exterior exit stairways and *ramps* shall be separated by ~~have~~ a minimum ~~*fire separation*~~ *distance* of 10 feet (3048 mm) measured at right angles from the exterior edge of the *stairway* or *ramps*, including landings, to:

1. Adjacent *lot lines* or to the centerline of a street, alley or public way.
2. Other portions of the *building* and other buildings on the same lot.
3. ~~Other buildings on the same lot unless the adjacent building *exterior walls* and openings are protected in accordance with Section 705 based on *fire separation distance*.~~

For the purposes of this section, other portions of the building shall be treated as separate *buildings*.

~~**Exception**~~ **Exceptions**:

1. *Exterior exit stairways* and *ramps* serving individual *dwelling units* of Group R-3 shall be separated by ~~have~~ a minimum ~~*fire separation*~~ *distance* of 5 feet (1525 mm).
2. Where the adjacent building exterior walls and openings are protected in accordance with Section 705 based on fire separation distance.

2024 International Fire Code

Revise as follows:

[BE] 1027.5 Location.
Exterior exit stairways and *ramps* shall be separated by ~~have~~ a minimum ~~*fire separation*~~ *distance* of 10 feet (3048 mm) measured at right angles from the exterior edge of the *stairway* or *ramps*, including landings, to:

1. Adjacent *lot lines* or to the centerline of a street, alley or public way.
2. Other portions of the *building* and other buildings on the same lot.
3. ~~Other buildings on the same lot unless the adjacent building *exterior walls* and openings are protected in accordance with Section 705 based on *fire separation distance*.~~

For the purposes of this section, other portions of the building shall be treated as separate buildings.

~~**Exception**~~ **Exceptions**:

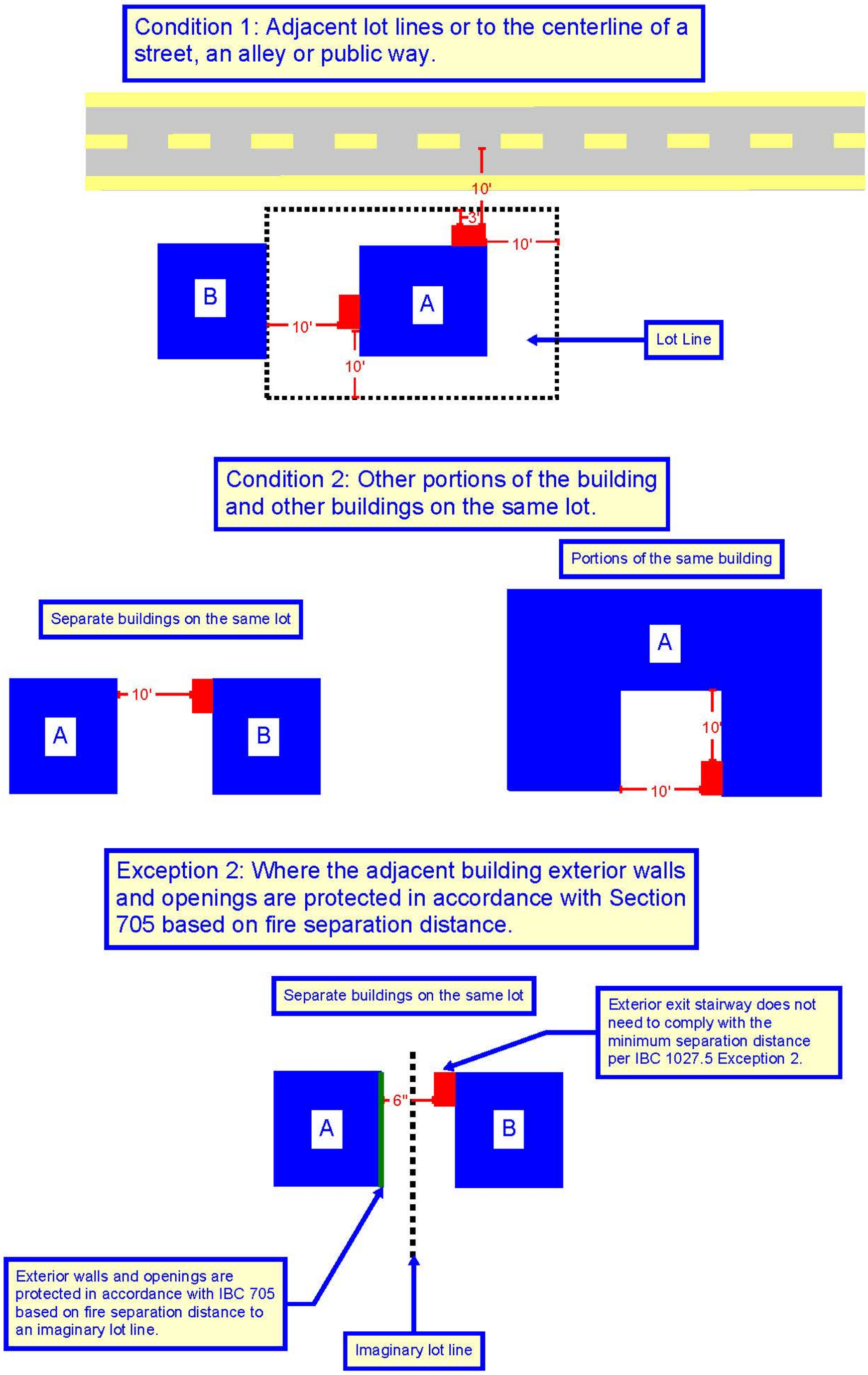
1. *Exterior exit stairways* and *ramps* serving individual *dwelling units* of Group R-3 shall be separated by ~~have~~ a minimum ~~*fire separation*~~ *distance* of 5 feet (1525 mm).
2. Where the adjacent building exterior walls and openings are protected in accordance with Section 705 based on fire separation distance.

Reason: This code change is not intended to change the application of IBC 1027.5. This proposal is intended to clarify how IBC 1027.5 is measured and to remove the contradictions between the minimum distance per IBC 1027.5 and fire separation distance.

The term “fire separation distance” has a specific definition and application within the IBC and is not the correct term to use for IBC 1027.5. Fire separation distance is measured at right angles from the building face to the closest interior lot line, the centerline of a street, an alley or public way, or to an imaginary line between two buildings on the lot. IBC 1027.5 specifies that exterior exit stairways and ramps shall be separated from adjacent lot lines, other portions of the building, and other buildings on the same lot unless the adjacent building exterior walls and openings are protected in accordance with Section 705 based on fire separation distance. Removing the term "fire separation distance" will remove the contradiction between the definition of fire separation distance and the minimum distance required per IBC 1027.5.

Item 1 was clarified to permit the minimum separation distance to be measured to the centerline of the street, alley, or public way. Exterior exit stairways should not be limited based on the lot line where facing a street. The IBC Code Commentary specifies that the reason a minimum 10 ft separation distance is required to an adjacent lot line is in case a future building is built right on an adjacent lot. Where the lot line faces a street, alley, or public way, the hazard of a building being built right on the adjacent property line is omitted, therefore, the separation distance should be measured to the centerline of the street, alley, or public way similar to how fire separation distance is measured.

Items 2 and 3 were revised to clarify the difference between the separation distance of IBC 1027.5 and fire separation distance. The separation distance of IBC 1027.5 specifically does not reference an imaginary lot line for separate buildings on the same lot. Item 3 addresses separate buildings on the same lot and states that the distance shall be measured perpendicular from the exterior exit stairway to the adjacent building and not an imaginary lot line. A total distance of 10 ft. between buildings is an adequate distance to maintain a safe non-rated egress path. This is further supported by the requirements of egress courts which require a minimum 10 ft. width to have non-rated egress court walls. This was simplified to indicate the minimum 10 ft separation shall be measured to other portions of the building and buildings on the same lot. An exception was added to clarify that where separate buildings on the same lot are protected in accordance with IBC 705 based on fire separation distance the minimum 10 ft separation distance is not required.



Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposed text clarifies the original intent of the minimum separation distance required for exterior exit stairways. A minimum 10 ft separation distance is already required per IBC 1027.5 and clarifying the way it is measured will not add any cost.

E106-24

E107-24

IBC: 1027.6; IFC: [BE] 1027.6

Proponents: Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org)

2024 International Building Code

Revise as follows:

1027.6 Exterior exit stairway and ramp protection.
Exterior exit stairways and *ramps* shall be separated from the interior of the *building* as required in Section 1023.2. Openings shall be limited to those necessary for egress from normally occupied spaces. Where a vertical plane projecting from the edge of an *exterior exit stairway* or *ramp* and landings is exposed by other parts of the *building* at an angle of less than 180 degrees (3.14 rad), the *exterior wall* shall be rated in accordance with Section 1023.7. Where the exterior exit stairway is recessed into the building, the separation for the exterior exit stairway or ramp shall extend to the exterior walls.

Exceptions:

1. Separation from the interior of the *building* is not required for occupancies, other than those in Group R-1 or R-2, in *buildings* that are not more than two *stories above grade plane* where a *level of exit discharge* serving such occupancies is the first *story above grade plane*.
2. Separation from the interior of the *building* is not required where the *exterior exit stairway* or *ramp* is served by an *exterior exit ramp* or balcony that connects two remote exterior exit *stairways* or other *approved exits* with a perimeter that is not less than 50 percent open. To be considered open, the opening shall be not less than 50 percent of the height of the enclosing wall, with the top of the openings not less than 7 feet (2134 mm) above the top of the balcony.
3. Separation from the *open-ended corridor* of the *building* is not required for *exterior exit stairways* or *ramps*, provided that Items 3.1 through 3.5 are met:
   - 3.1. The *building*, including *open-ended corridors*, and *stairways* and *ramps*, shall be equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2.
   - 3.2. The *open-ended corridors* comply with Section 1020.
   - 3.3. The *open-ended corridors* are connected on each end to an *exterior exit stairway* or *ramp* complying with Section 1027. At the location where the exterior exit stairway or ramp is open to an open-ended corridor, the separation from the interior of the building shall extend to the extent of the required landing.
   - 3.4. The *exterior walls* and openings adjacent to the *exterior exit stairway* or *ramp* comply with Section 1023.7.
   - 3.5. At any location in an open-ended *corridor* where a change of direction exceeding 45 degrees (0.79 rad) occurs, a clear opening of not less than 35 square feet (3.3 m^2) or an *exterior stairway* or *ramp* shall be provided. Where clear openings are provided, they shall be located so as to minimize the accumulation of smoke or *toxic* gases.
4. In Group R-3 occupancies not more than four *stories* in height, *exterior exit stairways* and *ramps* serving individual *dwelling units* are not required to be separated from the interior of the *building* where the *exterior exit stairway* or *ramp* discharges directly to grade.

2024 International Fire Code

Revise as follows:

[BE] 1027.6 Exterior exit stairway and ramp protection.
Exterior exit stairways and *ramps* shall be separated from the interior of the building as required in Section 1023.2. Openings shall be limited to those necessary for egress from normally occupied spaces. Where a vertical plane projecting from the edge of an *exterior exit stairway* or *ramp* and landings is exposed by other parts of the building at an angle of less than 180 degrees (3.14 rad), the *exterior wall* shall be rated in accordance with Section 1023.7. Where the exterior exit stairway is recessed into the building, the separation for the

exterior exit stairway or ramp shall extend to the exterior walls.

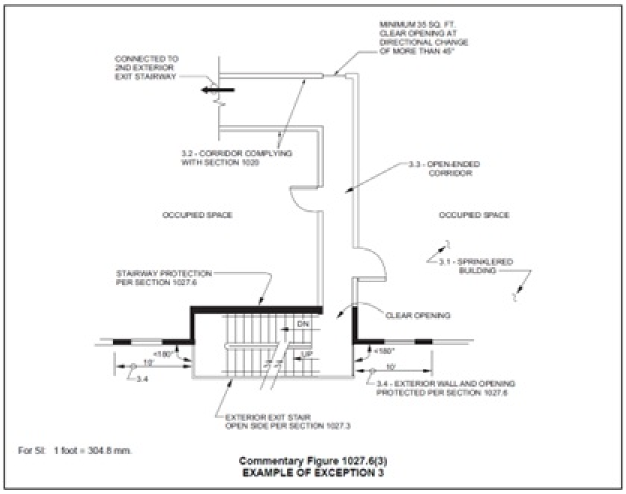
Exceptions:

1. Separation from the interior of the building is not required for occupancies, other than those in Group R-1 or R-2, in buildings that are not more than two stories above *grade plane* where a *level of exit discharge* serving such occupancies is the first story above *grade plane*.
2. Separation from the interior of the building is not required where the *exterior exit stairway* or *ramp* is served by an *exterior exit ramp* or balcony that connects two remote *exterior exit stairways* or other *approved exits*, with a perimeter that is not less than 50 percent open. To be considered open, the opening shall be not less than 50 percent of the height of the enclosing wall, with the top of the openings not less than 7 feet (2134 mm) above the top of the balcony.
3. Separation from the *open-ended corridor* of the building is not required for *exterior exit stairways* or *ramps*, provided that Items 3.1 through 3.5 are met:
   3.1. The building, including *open-ended corridors*, and *stairways* and *ramps*, shall be equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2.
   3.2. The *open-ended corridors* comply with Section 1020.
   3.3. The *open-ended corridors* are connected on each end to an *exterior exit stairway* or *ramp* complying with Section 1027. At the location where the exterior exit stairway or ramp is open to an open-ended corridor, the separation from the interior of the building shall extend to the extent of the required landing.
   3.4. The *exterior walls* and openings adjacent to the *exterior exit stairway* or *ramp* comply with Section 1023.7.
   3.5. At any location in an *open-ended corridor* where a change of direction exceeding 45 degrees (0.79 rad) occurs, a clear opening of not less than 35 square feet (3.3 m^2) or an exterior *stairway* or *ramp* shall be provided. Where clear openings are provided, they shall be located so as to minimize the accumulation of smoke or toxic gases.
4. In Group R-3 occupancies not more than four stories in height, *exterior exit stairways* and *ramps* serving individual *dwelling units* are not required to be separated from the interior of the building where the *exterior exit stairway* or *ramp* discharges directly to grade.

Reason: This proposal has two purposes:

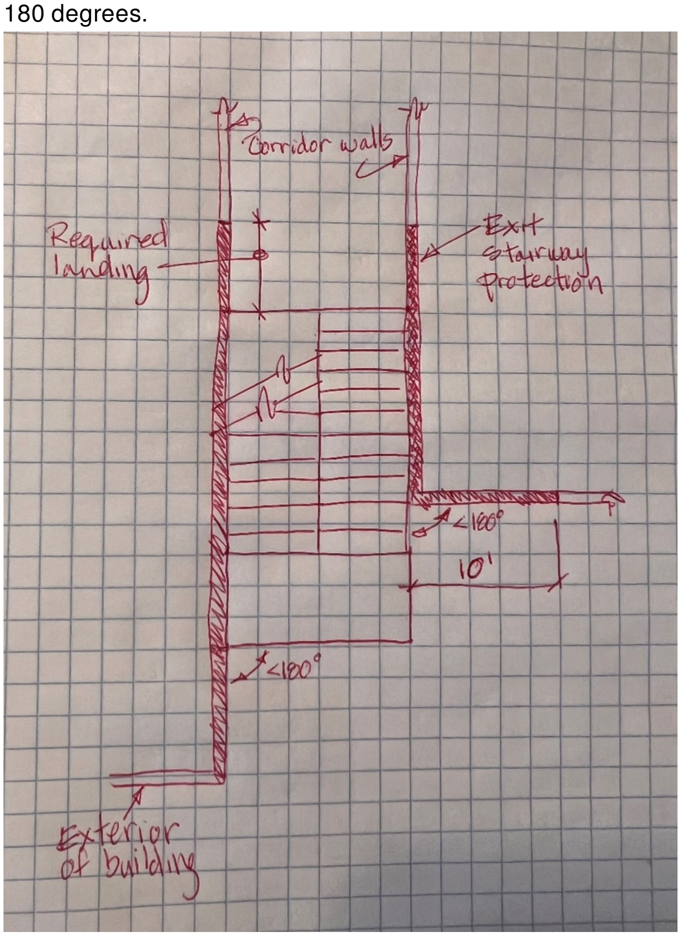
1. Address the rating/separation requirements for exterior exit stairways that are open to a breezeway at the floor landings
2. To address where a stairway may be recessed into the footprint of the building.

There has been a misinterpretation that the walls on the open-ended corridor are exterior walls in accordance with Item 3.4 instead of the corridor in accordance with 3.2. This can lead to unnecessary ratings on the corridor walls. The added sentence in 3.3 clarifies this. The sentence added in the base paragraph is to address a situation where the exterior exit stairway is completely recessed into the building. It is not clear if the walls between the exterior exit stairway and the exterior of the building is an exterior wall. However, BCAC felt the stairway does need to be available for people to leave the building, so the protection needs to be available. The following is an existing figure in IBC Commentary.



Commentary Figure 1027.6(3)
EXAMPLE OF EXCEPTION 3

The illustration below gives an orientation of a rotated stair that is partially within the building , illustrating where the rating would stop at the extent of the landing as well as illustrating how the requirement for the ten foot of exterior wall is required to be rated when less than 180 degrees.



This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC webpage.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is a clarification of existing provisions for exterior exit stairway configurations and fire-resistance ratings for the surrounding walls. There are no changes to construction requirements.

E107-24

E108-24

IBC: 1027.6; IFC: [BE] 1027.6

Proponents: David Renn, PE, SE, City and County of Denver, Colorado Chapter Code Development Committee (david.renn@denvergov.org)

2024 International Building Code

Revise as follows:

1027.6 Exterior exit stairway and ramp protection.
Exterior exit stairways and *ramps* shall be separated from the interior of the *building* as required in Section 1023.2. Openings shall be limited to those necessary for egress from normally occupied spaces. Where a vertical plane projecting from the edge of an *exterior exit stairway* or *ramp* and landings is exposed by other parts of the *building* at an angle of less than 180 degrees (3.14 rad), the *exterior wall* shall be rated in accordance with Section 1023.7.

Exceptions:

1. Separation from the interior of the *building* is not required for occupancies, other than those in Group R-1 or R-2, where not more than one story of travel to the exit discharge is required. ~~in *buildings* that are not more than two *stories above grade plane* where a *level of exit discharge* serving such occupancies is the first *story above grade plane*.~~
2. Separation from the interior of the *building* is not required where the *exterior exit stairway* or *ramp* is served by an *exterior exit ramp* or balcony that connects two remote exterior exit *stairways* or other *approved exits* with a perimeter that is not less than 50 percent open. To be considered open, the opening shall be not less than 50 percent of the height of the enclosing wall, with the top of the openings not less than 7 feet (2134 mm) above the top of the balcony.
3. Separation from the *open-ended corridor* of the *building* is not required for *exterior exit stairways* or *ramps*, provided that Items 3.1 through 3.5 are met:
   3.1. The *building*, including *open-ended corridors*, and *stairways* and *ramps*, shall be equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2.
   3.2. The *open-ended corridors* comply with Section 1020.
   3.3. The *open-ended corridors* are connected on each end to an *exterior exit stairway* or *ramp* complying with Section 1027.
   3.4. The *exterior walls* and openings adjacent to the *exterior exit stairway* or *ramp* comply with Section 1023.7.
   3.5. At any location in an open-ended *corridor* where a change of direction exceeding 45 degrees (0.79 rad) occurs, a clear opening of not less than 35 square feet (3.3 m^2) or an *exterior stairway* or *ramp* shall be provided. Where clear openings are provided, they shall be located so as to minimize the accumulation of smoke or *toxic* gases.
4. In Group R-3 occupancies not more than four *stories* in height, *exterior exit stairways* and *ramps* serving individual *dwelling units* are not required to be separated from the interior of the *building* where the *exterior exit stairway* or *ramp* discharges directly to grade.

2024 International Fire Code

Revise as follows:

[BE] 1027.6 Exterior exit stairway and ramp protection.
Exterior exit stairways and *ramps* shall be separated from the interior of the building as required in Section 1023.2. Openings shall be limited to those necessary for egress from normally occupied spaces. Where a vertical plane projecting from the edge of an *exterior exit stairway* or *ramp* and landings is exposed by other parts of the building at an angle of less than 180 degrees (3.14 rad), the *exterior wall* shall be rated in accordance with Section 1023.7.

Exceptions:

1. Separation from the interior of the *building* is not required for occupancies, other than those in Group R-1 or R-2, where not more than one story of travel to the exit discharge is required.~~ in *buildings* that are not more than two *stories above grade plane* where a *level of exit discharge* serving such occupancies is the first *story above grade plane*.~~
2. Separation from the interior of the building is not required where the *exterior exit stairway* or *ramp* is served by an *exterior exit ramp* or balcony that connects two remote *exterior exit stairways* or other *approved exits*, with a perimeter that is not less than 50 percent open. To be considered open, the opening shall be not less than 50 percent of the height of the enclosing wall, with the top of the openings not less than 7 feet (2134 mm) above the top of the balcony.
3. Separation from the *open-ended corridor* of the building is not required for *exterior exit stairways* or *ramps*, provided that Items 3.1 through 3.5 are met:
   3.1. The building, including *open-ended corridors*, and *stairways* and *ramps*, shall be equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2.

   3.2. The *open-ended corridors* comply with Section 1020.

   3.3. The *open-ended corridors* are connected on each end to an *exterior exit stairway* or *ramp* complying with Section 1027.

   3.4. The *exterior walls* and openings adjacent to the *exterior exit stairway* or *ramp* comply with Section 1023.7.

   3.5. At any location in an *open-ended corridor* where a change of direction exceeding 45 degrees (0.79 rad) occurs, a clear opening of not less than 35 square feet (3.3 m^2) or an exterior *stairway* or *ramp* shall be provided. Where clear openings are provided, they shall be located so as to minimize the accumulation of smoke or toxic gases.
4. In Group R-3 occupancies not more than four stories in height, *exterior exit stairways* and *ramps* serving individual *dwelling units* are not required to be separated from the interior of the building where the *exterior exit stairway* or *ramp* discharges directly to grade.

Reason: Section 1027.6 Exception 1 is currently limited to buildings of not more than two stories above grade plane. The commentary indicates that this exception is allowed since in the cases of fire in low buildings, the occupants are usually able to evacuate the premises before the fire can emerge through exterior wall openings and compromise the exterior exit stairway or ramp. This allowance is based on the small amount of vertical travel from an occupancy to the exit discharge, which is different than the number of stories of the building as currently written. This proposal revises this exception to be based on the amount of vertical travel to the exit discharge, which aligns with the reasoning for this exception.

This change will allow buildings to have a single-story exterior exit stairway or ramp regardless of the height of the building, as long as there is only one-story of vertical travel for occupants using the stairway or ramp. For example, a five-story office building could have spaces on the second story, or an occupied roof above the first story, such as exterior decks, conference rooms, or restaurants - these spaces are high occupant load spaces that may require the second story/occupied roof to have 3 exits, instead of 2, and an exterior exit stairway is often a good choice for this third exit. The current language would not allow this since the building is more than two stories; however, this proposal would allow this since the second story occupancies only have one story of vertical travel to the exit discharge. This change is in line with the current intent and purpose of Exception 1.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal aligns the wording in this section with the intent of the section indicated in the commentary, so there should be no cost impact.

E108-24

E109-24

IBC: 1028.2; IFC: [BE] 1028.2

Proponents: Ronald Geren, RLGA Technical Services, LLC, Self (ron@specsandcodes.com)

2024 International Building Code

Revise as follows:

1028.2 Exit discharge.
Exits shall discharge directly to the exterior of the *building*. Where two or more *exits* are required, the termination of not less than two *exits* at the *level of exit discharge* shall be placed a distance apart equal to not less than one-half of the length of the maximum overall diagonal dimension of the *building* or area to be served measured in a straight line between them and to any point along the width of the doorway.The *exit discharge* shall be at grade or shall provide a direct path of egress travel to grade. The *exit discharge* shall not reenter a *building*. The combined use of Exceptions 1 and 2 shall not exceed 50 percent of the number and minimum width or required capacity of the required *exits*.

Exceptions:

1. Not more than 50 percent of the number and minimum width or required capacity of *interior exit stairways* and *ramps* is permitted to egress through areas, including *atriums*, on the level of discharge provided that all of the following conditions are met:
   1.1. Discharge of *interior exit stairways* and *ramps* shall be provided with a free and unobstructed path of travel to an exterior *exit* door and such *exit* is readily visible and identifiable from the point of termination of the enclosure.

   1.2. The entire area of the *level of exit discharge* is separated from areas below by construction conforming to the *fire-resistance rating* for the enclosure.

   1.3. The egress path from the *interior exit stairway* and *ramp* on the *level of exit discharge* is protected throughout by an *approved automatic sprinkler system*. Portions of the *level of exit discharge* with access to the egress path shall be either equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, or separated from the egress path in accordance with the requirements for the enclosure of *interior exit stairways* or *ramps*.

   1.4. Where a required *interior exit stairway* or *ramp* and an *exit access stairway* or *ramp* serve the same floor level and terminate at the same *level of exit discharge*, the termination of the *exit access stairway* or *ramp* and the *exit discharge* door of the *interior exit stairway* or *ramp* shall be separated by a distance of not less than 30 feet (9144 mm) or not less than one-fourth the length of the maximum overall diagonal dimension of the *building*, whichever is less. The distance shall be measured in a straight line between the *exit discharge* door from the *interior exit stairway* or *ramp* and the last tread of the *exit access stairway* or termination of slope of the *exit access ramp*.

2. Not more than 50 percent of the number and minimum width or required capacity of the *interior exit stairways* and *ramps* is permitted to egress through a vestibule provided that all of the following conditions are met:
   2.1. The entire area of the vestibule is separated from areas below by construction conforming to the *fire-resistance rating* of the *interior exit stairway* or *ramp enclosure*.

   2.2. The depth from the exterior of the *building* is not greater than 10 feet (3048 mm) and the length is not greater than 30 feet (9144 mm).

   2.3. The area is separated from the remainder of the *level of exit discharge* by a *fire partition* constructed in accordance with Section 708.

      Exception: The maximum transmitted temperature rise is not required.

   2.4. The area is used only for *means of egress* and *exits* directly to the outside.

3. *Horizontal exits* complying with Section 1026 shall not be required to discharge directly to the exterior of the *building*.

4. <u>Where a building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2, the separation distance shall be not less than one-third of the length of the maximum overall diagonal dimension of the building or area served.</u>

2024 International Fire Code

Revise as follows:

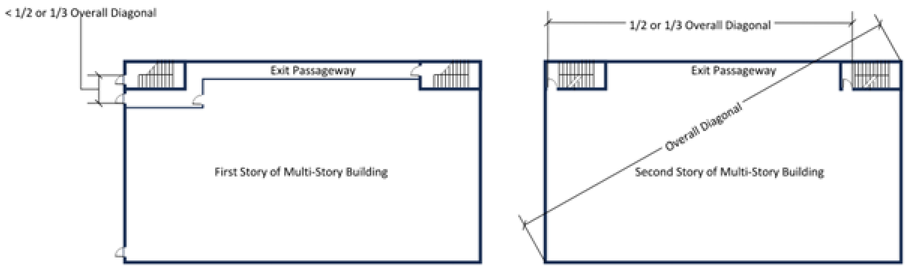
[BE] 1028.2 Exit discharge. *Exits* shall discharge directly to the exterior of the building. <u>Where two or more *exits* are required, the termination of not less than two *exits* at the *level of exit discharge* shall be placed a distance apart equal to not less than one-half of the length of the maximum overall diagonal dimension of the *building* or area to be served measured in a straight line between them and to any point along the width of the doorway.</u> The *exit discharge* shall be at grade or shall provide a direct path of egress travel to grade. The *exit discharge* shall not reenter a building. The combined use of Exceptions 1 and 2 shall not exceed 50 percent of the number and minimum width or required capacity of the required *exits*.

Exceptions:

1. Not more than 50 percent of the number and minimum width or required capacity of *interior exit stairways* and *ramps* is permitted to egress through areas, including atriums, on the *level of discharge* provided that all of the following conditions are met:
   1.1. Discharge of *interior exit stairways* and *ramps* shall be provided with a free and unobstructed path of travel to an exterior exit door and such *exit* is readily visible and identifiable from the point of termination of the enclosure.
   1.2. The entire area of the *level of exit discharge* is separated from areas below by construction conforming to the *fire-resistance rating* for the enclosure.
   1.3. The egress path from the *interior exit stairway* and *ramp* on the *level of exit discharge* is protected throughout by an *approved automatic sprinkler system*. Portions of the *level of exit discharge* with access to the egress path shall either be equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, or separated from the egress path in accordance with the requirements for the enclosure of *interior exit stairways* or *ramps*.
   1.4. Where a required *interior exit stairway* or *ramp* and an *exit access stairway* or *ramp* serve the same floor level and terminate at the same *level of exit discharge*, the termination of the *exit access stairway* or *ramp* and the exit discharge door of the *interior exit stairway* or *ramp* shall be separated by a distance of not less than 30 feet (9144 mm) or not less than one-fourth the length of the maximum overall diagonal dimension of the building, whichever is less. The distance shall be measured in a straight line between the exit discharge door from the *interior exit stairway* or *ramp* and the last tread of the *exit access stairway* or termination of slope of the *exit access ramp*.
2. Not more than 50 percent of the number and minimum width or required capacity of the *interior exit stairways* and *ramps* is permitted to egress through a vestibule provided that all of the following conditions are met:
   2.1. The entire area of the vestibule is separated from areas below by construction conforming to the *fire-resistance rating* of the *interior exit stairway* or *ramp* enclosure.
   2.2. The depth from the exterior of the building is not greater than 10 feet (3048 mm) and the length is not greater than 30 feet (9144 mm).
   2.3. The area is separated from the remainder of the *level of exit discharge* by a *fire partition* constructed in accordance with Section 708 of the International Building Code.
   Exception: The maximum transmitted temperature rise is not required.
   2.4. The area is used only for *means of egress* and *exits* directly to the outside.
3. *Horizontal exits* complying with Section 1026 shall not be required to discharge directly to the exterior of the building.

4. <u>Where a building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2, the separation distance shall be not less than one-third of the length of the maximum overall diagonal dimension of the building or area served.</u>

Reason: Although buildings with exit doors directly to the exterior would not have a problem complying with this requirement since the exit doors require comparable separation per Section 1007.1.1, it is entirely possible to have a combination of interior exit stairways and ramps and exit passageways that provide exit discharge points that are close or even adjacent to each other (see illustration below).



Blockage of one exit discharge door would likely cause a blockage to the adjacent, thus denying any means of egress from occupants on the upper stories.

To ensure that occupants on stories other than the level of exit discharge have options to allow safe egress from the building, the code requires that no less than two means of egress be separated by either 1/2 or 1/3 the overal diagonal depending on the presence of a sprinkler system. It makes no sense to then allow these exits to discharge at locations that could be literally adjacent to each other.

Cost Impact: Increase

Estimated Immediate Cost Impact:

The determination of the cost impact cannot be established since the variables are too many. Narrow urban sites with little to no fire separation distance would have the most difficulty in complying with the requirements, while large buildings with sufficient open space around much of the building perimeter would likely be able to comply with the requirement with no cost increase to a project.

Estimated Immediate Cost Impact Justification (methodology and variables):

The conservative approach is to state that there may be a cost increase since a building design may need additional circulation distance to accommodate the required separation. However, in most cases, separation of exit terminations is not an issue and there would be no cost impact to the construction of a building.

E109-24

E110-24

IBC: 1028.2; IFC: [BE] 1028.2

Proponents: Jeffrey Grove, Coffman Engineers, Coffman Engineers (jeff.grove@coffman.com)

2024 International Building Code

Revise as follows:

1028.2 Exit discharge.
Exits shall discharge directly to the exterior of the *building*. The *exit discharge* shall be at grade or shall provide a direct path of egress travel to grade. The *exit discharge* shall not reenter a *building*. The combined use of Exceptions 1 and 2 shall not exceed 50 percent of the number and minimum width or required capacity of the required *exits*.

Exceptions:

1. Not more than 50 percent of the number and minimum width or required capacity of *interior exit stairways* and *ramps* is permitted to egress through areas, including *atriums*, on the level of discharge provided that all of the following conditions are met:
   1.1. Discharge of *interior exit stairways* and *ramps* shall be provided with a free and unobstructed path of travel to an exterior *exit* door and such *exit* is readily visible and identifiable <u>by exit signage</u> from the point of termination of the enclosure.

   1.2. The entire area of the *level of exit discharge* is separated from areas below by construction conforming to the *fire-resistance rating* for the enclosure.

   1.3. The egress path from the *interior exit stairway* and *ramp* on the *level of exit discharge* is protected throughout by an *approved automatic sprinkler system*. Portions of the *level of exit discharge* with access to the egress path shall be either equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, or separated from the egress path in accordance with the requirements for the enclosure of *interior exit stairways* or *ramps*.

   1.4. Where a required *interior exit stairway* or *ramp* and an *exit access stairway* or *ramp* serve the same floor level and terminate at the same *level of exit discharge*, the termination of the *exit access stairway* or *ramp* and the *exit discharge* door of the *interior exit stairway* or *ramp* shall be separated by a distance of not less than 30 feet (9144 mm) or not less than one-fourth the length of the maximum overall diagonal dimension of the *building*, whichever is less. The distance shall be measured in a straight line between the *exit discharge* door from the *interior exit stairway* or *ramp* and the last tread of the *exit access stairway* or termination of slope of the *exit access ramp*.

2. Not more than 50 percent of the number and minimum width or required capacity of the *interior exit stairways* and *ramps* is permitted to egress through a vestibule provided that all of the following conditions are met:
   2.1. The entire area of the vestibule is separated from areas below by construction conforming to the *fire-resistance rating* of the *interior exit stairway* or *ramp enclosure*.

   2.2. The depth from the exterior of the *building* is not greater than 10 feet (3048 mm) and the length is not greater than 30 feet (9144 mm).

   2.3. The area is separated from the remainder of the *level of exit discharge* by a *fire partition* constructed in accordance with Section 708.

   Exception: The maximum transmitted temperature rise is not required.

   2.4. The area is used only for *means of egress* and *exits* directly to the outside.

3. *Horizontal exits* complying with Section 1026 shall not be required to discharge directly to the exterior of the *building*.

2024 International Fire Code

Revise as follows:

[BE] 1028.2 Exit discharge.

Exits shall discharge directly to the exterior of the building. The *exit discharge* shall be at grade or shall provide a direct path of egress travel to grade. The *exit discharge* shall not reenter a building. The combined use of Exceptions 1 and 2 shall not exceed 50 percent of the number and minimum width or required capacity of the required *exits*.

Exceptions:

1. Not more than 50 percent of the number and minimum width or required capacity of *interior exit stairways* and *ramps* is permitted to egress through areas, including atriums, on the *level of discharge* provided that all of the following conditions are met:
   1.1. Discharge of *interior exit stairways* and *ramps* shall be provided with a free and unobstructed path of travel to an exterior exit door and such *exit* is readily visible and identifiable <u>by exit signage</u> from the point of termination of the enclosure.

   1.2. The entire area of the *level of exit discharge* is separated from areas below by construction conforming to the *fire-resistance rating* for the enclosure.

   1.3. The egress path from the *interior exit stairway* and *ramp* on the *level of exit discharge* is protected throughout by an *approved automatic sprinkler system*. Portions of the *level of exit discharge* with access to the egress path shall either be equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, or separated from the egress path in accordance with the requirements for the enclosure of *interior exit stairways* or *ramps*.

   1.4. Where a required *interior exit stairway* or *ramp* and an *exit access stairway* or *ramp* serve the same floor level and terminate at the same *level of exit discharge*, the termination of the *exit access stairway* or *ramp* and the exit discharge door of the *interior exit stairway* or *ramp* shall be separated by a distance of not less than 30 feet (9144 mm) or not less than one-fourth the length of the maximum overall diagonal dimension of the building, whichever is less. The distance shall be measured in a straight line between the exit discharge door from the *interior exit stairway* or *ramp* and the last tread of the *exit access stairway* or termination of slope of the *exit access ramp*.

2. Not more than 50 percent of the number and minimum width or required capacity of the *interior exit stairways* and *ramps* is permitted to egress through a vestibule provided that all of the following conditions are met:
   2.1. The entire area of the vestibule is separated from areas below by construction conforming to the *fire-resistance rating* of the *interior exit stairway* or *ramp* enclosure.

   2.2. The depth from the exterior of the building is not greater than 10 feet (3048 mm) and the length is not greater than 30 feet (9144 mm).

   2.3. The area is separated from the remainder of the *level of exit discharge* by a *fire partition* constructed in accordance with Section 708 of the International Building Code.

   Exception: The maximum transmitted temperature rise is not required.

   2.4. The area is used only for *means of egress* and *exits* directly to the outside.

3. *Horizontal exits* complying with Section 1026 shall not be required to discharge directly to the exterior of the building.

Reason: Through the 2015 editions of both the IBC and NFPA 101, Life Safety Code, these two codes were consistent in their language and interpretation regarding exit discharge of interior exit stairways and ramps through areas of the building on the level of exit discharge. The 2018 edition of NFPA 101 included an amendment to Section 7.7.2(3) that clarified the intent of the code to permit the use of exit signage to direct occupants discharging from an exit enclosure to the nearest exterior exit door:

> *"The interior exit discharge shall lead to a free and unobstructed way to the exterior of the building, and such way shall be readily apparent or shall be identifiable by exit signage from the point of discharge from the exit."*

The 2018 IBC and subsequent 2021 and 2024 editions have lagged behind NFPA 101 and have not yet amended Section 1028.2 Exception 1.1 to provide this clarification.

This proposal will clarify that exit signage is permitted to be used for this purpose and will remove the common misconception that an exterior exit discharge must be visible from the point of exit enclosure termination. The proposal will also bring the IBC back into alignment with NFPA on this issue, as had long been the case until 2018.

Bibliography: NFPA 101, Life Safety Code

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposed text clarifies the original intent to allow utilization of exit signage to achieve interior exit stairway discharge through areas of the building on the level of exit discharge. The exit signage required for this purpose would already be required by Section 1013.1 and thus adds no cost."

E110-24

E111-24

IBC: 1028.2; IFC: [BE] 1028.2

Proponents: Ali Fattah, City of San Diego Development Services Department, San Diego Area Chapter of ICC (afattah@sandiego.gov)

2024 International Building Code

Revise as follows:

1028.2 Exit discharge.
Exits shall discharge directly to the exterior of the *building*. The *exit discharge* shall be at grade or shall provide a direct path of egress travel to grade. The *exit discharge* shall not reenter a *building*. The combined use of Exceptions 1 and 2 shall not exceed 50 percent of the number and minimum width or required capacity of the required *exits*.

Exceptions:

1. Not more than 50 percent of the number and minimum width or required capacity of *interior exit stairways* and *ramps* is permitted to egress through areas, including *atriums*, on the level of discharge provided that all of the following conditions are met:
   1.1. Discharge of *interior exit stairways* and *ramps* shall be provided with a free and unobstructed path of travel to an exterior *exit* door and such *exit* is readily visible and identifiable from the point of termination of the enclosure.

   1.2. The entire ~~area~~ <u>story</u> of the *level of exit discharge* is separated from ~~areas~~ <u>stories</u> below by construction conforming to the *fire-resistance rating* for the enclosure.

   1.3. The egress path from the *interior exit stairway* and *ramp* on the *level of exit discharge* is protected throughout by an *approved automatic sprinkler system* . Portions of the *level of exit discharge* with access to the egress path shall be either equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, or separated from the egress path in accordance with the requirements for the enclosure of *interior exit stairways* or *ramps*.

   1.4. Where a required *interior exit stairway* or *ramp* and an *exit access stairway* or *ramp* serve the same floor level and terminate at the same *level of exit discharge*, the termination of the *exit access stairway* or *ramp* and the *exit discharge* door of the *interior exit stairway* or *ramp* shall be separated by a distance of not less than 30 feet (9144 mm) or not less than one-fourth the length of the maximum overall diagonal dimension of the *building*, whichever is less. The distance shall be measured in a straight line between the *exit discharge* door from the *interior exit stairway* or *ramp* and the last tread of the *exit access stairway* or termination of slope of the *exit access ramp*.

2. Not more than 50 percent of the number and minimum width or required capacity of the *interior exit stairways* and *ramps* is permitted to egress through a vestibule provided that all of the following conditions are met:
   2.1. The entire area of the vestibule is separated from areas below by construction conforming to the *fire-resistance rating* of the *interior exit stairway* or *ramp enclosure*.

   2.2. The depth from the exterior of the *building* is not greater than 10 feet (3048 mm) and the length is not greater than 30 feet (9144 mm).

   2.3. The area is separated from the remainder of the *level of exit discharge* by a *fire partition* constructed in accordance with Section 708.

   Exception: The maximum transmitted temperature rise is not required.

   2.4. The area is used only for *means of egress* and *exits* directly to the outside.

3. *Horizontal exits* complying with Section 1026 shall not be required to discharge directly to the exterior of the *building*.

2024 International Fire Code

Revise as follows:

[BE] 1028.2 Exit discharge.
Exits shall discharge directly to the exterior of the building. The *exit discharge* shall be at grade or shall provide a direct path of egress travel to grade. The *exit discharge* shall not reenter a building. The combined use of Exceptions 1 and 2 shall not exceed 50 percent of the number and minimum width or required capacity of the required *exits*.

Exceptions:

1. Not more than 50 percent of the number and minimum width or required capacity of *interior exit stairways* and *ramps* is permitted to egress through areas, including atriums, on the *level of discharge* provided that all of the following conditions are met:
   1.1. Discharge of *interior exit stairways* and *ramps* shall be provided with a free and unobstructed path of travel to an exterior exit door and such *exit* is readily visible and identifiable from the point of termination of the enclosure.

   1.2. The entire ~~area~~ story of the *level of exit discharge* is separated from ~~areas~~ stories below by construction conforming to the *fire-resistance rating* for the enclosure.

   1.3. The egress path from the *interior exit stairway* and *ramp* on the *level of exit discharge* is protected throughout by an *approved automatic sprinkler system* . Portions of the *level of exit discharge* with access to the egress path shall be either equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, or separated from the egress path in accordance with the requirements for the enclosure of *interior exit stairways* or *ramps.*

   1.4. Where a required *interior exit stairway* or *ramp* and an *exit access stairway* or *ramp* serve the same floor level and terminate at the same *level of exit discharge*, the termination of the *exit access stairway* or *ramp* and the exit discharge door of the *interior exit stairway* or *ramp* shall be separated by a distance of not less than 30 feet (9144 mm) or not less than one-fourth the length of the maximum overall diagonal dimension of the building, whichever is less. The distance shall be measured in a straight line between the exit discharge door from the *interior exit stairway* or *ramp* and the last tread of the *exit access stairway* or termination of slope of the *exit access ramp*.

2. Not more than 50 percent of the number and minimum width or required capacity of the *interior exit stairways* and *ramps* is permitted to egress through a vestibule provided that all of the following conditions are met:
   2.1. The entire area of the vestibule is separated from areas below by construction conforming to the *fire-resistance rating* of the *interior exit stairway* or *ramp* enclosure.

   2.2. The depth from the exterior of the building is not greater than 10 feet (3048 mm) and the length is not greater than 30 feet (9144 mm).

   2.3. The area is separated from the remainder of the *level of exit discharge* by a *fire partition* constructed in accordance with Section 708 of the International Building Code.

   Exception: The maximum transmitted temperature rise is not required.

   2.4. The area is used only for *means of egress* and *exits* directly to the outside.

3. *Horizontal exits* complying with Section 1026 shall not be required to discharge directly to the exterior of the building.

Reason: This is an editorial code change that helps make code application of the requirements more consistent. Interior exit stairway protection terminates at horizontal exits and exterior exit doorways, or the stairway is extended to exterior exit doorways with exit passageways.

As written the IBC uses the undefined term area that some code users interpret to be the portion of the story at the level of exit discharge used to access the exterior exit doorways. Other code users interpret the requirement to apply to the entire story.

The latter interpretation is consistent with the IBC's philosophy that the level of protection along an egress path is not reduced and that the exceptions should be equivalent. Exit passageways, shaft enclosures protecting interior exit stairways and horizontal exits provide protection from the entire story. Additionally, fire sprinkler protection should be throughout the story since the stairway protection protects the stairway from the entire story.

When extended with an exit passageway the path of egress is defined and the protection has a top and sides and a bottom. As a consequence, at a minimum when exception 1.3 is applied the floor between the fire barriers should be fire resistance rated and when the fire sprinkler tradeoff is selected the entire floor above the story below should be protected. Most of the cases we have seen were when the entire story is protected with fire sprinklers.

Cost Impact: Increase

Estimated Immediate Cost Impact:

The increased cost of spray fireproofing between IIB and IIA construction is approximately $11 per sq ft. Between IB and IA, it is similar.

Estimated Immediate Cost Impact Justification (methodology and variables):

The cost was determined by analyzing the ICC Building Valuation Table and determining average variations across types of construction and occupancies for Type II and Type I.

Group (2021 International Building Code)	IA			IB			IIA		
A-1 Assembly, theaters, with stage	335.89	97%	$13.44	324.58	98%	$12.98	316.94	$12.68	98%
A-1 Assembly, theaters, without stage	307.39	96%	$12.30	296.08	97%	$11.84	288.44	$11.54	97%
A-2 Assembly, nightclubs	269.94	97%	$10.80	261.93	97%	$10.48	254.48	$10.18	97%
A-2 Assembly, restaurants, bars, banquet halls	268.94	97%	$10.76	260.93	97%	$10.44	252.48	$10.10	97%
A-3 Assembly, churches	311.88	96%	$12.48	300.57	97%	$12.02	292.93	$11.72	97%
A-3 Assembly, general, community halls, libraries, museums	266.07	96%	$10.64	254.76	97%	$10.19	246.12	$9.84	97%
A-4 Assembly, arenas	306.39	96%	$12.26	295.08	97%	$11.80	286.44	$11.46	97%
B Business	260.69	96%	$10.43	251.13	96%	$10.05	241.86	$9.67	96%
E Educational	273.46	97%	$10.94	263.96	97%	$10.56	255.62	$10.22	97%
F-1 Factory and industrial, moderate hazard	160.20	95%	$6.41	152.78	94%	$6.11	143.34	$5.73	94%
F-2 Factory and industrial, low hazard	159.20	95%	$6.37	151.78	94%	$6.07	143.34	$5.73	94%
H-1 High Hazard, explosives	149.46	95%	$5.98	142.04	94%	$5.68	133.60	$5.34	94%
H234 High Hazard	149.46	95%	$5.98	142.04	94%	$5.68	133.60	$5.34	94%
H-5 HPM	260.69	96%	$10.43	251.13	96%	$10.05	241.86	$9.67	96%
I-1 Institutional, supervised environment	262.22	96%	$10.49	252.95	97%	$10.12	244.31	$9.77	97%
I-2 Institutional, hospitals	434.15	98%	$17.37	424.59	98%	$16.98	415.32	$16.61	98%
I-2 Institutional, nursing homes	302.01	97%	$12.08	292.45	97%	$11.70	283.18	$11.33	97%
I-3 Institutional, restrained	295.86	97%	$11.83	286.31	97%	$11.45	277.03	$11.08	97%
I-4 Institutional, day care facilities	262.22	96%	$10.49	252.95	97%	$10.12	244.31	$9.77	97%
M Mercantile	201.37	96%	$8.05	193.36	96%	$7.73	184.91	$7.40	96%
R-1 Residential, hotels	264.67	97%	$10.59	255.41	97%	$10.22	246.77	$9.87	97%
R-2 Residential, multiple family	221.32	96%	$8.85	212.06	96%	$8.48	203.42	$8.14	96%
R-3 Residential, one- and two-family [d]	209.61	97%	$8.38	203.74	98%	$8.15	198.94	$7.96	98%
R-4 Residential, care/assisted living facilities	262.22	96%	$10.49	252.95	97%	$10.12	244.31	$9.77	97%
S-1 Storage, moderate hazard	148.46	95%	$5.94	141.04	93%	$5.64	131.60	$5.26	93%
S-2 Storage, low hazard	147.46	95%	$5.90	140.04	94%	$5.60	131.60	$5.26	94%
U Utility, miscellaneous	114.09	94%	$4.56	107.37	93%	$4.29	99.89	$4.00	93%
Average		96%	$9.79		96%	$9.43		$9.09	96%

E111-24

E112-24

IBC: 1028.2; IFC: [BE] 1028.2

Proponents: Jeffrey Grove, Coffman Engineers, Coffman Engineers (jeff.grove@coffman.com)

2024 International Building Code

Revise as follows:

1028.2 Exit discharge.
Exits shall discharge directly to the exterior of the *building*. The *exit discharge* shall be at grade or shall provide a direct path of egress travel to grade. The *exit discharge* shall not reenter a *building*. The combined use of Exceptions 1 and 2 shall not exceed 50 percent of the number and minimum width or required capacity of the required *exits*.

Exceptions:

1. Not more than 50 percent of the number and minimum width or required capacity of *interior exit stairways* and *ramps* is permitted to egress through areas, including *atriums*, on the level of discharge provided that all of the following conditions are met:
   1.1. Discharge of *interior exit stairways* and *ramps* shall be provided with a free and unobstructed path of travel to an exterior *exit* door and such *exit* is readily visible and identifiable from the point of termination of the enclosure.

   1.2. The entire area of the *level of exit discharge* is separated from areas below by construction conforming to the *fire-resistance rating* for the enclosure.

   1.3. The egress path from the *interior exit stairway* and *ramp* on the *level of exit discharge* is protected throughout by an *approved automatic sprinkler system*. Portions of the *level of exit discharge* with access to the egress path shall be either equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, or separated from the egress path in accordance with the requirements for the enclosure of *interior exit stairways* or *ramps*.

   1.4. Where a required *interior exit stairway* or *ramp* and an *exit access stairway* or *ramp* serve the same floor level and terminate at the same *level of exit discharge*, the termination of the *exit access stairway* or *ramp* and the *exit discharge* door of the *interior exit stairway* or *ramp* shall be separated by a distance of not less than 30 feet (9144 mm) or not less than one-fourth the length of the maximum overall diagonal dimension of the *building*, whichever is less. The distance shall be measured in a straight line between the *exit discharge* door from the *interior exit stairway* or *ramp* and the last tread of the *exit access stairway* or termination of slope of the *exit access ramp*.

2. Not more than 50 percent of the number and minimum width or required capacity of the *interior exit stairways* and *ramps* is permitted to egress through a vestibule provided that all of the following conditions are met:
   2.1. The entire area of the vestibule is separated from areas below by construction conforming to the *fire-resistance rating* of the *interior exit stairway* or *ramp enclosure*.

   2.2. The depth from the exterior of the *building* is not greater than 10 feet (3048 mm) and the length is not greater than 30 feet (9144 mm).

   2.3. The area is separated from the remainder of the *level of exit discharge* by a *fire partition* constructed in accordance with Section 708.

   Exception: The maximum transmitted temperature rise is not required.

   2.4. The area is used only for *means of egress* and *exits* directly to the outside.

3. *Horizontal exits* complying with Section 1026 shall not be required to discharge directly to the exterior of the *building*.

4. Exit discharge onto the roof of the same building or onto a horizontal building separation per Section 510.2 is permitted when all of the following criteria are met:
   4.1. The exit discharge shall be provided with a free and unobstructed path of travel that is readily visible and identifiable, that does not include re-entering the building or utilizing an interior exit stairway or ramp or exterior exit stairway or ramp.
   4.2. The roof assembly, for the structural bays that support the required exit discharge path, shall have no unprotected openings, and not less than a one-hour fire resistance rating, and not less than the fire resistance rating required for the exit enclosure that discharges onto the roof.

2024 International Fire Code

Revise as follows:

[BE] 1028.2 Exit discharge.

Exits shall discharge directly to the exterior of the building. The *exit discharge* shall be at grade or shall provide a direct path of egress travel to grade. The *exit discharge* shall not reenter a building. The combined use of Exceptions 1 and 2 shall not exceed 50 percent of the number and minimum width or required capacity of the required *exits*.

Exceptions:

1. Not more than 50 percent of the number and minimum width or required capacity of *interior exit stairways* and *ramps* is permitted to egress through areas, including *atriums*, on the level of discharge provided that all of the following conditions are met:
   1.1. Discharge of *interior exit stairways* and *ramps* shall be provided with a free and unobstructed path of travel to an exterior *exit* door and such *exit* is readily visible and identifiable from the point of termination of the enclosure.
   1.2. The entire area of the *level of exit discharge* is separated from areas below by construction conforming to the *fire-resistance rating* for the enclosure.
   1.3. The egress path from the *interior exit stairway* and *ramp* on the *level of exit discharge* is protected throughout by an *approved automatic sprinkler system*. Portions of the *level of exit discharge* with access to the egress path shall be either equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, or separated from the egress path in accordance with the requirements for the enclosure of *interior exit stairways* or *ramps*.
   1.4. Where a required *interior exit stairway* or *ramp* and an *exit access stairway* or *ramp* serve the same floor level and terminate at the same *level of exit discharge*, the termination of the *exit access stairway* or *ramp* and the *exit discharge* door of the *interior exit stairway* or *ramp* shall be separated by a distance of not less than 30 feet (9144 mm) or not less than one-fourth the length of the maximum overall diagonal dimension of the *building*, whichever is less. The distance shall be measured in a straight line between the *exit discharge* door from the *interior exit stairway* or *ramp* and the last tread of the *exit access stairway* or termination of slope of the *exit access ramp*.
2. Not more than 50 percent of the number and minimum width or required capacity of the *interior exit stairways* and *ramps* is permitted to egress through a vestibule provided that all of the following conditions are met:
   2.1. The entire area of the vestibule is separated from areas below by construction conforming to the *fire-resistance rating* of the *interior exit stairway* or *ramp enclosure*.
   2.2. The depth from the exterior of the *building* is not greater than 10 feet (3048 mm) and the length is not greater than 30 feet (9144 mm).
   2.3. The area is separated from the remainder of the *level of exit discharge* by a *fire partition* constructed in accordance with Section 708.
   Exception: The maximum transmitted temperature rise is not required.
   2.4. The area is used only for *means of egress* and *exits* directly to the outside.
3. *Horizontal exits* complying with Section 1026 shall not be required to discharge directly to the exterior of the *building*.

4. Exit discharge onto the roof of the same building or onto a horizontal building separation per Section 510.2 is permitted when all of the following criteria are met:
   4.1. The exit discharge shall be provided with a free and unobstructed path of travel that is readily visible and identifiable, that does not include re-entering the building or utilizing an interior exit stairway or ramp or exterior exit stairway or ramp.
   4.2. The roof assembly, for the structural bays that support the required exit discharge path, shall have no unprotected openings, and not less than a one-hour fire resistance rating, and not less than the fire resistance rating required for the exit enclosure that discharges onto the roof.

Reason: This code change proposal is intended to extend the concept of exit discharge through interior areas on the level of exit discharge, as provided in Exception 1, to exterior areas that happen to be located above other building areas. This is a typical condition in urban areas where the footprint of lower levels, such as a below-grade parking garage, is larger than the footprint of upper levels. It is understood that this condition is not permitted by Section 1028.2, because the roof of the below-grade areas would not be considered "grade". The intent is to provide an equivalent level of safety as is provided for interior discharge configurations, by providing a fire resistance rating for the roof area in close proximity to the exit discharge path, without unprotected openings.

Item 4.1 makes clear that this provision is not intended to allow an occupant to leave an exit stair at an upper story of a building, travel across a roof, and enter another exit. Any vertical changes in elevation along the exit discharge path across the roof would be limited to less than one full story, as otherwise the stairway or ramp would be considered an exterior exit stairway or ramp.

Item 4.2 ensures that a minimum level of fire resistance be provided from below-grade interior spaces, and that roof assemblies in the vicinity of the exit discharge path do not have unprotected openings, which are otherwise permitted in roof assemblies. As part of the exit discharge path, the requirements for egress courts in IBC 1028.4 would still be applicable, if the configuration of the roof surface included an egress court condition. Note that NFPA 101 Life Safety Code has a similar provision in Section 7.7.6, which states the following:

> **7.7.6 Discharge to Roofs.** Where approved by the authority having jurisdiction, exits shall be permitted to discharge to roofs or other sections of the building or an adjoining building where all of the following criteria are met:
>
> (1) The roof/ceiling assembly construction has a fire resistance rating not less than that required for the exit enclosure.
>
> (2) A continuous and safe means of egress from the roof is available.

Bibliography: NFPA 101 Life Safety Code

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This code change proposal is considered to have no cost impact because the exterior surface that occupants will utilize for exit discharge will likely either be a horizontal building separation / Type IA roof assembly, which requires a fire resistance rating, or the roof of a below-grade portion of the building (such as an underground parking garage), which are typically constructed of concrete.

E112-24

E113-24

IBC: 1031.2; IFC: [BE] 1031.2

Proponents: Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org)

2024 International Building Code

Revise as follows:

1031.2 Where required.
In addition to the *means of egress* required by this chapter, *emergency escape and rescue openings* shall be provided in the following occupancies:

1. Group R-2 occupancies located in *stories* with only one *exit* or access to only one *exit* as permitted by Tables 1006.3.4(1) and 1006.3.4(2).
2. Group R-2 occupancies with only one exit or access to only one exit as permitted by Section 1006.3.4 Exceptions 2 and 5.
3~~2~~. Group R-3 and R-4 occupancies.

Basements and sleeping rooms below the fourth *story above grade plane* shall have not fewer than one *emergency escape and rescue opening* in accordance with this section. Where *basements* contain one or more sleeping rooms, an *emergency escape and rescue opening* shall be required in each sleeping room, but shall not be required in adjoining areas of the *basement*. Such openings shall open directly into a *public way* or to a *yard* or *court* that opens to a *public way, or to an egress balcony that leads to a public way* .

Exceptions:

1. *Basements* with a ceiling height of less than 80 inches (2032 mm) shall not be required to have *emergency escape and rescue openings*.
2. *Emergency escape and rescue openings* are not required from *basements* or sleeping rooms that have an *exit* door or *exit access* door that opens directly into a *public way* or to a *yard*, *court* or exterior egress balcony that leads to a *public way*.
3. *Basements* without *habitable spaces* and having not more than 200 square feet (18.6 m^2) in floor area shall not be required to have *emergency escape and rescue openings*.
4. *Storm shelters* are not required to comply with this section where the shelter is constructed in accordance with ICC 500.
5. Within individual *dwelling* and *sleeping units* in Groups R-2 and R-3, where the *building* is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3, *sleeping rooms* in *basements* shall not be required to have *emergency escape and rescue openings* provided that the *basement* has one of the following:
   5.1. One *means of egress* and one *emergency escape and rescue opening*.
   5.2. Two *means of egress*.

2024 International Fire Code

Revise as follows:

[BE] 1031.2 Where required.
In addition to the *means of egress* required by this chapter, *emergency escape and rescue openings* shall be provided in the following occupancies:

1. Group R-2 occupancies located in stories with only one *exit* or access to only one *exit* as permitted by Tables 1006.3.4(1) and 1006.3.4(2).
2. Group R-2 occupancies with only one exit or access to only one exit as permitted by Section 1006.3.4 Exceptions 2 and 5.
3~~2~~. Group R-3 and R-4 occupancies.

Basements and sleeping rooms below the fourth *story above grade plane* shall have not fewer than one *emergency escape and rescue opening* in accordance with this section. Where *basements* contain one or more sleeping rooms, an *emergency escape and rescue opening* shall be required in each sleeping room, but shall not be required in adjoining areas of the *basement*. Such openings shall open directly into a *public way* or to a *yard* or *court* that opens to a *public way* , or to an egress balcony that leads to a *public way* .

Exceptions:

1. *Basements* with a ceiling height of less than 80 inches (2032 mm) shall not be required to have *emergency escape and rescue openings*.
2. *Emergency escape and rescue openings* are not required from *basements* or sleeping rooms that have an *exit* door or *exit access* door that opens directly into a *public way* or to a *yard*, *court* or exterior egress balcony that leads to a *public way*.
3. *Basements* without *habitable spaces* and having not more than 200 square feet (18.6 m^2) in floor area shall not be required to have *emergency escape and rescue openings*.
4. *Storm shelters* are not required to comply with this section where the shelter is constructed in accordance with ICC 500.
5. Within individual *dwelling* and *sleeping units* in Groups R-2 and R-3, where the building is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3, sleeping rooms in *basements* shall not be required to have *emergency escape and rescue openings* provided that the *basement* has one of the following:
   5.1. One *means of egress* and one *emergency escape and rescue opening*.

   5.2. Two *means of egress*.

Reason: BCAC did not believe that a building should be able to use 1006.3.4 Exception 2 and 5 and not have to have EERO in a bedroom. A building does have to provide EERO if you use Exception 1 for Group R-2.

Exception 2 is limited to exits at the level of exit discharge, however Exception 5 could be multiple stories. Building using Exception 2 could be a single story unit with multiple rooms, or an efficiency unit. Travel distance in Table 1006.2.1 is 125 feet. An R-2 townhouse can use an NFPA13D system. BCAC has a separate change for travel distance for Group R-2 with an NFPA 13D (suggesting 75 feet).

This proposal is submitted by the ICC Building Code Action Committee (BCAC).
BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC webpage.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This provides clarification for requirements for emergency escape and rescue opening in all low rise residential units with a single exit that and meets the original intent to provide the option of an EERO from bedrooms.

E113-24

E114-24

IBC: 1031.2; IFC: [BE] 1031.2

Proponents: Jeffrey Munsterteiger, National Association of Home Builders, National Association of Home Builders (jmunsterteiger@nahb.org)

2024 International Building Code

Revise as follows:

1031.2 Where required.
In addition to the *means of egress* required by this chapter, *emergency escape and rescue openings* shall be provided in the following occupancies:

1. Group R-2 occupancies located in *stories* with only one *exit* or access to only one *exit* as permitted by Tables 1006.3.4(1) and 1006.3.4(2).
2. Group R-3 and R-4 occupancies.

Basements and sleeping rooms below the fourth *story above grade plane* shall have not fewer than one *emergency escape and rescue opening* in accordance with this section. Where *basements* contain one or more sleeping rooms, an *emergency escape and rescue opening* shall be required in each sleeping room, but shall not be required in adjoining areas of the *basement*. Such openings shall open directly into a *public way* or to a *yard* or *court* that opens to a *public way, or to an egress balcony that leads to a public way* .

Exceptions:

1. *Basements* with a ceiling height of less than 80 inches (2032 mm) shall not be required to have *emergency escape and rescue openings*.
2. *Emergency escape and rescue openings* are not required from *basements* or sleeping rooms that have an *exit* door or *exit access* door that opens directly into a *public way* or to a *yard*, *court* or exterior egress balcony that leads to a *public way*.
3. *Basements* without *habitable spaces* and having not more than 200 square feet (18.6 m^2) in floor area shall not be required to have *emergency escape and rescue openings*.
4. *Storm shelters* are not required to comply with this section where the shelter is constructed in accordance with ICC 500.
5. Within individual *dwelling* and *sleeping units* in Groups R-2 and R-3, where the *building* is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3, *sleeping rooms* in *basements* shall not be required to have *emergency escape and rescue openings* provided that the *basement* has one of the following:
   5.1. One *means of egress* and one *emergency escape and rescue opening*.
   5.2. Two *means of egress*.
6. <u>In Groups R-2 and R-3, a yard shall not be required to open directly into a public way where the yard opens to an unobstructed path from the yard to the public way. Such path shall have a width of not less than 36-inches (914 mm).</u>

2024 International Fire Code

Revise as follows:

[BE] 1031.2 Where required.
In addition to the *means of egress* required by this chapter, *emergency escape and rescue openings* shall be provided in the following occupancies:

1. Group R-2 occupancies located in stories with only one *exit* or access to only one *exit* as permitted by Tables 1006.3.4(1) and 1006.3.4(2).
2. Group R-3 and R-4 occupancies.

Basements and sleeping rooms below the fourth *story above grade plane* shall have not fewer than one *emergency escape and rescue opening* in accordance with this section. Where *basements* contain one or more sleeping rooms, an *emergency escape and rescue opening* shall be required in each sleeping room, but shall not be required in adjoining areas of the *basement*. Such openings shall open directly into a *public way* or to a *yard* or *court* that opens to a *public way* , or to an egress balcony that leads to a *public way* .

Exceptions:

1. *Basements* with a ceiling height of less than 80 inches (2032 mm) shall not be required to have *emergency escape and rescue openings*.
2. *Emergency escape and rescue openings* are not required from *basements* or sleeping rooms that have an *exit* door or *exit access* door that opens directly into a *public way* or to a *yard*, *court* or exterior egress balcony that leads to a *public way*.
3. *Basements* without *habitable spaces* and having not more than 200 square feet (18.6 m^2) in floor area shall not be required to have *emergency escape and rescue openings*.
4. *Storm shelters* are not required to comply with this section where the shelter is constructed in accordance with ICC 500.
5. Within individual *dwelling* and *sleeping units* in Groups R-2 and R-3, where the building is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3, sleeping rooms in *basements* shall not be required to have *emergency escape and rescue openings* provided that the *basement* has one of the following:
   5.1. One *means of egress* and one *emergency escape and rescue opening*.
   5.2. Two *means of egress*.
6. In Groups R-2 and R-3, a yard shall not be required to open directly into a public way where the yard opens to an unobstructed path from the yard to the public way. Such path shall have a width of not less than 36-inches (914 mm).

Reason: The purpose of this code change is to allow an EERO to discharge into a yard that does not directly open onto a public way if a minimum 36-inch-wide path is provided from the yard to the public way. This language is similar to language that was approved in the IRC last cycle. In many cities, new townhouses are being constructed on infill lots with tight space limitations. Back yards may already be enclosed because of placement of fences on neighboring lots. There are many examples of this in cities throughout the country where backyard fences are added after the structure was built leaving existing EERO to discharge into a fenced back yard. In some cases, a builder may want to construct two rows of townhouses that are tight up to the street but that have fenced backyards for each unit. Under the current code, the builder must construct all EERO facing the front of the units, with a window well in the sidewalk to access a basement EERO or forgo the private fenced yards as there will likely not be enough space to provide a 10-foot wide “public way”. The problems with placing an EERO in the front to allow a fenced yard in the back include coordinating the location with entry doors and front steps, coordinating the location with utilities, and providing a secure cover over the window well that prevents passers-by from dropping trash into the window well or falling. The problem with forgoing fenced yards is the loss of security for children and pets, and privacy.

While a 10-foot-wide path between back-to-back fenced yards is almost certainly not feasible, a 3-foot path may be in many cases. The new exception would allow such a path, that occupants could use to get out of their yard after escaping through an EERO or that firefighters could use to access the fenced yard for firefighting and rescue operations without having to breach or climb over a series of fences. In these multi-family arrangements this space most-likely would be a common space maintained by the management company or by an association.

Support for choosing the 36-inch minimum width can be found in NFPA 101 (2024) where exit discharge paths leading to a public way are allowed to be a minimum of 36-inches wide in Section 7.7.1.2 for all occupancies and occupant loads. Similarly, IBC Table 1020.3 allows corridors 36-inches in width when serving any occupant load of less than 50 in all occupancies.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The code change proposal will not increase or decrease the cost of construction. The code change does not change the requirement to provide an EERO for sleeping rooms. Thus, there should be no increase in cost because of this proposal.

There may be a modest savings from the added ability to locate a basement EERO in the rear of the home, where covers may not be required and coordination with utilities is easier.

E114-24

E115-24

IBC: 1031.2.1, 1031.3, 1031.3.3, 1031.6; IFC: [BE] 1031.2.1, [BE] 1031.3, [BE] 1031.3.3, [BE] 1031.6

Proponents: Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org)

2024 International Building Code

Revise as follows:

1031.2.1 Operational constraints and opening control devices.
Emergency escape and rescue openings shall be operational from inside the room without the use of keys or tools. Window-opening control devices <u>and fall prevention devices</u> complying with ASTM F2090 shall be permitted for use on windows serving as a required *emergency escape and rescue opening.*

1031.3 Emergency escape and rescue openings.
Emergency escape and rescue openings shall ~~comply~~ <u>have dimensions in accordance</u> with Sections 1031.3.1 through 1031.3.3.

1031.3.3 Maximum height from floor.
<u>Where a window is provided as the emergency</u> ~~*Emergency*~~ *escape and rescue openings*<u>, such window</u> shall have the bottom of the clear opening not greater than 44 inches (1118 mm) measured from the floor.

1031.6 Bars, grilles, covers and screens.
Where bars, grilles, covers, screens or similar devices are placed over *emergency escape and rescue openings* or area wells that serve such openings, the minimum net clear opening size shall comply with Sections 1031.3 <u>through 1031.3.2</u> and ~~1031.5~~ <u>1031.5.1</u>. Such devices shall be releasable or removable from the inside without the use of a key, tool or force greater than that which is required for normal operation of the *emergency escape and rescue opening*.

2024 International Fire Code

Revise as follows:

[BE] 1031.2.1 Operational constraints and opening control devices.
Emergency escape and rescue openings shall be operational from inside the room without the use of keys or tools. Window-opening control devices <u>and fall prevention devices</u> complying with ASTM F2090 shall be permitted for use on windows serving as a required emergency escape and rescue opening.

[BE] 1031.3 Emergency escape and rescue openings.
Emergency escape and rescue openings shall ~~comply~~ <u>have dimensions in accordance</u> with Sections 1031.3.1 through 1031.3.3.

[BE] 1031.3.3 Maximum height from floor.
<u>Where a window is provided as the emergency</u> ~~*Emergency*~~ *escape and rescue openings*<u>, such window</u> shall have the bottom of the clear opening not greater than 44 inches (1118 mm) measured from the floor.

[BE] 1031.6 Bars, grilles, covers and screens.
Where bars, grilles, covers, screens or similar devices are permitted to be placed over *emergency escape and rescue openings*, or area wells that serve such openings, the minimum net clear opening size shall comply with Sections 1031.3 <u>through 1031.3.2.</u> and ~~1031.5~~ <u>1031.5.1</u>. Such devices shall be releasable or removable from the inside without the use of a key, tool or force greater than that which is required for normal operation of the escape and rescue opening.

Reason: The intent of this code change is to complete the coordination for EERO in IBC and IRC where appropriate. There were multiple proposals during the last two cycles and this was split between Group A and B, so some items remain to be coordinated.

1031.2.1 – It was pointed out during the IRC changes that ASTM F2090 was applicable to control devices and fall prevention devices. This revision would also coordinate with IRC Section R319.1.1.

1031.3 – This is a more specific description of the referenced sections. This will coordinate with R319.2.

1031.3.3 - EEROs can be doors or windows. The prosed revision in text would clarify that the bottom of the opening applies only to windows. This change was approved for IRC R319.2.3.

This proposal was disapproved last cycle because there was a misinterpretation that this revision was limiting the EERO to windows only, and not allowing doors. This section only references windows because only windows have a bottom edge requirement. A door would be controlled through the general door requirements for thresholds and landings, but it can still be an EERO (Section 1031.4). This is the proposed language in context.

1031.3 Emergency escape and rescue openings. Emergency escape and rescue openings shall ~~comply~~ have minimum dimensions in accordance with Sections 1031.3.1 through 1031.3.3.

1031.3.1 Minimum size. Emergency escape and rescue openings shall have a minimum net clear opening of 5.7 square feet (0.53 m^2).
Exception: The minimum net clear opening for grade floor emergency escape and rescue openings shall be 5 square feet (0.46 m^2).

1031.3.2 Minimum dimensions. The minimum net clear opening height dimension shall be 24 inches (610 mm). The minimum net clear opening width dimension shall be 20 inches (508 mm). The net clear opening dimensions shall be the result of normal operation of the opening.

1031.3.3 Maximum height from floor. Where a window is provided as the emergency ~~Emergency~~ escape and rescue openings, such window shall have the bottom of the clear opening not greater than 44 inches (1118 mm) measured from the floor.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC webpage.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

These changes are coordination between the provisions for EERO in IBC and IRC. This is consistent with the EERO proposals the BCAC submitted for the 2024 codes. There are not changes to requirements.

E115-24

E116-24

IBC: 1103.2.11

Proponents: Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org)

2024 International Building Code

Revise as follows:

1103.2.11 Residential Group R-1 or R-3. *Buildings* of Group R-1 ~~containing not more than five *dwelling units* and *sleeping units* in aggregate for rent or hire~~ that are ~~also~~ occupied as the residence of the proprietorand that contain not more than five *guestrooms* for rent or hire are not required to comply with this chapter. *Buildings* of Group R-3 *congregate living facilities* (*transient*) or *boarding houses* (*transient*) ~~containing not more than five *sleeping units* for rent or hire~~ that are ~~also~~ occupied as the residence of the proprietor and that contain not more than five *guestrooms* for rent or hire are not required to comply with this chapter.

Reason: G44-21 Part 1 revised this section as part of a generic change that recognized that hotels can have sleeping units or dwelling units. However, this is a very specific exception in Chapter 11 that was consistent with a similar exception in IRC Section R322.1 and the 2010 ADA. This is intended to exempt small bed-n-breakfast facilities where the owner lives (possible dwelling unit) in the same building and there are only 5 guestrooms (sleeping units). By saying 'aggregate' this could be read to add the owner's living quarters to the count. Also, this exception is not intended to extend to small transient apartment buildings that offer units for rent, even if the owner lived in the building. Since the IBC now includes a definition for 'guestroom', it is clearer to just go back to that language for this specific section. That would also be consistent terms used in Section 310.4.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC webpage.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0 - Assuming that the owner's apartment and shared space are approximately 50% of the building, allowing for 5 instead of 4 guestrooms would result in a savings of approximately 10% of the cost of the building. The cost of the building varies widely by size and local.

Estimated Immediate Cost Impact Justification (methodology and variables):

This is not a change from what was required in the 2021 and previous codes and the 2010 ADA. This will be a reduction in cost because it would restore the 5 guestrooms plus the owners apartment instead of only 4 guestrooms with the owners apartment.

E116-24

E117-24

IBC: 1105.1

Proponents: Steve Thomas, Shums Coda Associates, Himself (sthomas@coloradocode.net)

2024 International Building Code

Revise as follows:

1105.1 Public entrances.
In addition to accessible entrances required by Sections 1105.1.2 through 1105.1.8, at least 60 percent of all *public entrances* shall be accessible.

Exceptions:

1. An accessible entrance is not required to areas not required to be accessible.
2. Loading and *service entrances* that are not the only entrance to a tenant space.
3. <u>Groups R-2, R-3 or R-4 occupancies containing Accessible, Type A or Type B Units, including accessory occupancies in accordance with Section 508.2 shall be provided with no fewer than one accessible public entrance.</u>

Reason: The Federal Fair Housing Act does not require more than one entrance to buildings regulated under that standard. The intent of this proposal is to be consistent with those provisions and clarify that 60% of the entrances are not required to be accessible but that at least one entrance must be accessible. Section 1108.4 states the following:

Not fewer than one accessible route shall connect accessible building or facility entrances with the primary entrance of each Accessible unit, Type A unit and Type B unit within the building or facility and with those exterior and interior spaces and facilities that serve the units.

We believe that this provides supporting documentation that only one accessible route and entrance is required to a residential building.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is a clarification of the intent of the code. This requirement is consistent with the Fair Housing Act and the current code language in 1105.1.8.

E117-24

E118-24

IBC: 1106.2, 1107.2.1, 1107.2.2

Proponents: Gene Boecker, CCI, self (geneb@codeconsultants.com); Matt Lescher, CCI, self (mattl@codeconsultants.com); Richard Williams, CWA Consultants, Self (richard@cwaconsultants.net); Marsha Mazz, United Spinal Association, United Spinal Association (mmazz@accessibility-services.com)

2024 International Building Code

Revise as follows:

1106.2 Required.
Where parking is provided, accessible parking spaces shall be provided in compliance with Table 1106.2, except as required by Sections 1106.3 through 1106.5. Where more than one parking *facility* is provided on a *site*, the number of parking spaces required to be accessible shall be calculated separately for each parking *facility*. The vehicle spaces for the electric vehicle charging stations shall not be considered a type of parking space or be included in the number of parking spaces provided on a site.

~~Exception~~ Exceptions:

1. This section does not apply to parking spaces used exclusively for buses, trucks, other delivery vehicles, law enforcement vehicles or vehicular impound and motor pools where *lots* accessed by the public are provided with an accessible passenger loading zone.
2. In Group R-2 occupancies, where accessible vehicle spaces served by electrical vehicle charging stations are assigned to Accessible or Type A dwelling units, the accessible vehicle space shall be permitted to be counted as accessible parking spaces.

1107.2.1 Number of accessible vehicle spaces.
Not less than 5 percent of vehicle spaces on the *site* served by electrical vehicle charging systems, but not fewer than one for each type of electric vehicle charging system, shall be accessible.

Exception: In Group R-2 occupancies, where vehicle spaces are assigned to specific dwelling units or sleeping units, at least one accessible vehicle space served by electrical vehicle charging systems shall be provide for each Accessible or Type A unit. At least one additional accessible vehicle space served by an electrical vehicle charging station shall be provided.

Delete without substitution:

~~**1107.2.2 Vehicle space size.**~~
~~Accessible vehicle spaces shall comply with the requirements for a van accessible parking space that is 132 inches (3350 mm) minimum in width with an adjoining access aisle that is 60 inches (1525 mm) minimum in width.~~

Reason: During last code change cycle the exception for R-2 occupancies was eliminated, meaning that electric vehicle charging stations (EVCSs) needed to be provided for residential occupancies. It is understood that EVCSs are not parking spaces and are intended to be treated as a vehicle amenity. The last sentence in 1107.2.1 addresses that. However, in residential parking facilities it is common to have EVCSs provided to parking spaces.

The proposal includes an exception that allows parking spaces to be also considered EVCSs under a limited condition. In many cases, where EVCSs are provided to multiple individual residential parking spaces, the number of EVCS can be 10, 20 or even 30 spaces. As time progresses, the number could eventually be the entire parking facility. This would require a potential retroactive revision of parking spaces to allow for the 5 percent accessible EVCSs in a facility which may need to reduce the number of total parking spaces to accommodate the 5 percent.

For example, in a parking facility with 300 dwelling units and 300 parking spaces with 20 parking spaces intended to be EVCSs, under the current way this is worded, a single additional EVCS is required (5% of 20) since EVCS are amenities, not parking spaces. However, if all 300 parking spaces are designed to be EVCS, then 15 accessible EVCS would be required.

With the proposed change, for the 20 EVCS, nothing is different; a single accessible EVCS would be required. However, for the situation where all 300 spaces are EVCS, the number of accessible EVCS would be more reasonable. All 6 Type A units would have parking spaces designed to be accessible and a single, independent EVCS would be provided; 7 instead of 15. This is a more manageable way to address residential EVCS design in residential facilities.

The A117.1 has approved ,for the next edition, technical criteria for EV charging spaces that are consistent with the guidance from the U.S. Access Board. Section 1107.2.2 is deleted since this is in conflict with those requirements and is no longer needed.

Bibliography: https://energy5.com/how-much-does-a-commercial-ev-charging-station-cost
https://wattlogic.com/blog/commercial-ev-charging-stations-cost/
https://4frontenergy.com/blog/commercial-ev-charging-station-cost/
https://cyberswitching.com/commercial-ev-charging-station-cost/
https://futureenergy.com/ev-charging/how-much-do-ev-charging-stations-cost/
https://afdc.energy.gov/files/u/publication/evse_cost_report_2015.pdf

Cost Impact: Decrease

Estimated Immediate Cost Impact:

According to several sources on the internet, a commercial EVCS can cost between $3,000 and $60,000 with the average being between $7,000 and $10,000. Assuming the low end of the average cost, given the scenario above, the cost saving for providing 7 stations instead of 15 stations would be around $56,000. This would be a cost savings of $46,000 or more. The variables include the number of Type A units and the number of intended EVCS over the life of the facility.

Estimated Immediate Cost Impact Justification (methodology and variables):

The methodology provided for the added code text would not impact facilities where all units are Type B but would likely decrease the number of accessible EVCS for residential facilities while still maintaining at least one EVCS that is not specifically assigned to a residential unit.

Estimated Life Cycle Cost Impact:

he life cycle costs would vary on prices for EVCS in the future and the number of EVCS.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

As noted above, variables are numbers of EVCS and numbers of Type A units.

E118-24

E119-24

IBC: 1106.3.1 (New)

Proponents: Gene Boecker, CCI, self (geneb@codeconsultants.com); Matt Lescher, CCI, self (mattl@codeconsultants.com); Richard Williams, CWA Consultants, Self (richard@cwaconsultants.net); Marsha Mazz, United Spinal Association, United Spinal Association (mmazz@accessibility-services.com)

2024 International Building Code

1106.3 Groups R-2, R-3 and R-4.
Accessible parking spaces shall be provided in Group R-2, R-3 and R-4 occupancies in accordance with the greatest number of parking spaces of any of the following:

1. In Group R-2, R-3 and R-4 occupancies that are required to have *Accessible*, Type A or *Type B dwelling units* or *sleeping units*, at least 2 percent, but not less than one, of each type of parking space provided shall be accessible.
2. Where at least one parking space is provided for each *dwelling unit* or *sleeping unit*, at least one accessible parking space shall be provided for each *Accessible* and *Type A unit*.

Add new text as follows:

1106.3.1 Parking for other than residents. In parking lots serving Group R-2, R-3 and R-4 occupancies, where parking spaces are provided for persons other than residents, parking for such spaces shall be provided in accordance with Table 1106.2.

Reason: The additional text is necessary to clarify that the parking spaces at residential facilities can be based upon each "facility" and that guest parking, employee parking, parking for the leasing office, etc. are not intended to be included as parking the calculation for residential parking noted in Section 1106.3. The language is the same as that in Section 208.2.3.3. This is also consistent with the manner in which HUD interprets the condition.

Bibliography: 2010 ADA Standards for Accessible Design

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The intent is only to provide clarity to the condition where confusion has been present for non-resident parking requirements.

E119-24

E120-24

IBC: 1107.2, 1107.2.1, 1107.2.2, 1107.2.2.1 (New), 1107.2.3 (New), 1107.2.3.1 (New), 1107.2.3.2 (New), 1107.2.3.3 (New), 1107.2.4 (New), 1107.2.4.1 (New), 1107.2.4.2 (New), 1112.1

Proponents: Jeffrey Grove, Southern Nevada ICC Chapter (jeff.grove@coffman.com)

2024 International Building Code

Revise as follows:

1107.2 Electrical vehicle charging stations.
Electrical vehicle charging stations shall comply with Sections 1107.2.1 ~~and 1107.2.2~~ through 1107.2.4.

Exceptions:

1. *Electrical vehicle charging stations* provided to serve Group R-3 and R-4 occupancies are not required to comply with this section.
2. Electric vehicle charging stations used exclusively by buses, trucks, other delivery vehicles, law enforcement vehicles and motor pools are not required to comply with this section.

1107.2.1 Number of accessible vehicle spaces. Not less than 5 percent of vehicle spaces on the *site* served by electrical vehicle charging systems, but not fewer than one for each type of electric vehicle charging system, shall be accessible. Where new electric vehicle charging stations are installed in facilities with existing electric vehicle charging stations, the total number of accessible spaces provided shall include both existing and new electric vehicle charging stations. Where an electric vehicle charging station charger can simultaneously charge more than one vehicle, the number of electric vehicle charging stations provided shall be considered equivalent to the number of electric vehicles that can be simultaneously charged. Parking spaces serving electric vehicle charging stations shall not be permitted to count towards the number of accessible parking spaces required by Section 1106.

1107.2.2 Vehicle space size.
Accessible vehicle charging spaces shall ~~comply with the requirements for a van accessible parking space that is~~ be132 inches (3350 mm) minimum in width, 240 inches (6096 mm) minimum in length, and 98 inches (2489 mm) minimum in height with an adjoining access aisle ~~that is 60 inches (1525 mm) minimum in width~~ complying with Section 1107.2.3.

Add new text as follows:

1107.2.2.1 Vehicle charging space marking. The vehicle charging spaces shall be marked to define the width and length. Where vehicle charging spaces are marked with lines, the width measurements of vehicle charging spaces and adjacent access aisles shall be made from the centerline of the markings.

Exceptions:

1. Where parking spaces or access aisles are not adjacent to another vehicle charging space or access aisle, measurements shall be permitted to include the full width of the line defining the vehicle charging space or access aisle.
2. Vehicle charging space in pull-through electric vehicle charging stations are not required to comply with this section.

1107.2.3 Access aisle. The vehicle charging spaces shall have an adjacent access aisle complying with Section 1107.2.3.1 through 1107.2.3.3. Access aisles shall adjoin an accessible route. Two vehicle charging spaces shall be permitted to share a common access aisle. Access aisles shall not overlap with the vehicular way. The vehicle charging spaces shall be permitted to have access aisles placed on either side of the vehicle charging space.

1107.2.3.1 Width. Access aisles serving the vehicle charging spaces shall be 60 inches (1525 mm) minimum in width.

1107.2.3.2 Length. Access aisles shall extend the full length of the vehicle charging spaces they serve.

1107.2.3.3 Marking. Access aisles shall be marked so as to discourage parking in them. Where access aisles are marked with lines, the width measurements of access aisles and adjacent vehicle charging spaces shall be made from the centerline of the markings.

Exceptions:

1. Where access aisles or vehicle charging spaces are not adjacent to another access aisle or vehicle charging space, measurements shall be permitted to include the full width of the line defining the access aisle or vehicle charging space
2. Vehicle charging space in pull-through EV charging stations are not required to comply with this section.

1107.2.4 Accessible routes. Accessible routes shall be provided to serve *electric vehicle charging stations* in accordance with Sections 1107.2.4.1 and 1107.2.4.2.

1107.2.4.1 Building or facility. Accessible *electric vehicle charging stations* that serve a building or facility on the same site shall be located along an *accessible route* providing access to an *accessible* building entrance. Where *accessible electric vehicle charging stations* do not serve a building or facility on the same site, they shall be located along an accessible route providing access to the *public way*.

1107.2.4.2 Charging stations. *Accessible electric vehicle charging stations* shall be provided with an *accessible route* between the *accessible* aisle serving it and all related operable parts and other equipment. When a vehicle is being charged, the *accessible route* shall not be obstructed by the cable between the vehicle and the charging station.

Revise as follows:

1112.1 Signs.

Required accessible elements shall be identified by the International Symbol of Accessibility at the following locations.

1. Accessible parking spaces required by Section 1106.2.

   Exception: Where the total number of parking spaces provided is four or less, identification of accessible parking spaces is not required.

2. Accessible parking spaces required by Section 1106.3.

   Exception: In Group I-1, R-2, R-3 and R-4 *facilities*, where parking spaces are assigned to specific *dwelling units* or *sleeping units*, identification of accessible parking spaces is not required.

3. Accessible electric vehicle charging station signs shall include “Accessible EV Charing - Use Last”. Signs shall be 60 inches (1525 mm) minimum above the floor of the vehicle charging space, measured to the bottom of the sign.

~~3~~4. Accessible passenger loading zones.

~~4~~5. Accessible toilet or bathing rooms where not all toilet or bathing rooms are *accessible*.

~~5~~6. Accessible entrances where not all entrances are accessible.

~~6~~7. Accessible checkout aisles where not all aisles are accessible. The sign, where provided, shall be above the checkout aisle in the same location as the checkout aisle number or type of checkout identification.

~~7~~8. Accessible dressing, fitting and locker rooms where not all such rooms are accessible.

~~89.~~ *Accessible areas of refuge* in accordance with Section 1009.9.

~~9~~10 Exterior areas for assisted rescue in accordance with Section 1009.9.

~~10~~11. In recreational *facilities*, lockers that are required to be accessible in accordance with Section 1110.12.

Reason: This code change is proposing to add language to more closely align accessibility requirements with the existing requirements for parking and accessibility in Section 1106 and ANSI A117.1 as well as the recommendations from the U.S. Access board while allowing for more sustainable implementation. The current language attempts to rely on the provisions in ANSI 117.1 to identify the requirements of vehicle charging spaces such as is done with accessible parking spaces. Currently, ANSI 117.1 does not have requirements specific to vehicle charging spaces. This leaves language open to misinterpretation and increases the probability of conflicts between the two code documents.

The vehicle space size was chosen based on the recommendations of the U.S. Access Board. It was determined that these mobility features allow sufficient space for a person who uses a mobility device to exit and maneuver around the vehicle, retrieve the EV connector, and plug the connector into the electric vehicle charging inlet. Since EVs do not have a uniform vehicle charging inlet location, a larger vehicle charging space is needed to maneuver around all sides of the electric vehicle.

The current version of the code would allow for the accessible charging stations to be counted towards the overall accessible parking requirement for the site. Making the charging station a required accessible parking space with accessible signage could potentially prevent people who are able bodied from being permitted to utilize the charging stations without facing fines and/or other legal penalties. In a small group of charging stations this could lead to an extremely low utilization rate on the charging stations affecting the viability of the installation. By allowing smaller groups of charging stations to be accessible without requiring them to be dedicated, the utilization rates will be higher. Adding the signage requirement to Section 1112.1 would further clarify anyone may use the accessible charging space with preference that it be used last. The overall resources required will be reduced allowing for a more rapid implementation of the charging network.

Adding a requirement to provide access to a building or public way is necessary to provide equal access. An accessible route to a building will by default provide access to a public way as the code already requires buildings be connected to a public way by an accessible route. Requiring charging stations not on a site with buildings to connect to a public way allows users to have access to public transportation or businesses off site. While many charging stations are rapid charging stations, some take a significant amount of time to complete a charge. In that time people may walk to get some food or use a nearby restroom facility. Another scenario where this becomes important is in the event the vehicle becomes disabled at the charging station and the user needs to leave the site to seek shelter or other transportation.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

Typical fast charger equipment cost is $30,000-$50,000.

Estimated Immediate Cost Impact Justification (methodology and variables):

By eliminating the need to install a dedicated accessible underutilized charger, the overall number of chargers can be reduced by at least 1. There are too many variables to estimate the additional infrastructure cost. Distance from utility access to 3 phase power, free capacity on existing service, site characteristics, ect. are all highly variable contributors to the construction cost.

E120-24

E121-24

IBC: 1108.6.2.2.1

Proponents: Gene Boecker, CCI, self (geneb@codeconsultants.com); Matt Lescher, CCI, self (mattl@codeconsultants.com); Richard Williams, CWA Consultants, Self (richard@cwaconsultants.net); Marsha Mazz, United Spinal Association, United Spinal Association (mmazz@accessibility-services.com)

2024 International Building Code

Revise as follows:

1108.6.2.2.1 Type A units.
In Group R-2 occupancies containing more than 20 *dwelling units* or *sleeping units*, at least 2 percent but not less than one of the units shall be a *Type A unit*. All Group R-2 units on a *site* shall be considered to determine the total number of units and the required number of *Type A units*. *Type A units* shall be dispersed among the various classes of units. Where two or more *Type A units* are provided, at least 5 percent but not less than one *Type A unit* shall include a bathroom with a shower complying with ICC A117.1 for *Type A units*.

Exceptions:

1. The number of *Type A units* is permitted to be reduced in accordance with Section 1108.7.
2. *Existing structures* on a *site* shall not contribute to the total number of units on a *site*.
3. <u>Where multi-story dwelling units or sleeping units are provided, one-story dwelling units or sleeping units shall be permitted to be considered the same class of unit provided the one-story unit has equivalent rooms and spaces.</u>

Reason: The added exception makes it clear how to approach multi-story units where Type A units are provided. The text is the same as that in the ADA 2010 Standards and located as an exception to Section 233.3.5, Dispersion. While the types of units identified in Section 233 are more similar to those required for facilities subject to Section 504 of the 1973 Rehabilitation Act, the actual dwelling unit design is relatively similar to that of a Type A unit. Since there is currently no clear guidance as far as what to do where multi-story units are provided within a facility where Type A units are required, this is essentially providing clarity to a subject not currently addressed.

Bibliography: 2010 ADA Standards for Accessible Design

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Currently there is no code language on how to address the condition. Many jurisdictions may already be using this interpretation. It simply addresses what must be done for a condition that has not had specific code language previously.

E121-24

E122-24

IBC: 1108.5.1.1, 1108.5.1.2, 1108.5.2.1, 1108.5.4, 1110.2.2, 1110.2.2.1, 1110.2.2.2, 1110.2.2.2.1, 1110.2.2.2.2, 1110.2.2.2.3, 1110.2.2.3, 1110.2.2.4, 1110.2.2.5, 1110.2.2.6, 1110.2.3, 1110.2.3.1, 1110.2.3.2, 1110.2.3.3, 1110.2.3.3.1, 1110.2.3.3.2, 1110.2.3.4, 1110.2.3.5, 1110.2.3.6, 1110.2.3.7, 1110.2.3.8, 1110.2.3.9

Proponents: Matt Lescher, CCI, self (mattl@codeconsultants.com); Marsha Mazz, United Spinal Association, United Spinal Association (mmazz@accessibility-services.com); Gene Boecker, CCI, self (geneb@codeconsultants.com); Jim Safranek, Safranek Group LLC, Self (jim@safranekgroup.com)

2024 International Building Code

1108.5 Group I.
Accessible units and *Type B units* shall be provided in Group I occupancies in accordance with Sections 1108.5.1 through 1108.5.5.

1108.5.1 Group I-1.
Accessible units and *Type B units* shall be provided in Group I-1 occupancies in accordance with Sections 1108.5.1.1 and 1108.5.1.3.

Revise as follows:

1108.5.1.1 Accessible units.
In Group I-1, Condition 1, at least 4 percent, but not less than one, of the *dwelling units* and *sleeping units* shall be *Accessible units*. *Accessible dwelling units* and *sleeping units* shall be dispersed among the various classes of units.

Exceptions:

1. Water closets shall be permitted to comply with assisted toileting requirements in accordance with ICC A117.1 Section 611 ~~not be required to comply with ICC A117.1 where such water closets comply with Section 1110.2.2~~, in not more than 50 percent of the *Accessible units.*
2. Roll-in-type showers shall be permitted to comply with assisted toileting requirements in accordance with ICC A117.1 Section 611.7 ~~not be required to comply with ICC A117.1 where such water closets comply with Section 1110.2.3~~, in not more than 50 percent of the *Accessible units*.

1108.5.1.2 Accessible units in Group I-1, Condition 2.
In Group I-1, Condition 2, at least 10 percent, but not less than one, of the *dwelling units* and *sleeping units* shall be *Accessible units*. *Accessible dwelling units* and *sleeping units* shall be dispersed among the various classes of units.

Exceptions:

1. Water closets shall be permitted to comply with assisted toileting requirements in accordance with ICC A117.1 Section 611 ~~not be required to comply with ICC A117.1 where such water closets comply with Section 1110.2.2~~, in not more than 50 percent of the *Accessible units.*
2. Roll-in-type showers shall be permitted to comply with assisted toileting requirements in accordance with ICC A117.1 Section 611.7 ~~not be required to comply with ICC A117.1 where such water closets comply with Section 1110.2.3~~, in not more than 50 percent of the *Accessible units*.

1108.5.1.3 Type B units.
In *structures* with four or more *dwelling units* or *sleeping units intended to be occupied as a residence* , every *dwelling unit* and *sleeping unit intended to be occupied as a residence* shall be a *Type B unit*.

Exception: The number of *Type B units* is permitted to be reduced in accordance with Section 1108.7.

1108.5.2 Group I-2 nursing homes.
Accessible units and *Type B units* shall be provided in *nursing homes* of Group I-2, Condition 1 occupancies in accordance with Sections 1108.5.2.1 and 1108.5.2.2.

Revise as follows:

1108.5.2.1 Accessible units.

At least 50 percent but not less than one of each type of the *dwelling units* and *sleeping units* shall be *Accessible units*.

Exceptions:

1. Water closets shall be permitted to comply with assisted toileting requirements in accordance with ICC A117.1 Section 611 ~~not be required to comply with ICC A117.1 where such water closets comply with Section 1110.2.2~~, in not more than 90 percent of the *Accessible units*.
2. Roll-in-type showers shall be permitted to comply with assisted toileting requirements in accordance with ICC A117.1 Section 611.7 ~~not be required to comply with ICC A117.1 where such water closets comply with Section 1110.2.3~~, in not more than 90 percent of the *Accessible units.*

1108.5.2.2 Type B units.

In *structures* with four or more *dwelling units* or *sleeping units intended to be occupied as a residence*, every *dwelling unit* and *sleeping unit intended to be occupied as a residence* shall be a *Type B unit*.

Exception: The number of *Type B units* is permitted to be reduced in accordance with Section 1108.7.

1108.5.3 Group I-2 hospitals.

Accessible units and *Type B units* shall be provided in general-purpose *hospitals*, psychiatric *facilities* and *detoxification facilities* of Group I-2 occupancies in accordance with Sections 1108.5.3.1 and 1108.5.3.2.

1108.5.3.1 Accessible units.

At least 10 percent, but not less than one, of the *dwelling units* and *sleeping units* shall be *Accessible units*.

Exception: Entry doors to *Accessible dwelling units* or *sleeping units* shall not be required to provide the maneuvering clearance beyond the latch side of the door.

1108.5.3.2 Type B units.

In *structures* with four or more *dwelling units* or *sleeping units intended to be occupied as a residence*, every *dwelling unit* and *sleeping unit intended to be occupied as a residence* shall be a *Type B unit*.

Exception: The number of *Type B units* is permitted to be reduced in accordance with Section 1108.7.

Revise as follows:

1108.5.4 Group I-2 rehabilitation facilities.

In *hospitals* and rehabilitation *facilities* of Group I-2 occupancies that specialize in treating conditions that affect mobility, or units within either that specialize in treating conditions that affect mobility, 100 percent of the *dwelling units* and *sleeping units* shall be *Accessible units*.

Exceptions:

1. Water closets shall be permitted to comply with assisted toileting requirements in accordance with ICC A117.1 Section 611~~not be required to comply with ICC A117.1 where such water closets comply with Section 1110.2.2~~ , in not more than 50 percent of *Accessible units*.
2. Roll-in-type showers shall be permitted to comply with assisted toileting requirements in accordance with ICC A117.1 Section 611.7 ~~not be required to comply with ICC A117.1 where such water closets comply with Section 1110.2.3~~, in not more than 50 percent of *Accessible units*.

Delete without substitution:

~~1110.2.2 Water closets designed for assisted toileting~~ .

~~Water closets designed for assisted toileting shall comply with Sections 1110.2.2.1 through 1110.2.2.6.~~

~~1110.2.2.1 Location~~.
~~The centerline of the water closet shall be not less than 24 inches (610 mm) and not greater than 26 inches (660 mm) from one side of the required clearance.~~

~~1110.2.2.2 Clearance~~.
~~Clearance around the water closet shall comply with Sections 1110.2.2.2.1 through 1110.2.2.2.3.~~

~~1110.2.2.2.1 Clearance width~~.
~~Clearance around a water closet shall be not less than 66 inches (1675 mm) in width, measured perpendicularly from the side of the clearance that is not less than 24 inches (610 mm) and not greater than 26 inches (660 mm) from the water closet centerline.~~

~~1110.2.2.2.2 Clearance depth~~.
~~Clearance around the water closet shall be not less than 78 inches (1980 mm) in depth, measured perpendicularly from the rear wall~~

~~1110.2.2.2.3 Clearance overlap~~.
~~The required clearance around the water closet shall permit overlaps per ICC A117.1, Section 604.3.3~~

~~1110.2.2.3 Height~~.
~~The height of the water closet seats shall comply with ICC A117.1, Section 604.4.~~

~~1110.2.2.4 Swing-up grab bars~~.
~~Swing-up grab bars shall comply with ICC A117.1, Sections 609.2 and 609.8. Swing-up grab bars shall be provided on both sides of the water closet and shall comply with all of the following:~~

1. ~~The centerline of the grab bar shall be not less than 14 inches (356 mm) and not greater than 16 inches (405 mm) from the centerline of the water closet.~~
2. ~~The length of the grab bar is not less than 36 inches (915 mm) in length, measured from the rear wall to the end of the grab bar.~~
3. ~~The top of the grab bar in the down position is not less than 30 inches (760 mm) and not greater than 34 inches (865 mm) above the floor.~~

~~1110.2.2.5 Flush controls~~.
~~Flush controls shall comply with ICC A117.1, Section 604.6.~~

~~1110.2.2.6 Dispensers~~.
~~Toilet paper dispensers shall be mounted on at least one of the swing-up grab bars and the outlet of the dispenser shall be located not less than 24 inches (610 mm) and not greater than 36 inches (915 mm) from the rear wall.~~

~~1110.2.3 Standard roll-in-type shower compartment designed for assisted bathing~~.
~~Standard roll-in-type shower compartments designed for assisted bathing shall comply with Sections 1110.2.3.1 through 1110.2.3.9.~~

~~1110.2.3.1 Size~~.

~~Standard roll-in-type shower compartments shall have a clear inside dimension of not less than 60 inches (1525 mm) in width and 30 inches (760 mm) in depth, measured at the center point of opposing sides. An entry not less than 60 inches (1525 mm) in width shall be provided.~~

~~1110.2.3.2 Clearance~~.

~~A clearance of not less than 60 inches (1525 mm) in length adjacent to the 60-inch (1525 mm) width of the open face of the shower compartment, and not less than 30 inches (760 mm) in depth, shall be provided.~~

~~Exceptions:~~

1. ~~A lavatory complying with ICC A117.1, Section 606 shall be permitted at one end of the clearance.~~
2. ~~Where the shower compartment exceeds minimum sizes, the clear floor space shall be placed adjacent to the grab bars and not less than 30 inches (762 mm) from the back wall.~~

~~1110.2.3.3 Grab bars~~.

~~Grab bars shall comply with ICC A117.1, Section 609 and shall be provided in accordance with Sections 1110.2.3.3.1 and 1110.2.3.3.2. In standard roll-in-type shower compartments, grab bars shall be provided on three walls. Where multiple grab bars are used, required horizontal grab bars shall be installed at the same height above the floor. Grab bars can be separate bars or one continuous bar.~~

~~1110.2.3.3.1 Back-wall grab bar~~.

~~The back-wall grab bar shall extend the length of the back wall and extend within 6 inches (150 mm) maximum from the two adjacent sidewalls.~~

~~Exception:~~ ~~The back-wall grab bar shall not be required to exceed 48 inches (1220 mm) in length. The rear grab bar shall be located with one end within 6 inches maximum of a sidewall with a grab bar complying with Section 1110.2.3.3.2.~~

~~1110.2.3.3.2 Sidewall grab bars~~.

~~The sidewall grab bars shall extend the length of the wall and extend within 6 inches (150 mm) of the adjacent back wall.~~

~~Exceptions:~~

1. ~~The sidewall grab bar shall not be required to exceed 30 inches (760 mm) in length. The side grab bar shall be located with one end within 6 inches (152 mm) of the back wall with a grab bar complying with Section 1110.2.3.3.1.~~
2. ~~Where the sidewalls are located 72 inches (1830 mm) or greater apart, a grab bar is not required on one of the sidewalls.~~

~~1110.2.3.4 Seats~~.

~~Wall-mounted folding seats shall not be installed.~~

~~1110.2.3.5 Controls and hand showers~~.

~~In standard roll-in-type showers, the controls and hand shower shall be located not less than 38 inches (965 mm) and not greater than 48 inches (1220 mm) above the shower floor. Controls shall be located to facilitate caregiver access.~~

~~1110.2.3.6 Hand showers~~.

~~Hand showers shall comply with ICC A117.1, Section 608.5.~~

~~1110.2.3.7 Thresholds~~.

~~Thresholds shall comply with ICC A117.1, Section 608.6.~~

~~1110.2.3.8 Shower enclosures~~.

~~Shower compartment enclosures for shower compartments shall comply with ICC A117.1, Section 608.7.~~

~~1110.2.3.9 Water temperature~~.

~~Water temperature shall comply with ICC A117.1, Section 608.8.~~

Reason: The next edition of ICC A117.1 will include requirements for assisted toileting and bathing in Section 611. This proposal was 06-84-2021. Information can be viewed on the ICC A117.1 webpage at https://www.iccsafe.org/icc-asc-a117-1/. These provisions include several improvements to the text currently in the IBC. This section should be deleted from the IBC and reference the appropriate sections in the ICC A117.1.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

These requirements are being replaced with similar requirements in the next edition of ICC A117.1. There scoping will remain the same for this option.

E122-24

E123-24

IBC: 1108.6.2

Proponents: Matt Lescher, CCI, self (mattl@codeconsultants.com); Jim Safranek, Safranek Group LLC, Self (jim@safranekgroup.com); Gene Boecker, CCI, self (geneb@codeconsultants.com); Marsha Mazz, United Spinal Association, United Spinal Association (mmazz@accessibility-services.com)

2024 International Building Code

Revise as follows:

1108.6.2 Group R-2.
Accessible units, Type A units and *Type B units* shall be provided in Group R-2 occupancies in accordance with Sections 1108.6.2.1 through 1108.6.2.3. <u>Where Group R-2 apartments will have dwelling units intended to also be Group R-1 occupancies, those units shall comply with Section 1108.6.1.</u>

Reason: In the old days it was generally simple to distinguish the difference between an apartment building and a hotel building. However, in recent years as the demand for short term rentals has increased exponentially, many multifamily R-2 projects are being designed with a group of units where the intention is that they will be used for short term stays. In many instances, these units will be covered by the ADA and/or Fair Housing Act (FHA). One of the main objectives of Chapter 11 is to harmonize with the ADA and FHA requirements because the Building Official is charged with enforcing the IBC and does not otherwise have authority to enforce the ADA or FHA. There are many factors that must be considered when determining the application of the ADA and FHA, such as ownership, management, length of stays, etc., but we have attempted to provide some generalizations in order to simplify and capture some of the major concerns.

If these units will be available to be rented by the general public, it is likely that they will be covered by the ADA as transient lodging. Similar to hotels, this code change proposal requires compliance with the R-1 requirements of Section 1108.6.1. Accessible units will be required in accordance with Table 1108.6.1.1. Per Section 1108.6.1.2, the remaining units will be required to be Type B if they are intended to be occupied as a residence to meet the requirements of the Fair Housing Act (FHA), if these units will only function for short term stays, like a standard hotel, then the remaining units would not be Type B.

If these units will only be available as an amenity for residents and will not be available for rental by the general public, then it is unlikely that the ADA will apply to these units. However, the units will likely be covered by the FHA. While covered by the FHA, the FHA safe harbor documents do not state how they should be addressed. Requiring compliance with Section 1108.6.1 will cover this concern. Fully accessible units will be required per Table 1108.6.1.1 and the determination for Type B is whether or not these units are intended to be occupied as a residence.

In this proposal, the term apartment houses was used for consistency with the other applicable sections for R-2. As such, it is intended to cover both apartment houses and condominiums.

There will be times where there is no way to know how certain units will be used in the future. Therefore, designers, Building Officials, owners, and other interested parties, must use the best information available at that time when applying these requirements.

Another goal of this proposal is to avoid future litigation as these short term rentals are covered by the ADA and FHA and must provide accessibility to people with disabilities.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

In our opinion, this proposal is a clarification for how the requirements should be applied to short term rental units. These units do not function as standard apartment/condominium units and should be classified as R-1 units, not as R-2 where the occupancy is longer than 30 days.

E123-24

E124-24

IBC: SECTION 202 (New), 1109.2

Proponents: Matt Lescher, CCI, self (mattl@codeconsultants.com); Jim Safranek, Safranek Group LLC, Self (jim@safranekgroup.com); Gene Boecker, CCI, self (geneb@codeconsultants.com)

2024 International Building Code

Add new definition as follows:

SOCIAL STAIRS. Tiered amphitheater style seating two or more rows high, used for assembly purposes, with an open interior or exterior stairway located on at least one side.

Revise as follows:

1109.2 Assembly area seating.
A *building*, room or space used for assembly purposes with *fixed seating, bleachers*, social stairs, *grandstands* or *folding and telescopic seating* shall comply with Sections 1109.2.1 through 1109.2.5. Lawn seating shall comply with Section 1109.2.6. Assistive listening systems shall comply with Section 1109.2.7. Performance areas viewed from assembly seating areas shall comply with Section 1109.2.8. Dining areas shall comply with Section 1109.2.9.

Exception: Social stairs with 300 seats or less shall be permitted to comply with the ICC A117.1 requirements for bleachers.

Reason: Social stairs are routinely being provided in K-12 schools, universities, multi-assembly buildings, and exterior areas. They appear to fall somewhere between stairways and small assembly seating. They also appear to be an open circulation element (a stairway) that has been expanded and repurposed to include small secondary areas that may function individually as discrete areas or may be utilized collectively as a singular assembly area. Refer to figures 1 through 3 for both interior and exterior examples of social stairs. Social stairs differ from typical bleachers because social stairs are permanent, building construction that connects two levels, and functions as primary circulation from one level to another level. Social stairs also differ from other assembly spaces because social stairs provide discreet spaces for a variety of uses, and the stairways function as a primary circulation element, from one level to another level.

The current accessibility scoping provisions do not appear to address the dispersion of wheelchair spaces in a small, multilevel assembly seating area such as that of the typical, social stairs. The proposal seeks clarify that social stairs should be treated as assembly seating and to apply the ICC/A117.1 requirements for bleachers to these areas, specifically Section 802.10.2 Exception 1:

In bleachers, wheelchair space locations provided only in rows at points of entry to bleacher seating shall be permitted.

There was a concern that people would try to apply this proposal for all assembly areas, even if they were not designed to be social stairs. This proposal addresses that concern by including a definition for social stair and also by limiting the application to 300 or less seats because most assembly areas that have this limited seating capacity would be allowed to use similar exceptions regarding vertical and horizontal dispersion.

The accessible wheelchair spaces are generally designed with cutouts at the top and/or bottom levels in order to achieve the required shoulder alignment. However, this proposal is only intended to address the scoping requirements for social stairs. The technical criteria should be included in future editions of the ICC/A117.1, if that committee determines special technical criteria is necessary.

Figure 1

Photograph courtesy of Bassetti Architects.

Figure 2

Photograph courtesy of the U.S. Access Board

Figure 3

Photograph courtesy of the U.S. Access Board

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Social stairs are assembly areas with tiered seating, so the IBC and ICC/A117.1 requirements for assembly areas were already applicable under the current editions. This proposal seeks to clarify how these requirements should be applied. If someone were to argue that these were not previously considered assembly areas, then I would counter that this proposal decreases the construction costs, because if they are not considered assembly seating, then the are not subject to the associated exceptions, and an accessible route would be required to each level.

E124-24

E125-24

IBC: 1109.2.8

Proponents: William Conner, Bill Conner Associates LLC, American Society of Theatre Consultants (bill@bcaworld.com); Marsha Mazz, United Spinal Association, United Spinal Association (mmazz@accessibility-services.com)

2024 International Building Code

Revise as follows:

1109.2.8 Performance areas. An *accessible route* shall directly connect the performance area to the assembly seating area where a *circulation path* directly connects a performance area to an assembly seating area. <u>The location of the *accessible route* shall be in the same rooms and spaces as the *circulation path*. The audience's sightlines to the *accessible route* shall be comparable to the audience's sightlines to the *circulation path*.</u> An *accessible route* shall be provided from performance areas to ancillary areas or *facilities* used by performers.

Reason: This is to clarify the requirement to "directly connect" in relation to the circulation path. This is overwhelmingly a school auditorium and stage issue, which of course represents the largest number of stages and auditoriums in the US . It is simply discriminatory to require someone using a wheelchair to have to leave the auditorium and be out of sight of the audience while the other person not using the wheelchair can simply go down the aisle and take a short flight of stairs to be on stage. Accessible routes which requiring exiting the auditorium and re-entering the stage and then having to get to the front of the stage is unacceptable. Unfortunately is is all too common among new schools being designed and constructed today.

The precise wording I proposed may not be the best, but the intent of "directly connect" must be better conveyed. If the intent is that its OK for the accessible route to require minutes instead of seconds, and for that person to be out of sight of the audience for some of the travel, and to enter backstage to end up in front of the presenter t receive the award, say that, but please be clear.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

While the design may vary, the directness and details and components of the accessible route all still remain in the project.

E125-24

E126-24 Part I

IBC: SECTION 202 (New), 1110.2.1, 1110.2.1.1, 1110.2.1.2, 1110.2.1.3, 1110.2.1.4, 1110.2.1.5, 1110.2.1.6, 1110.4, 1110.4.1, 1110.4.2, 1112.3

Proponents: Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE IBC EGRESS CODE COMMITTEE. PART II WILL BE HEARD BY THE PLUMBING/PRIVATE SEWAGE CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Building Code

Add new definition as follows:

ASSISTED BATHING.
A roll-in shower designed for adults who need assistance and configured to allow space to enable a care giver to assist.

ASSISTED TOILETING.
A water closet designed for adults who need assistance and configured to allow space to enable a care giver to assist.

FAMILY OR COMPANION BATHING ROOM. A room for toileting and bathing that provides privacy and designed for a family with children and for people with disabilities with a companion or assistant.

FAMILY OR COMPANION TOILET ROOM.
A toilet room that provides privacy and designed for a family with children and for people with disabilities with a companion or assistant.

Revise as follows:

1110.2.1 Family or ~~assisted-use~~ companion toilet and bathing rooms. In assembly and mercantile occupancies, an accessible family or ~~assisted-use~~ companion toilet room shall be provided where an aggregate of six or more male and female water closets is required. In *buildings* of mixed occupancy, only those water closets required for the assembly or mercantile occupancy shall be used to determine the family or ~~assisted-use~~ companion toilet room requirement. In recreational *facilities* where separate-sex bathing rooms are provided, an accessible family or ~~assisted-use~~ companion bathing room shall be provided. Fixtures located within family or ~~assisted-use~~ companion toilet and bathing rooms shall be included in determining the number of fixtures provided in an occupancy.

Exception: Where each separate-sex bathing room has only one shower or bathtub fixture, a family or ~~assisted-use~~ companion bathing room is not required.

1110.2.1.1 Standard.
Family or assisted-use toilet and bathing rooms shall comply with Sections 1110.2.1.2 through 1110.2.1.6.

Revise as follows:

1110.2.1.2 Family or ~~assisted-use~~ companion toilet rooms. Family or ~~assisted-use~~ companion toilet rooms shall include only one water closet and only one lavatory. A family or ~~assisted-use~~ companion bathing room in accordance with Section 1110.2.1.3 shall be considered to be a family or ~~assisted-use~~ companion toilet room.

Exception: The following additional plumbing fixtures shall be permitted in a family or ~~assisted-use~~ companion toilet room:

1. A urinal.
2. A child-height water closet.
3. A child-height lavatory.
4. An adult changing station also used for bathing.

1110.2.1.3 Family or ~~assisted-use~~ companion bathing rooms. Family or ~~assisted-use~~ companion bathing rooms shall include only one shower or bathtub fixture. Family or ~~assisted-use~~ companion bathing rooms shall also include one water closet and one lavatory. Where storage *facilities* are provided for separate-sex bathing rooms, accessible storage *facilities* shall be provided for family or ~~assisted use~~ companion bathing rooms.

1110.2.1.4 Location. Family or ~~assisted use~~ companion toilet and bathing rooms shall be located on an *accessible route*. Family or ~~assisted use~~ companion toilet rooms shall be located not more than one *story* above or below separate-sex toilet rooms. The *accessible route* from any separate-sex toilet room to a family or ~~assisted use~~ companion toilet room shall not exceed 500 feet (152 m).

1110.2.1.5 Prohibited location. In passenger transportation *facilities* and airports, the *accessible route* from separate-sex toilet rooms to a family or ~~assisted use~~ companion toilet room shall not pass through security checkpoints.

1110.2.1.6 Privacy.
Doors to family or ~~assisted use~~ companion toilet and bathing rooms shall be securable from within the room and be provided with an "occupied" indicator.

1110.4 Adult changing stations.
Where provided, adult changing stations shall be accessible. Where required, adult changing stations shall be accessible and shall comply with Sections 1110.4.1 through 1110.4.4.

Revise as follows:

1110.4.1 Where required.
Not fewer than one adult changing station shall be provided in the following locations:

1. In assembly and mercantile occupancies, where family or ~~assisted use~~ companion toilet or bathing rooms are required to comply with Section 1110.2.1.
2. In Group B occupancies providing educational *facilities* for students above the 12th grade, where an aggregate of 12 or more male and female water closets are required to serve the classrooms and lecture halls.
3. In Group E occupancies, where a room or space used for assembly purposes requires an aggregate of six or more male and female water closets for that room or space.
4. In highway rest stops and highway service plazas.

1110.4.2 Room.
Adult changing stations shall be located in toilet rooms that include only one water closet and only one lavatory. Fixtures located in such rooms shall be included in determining the number of fixtures provided in an occupancy. The occupants shall have access to the required adult changing station at all times that the associated occupancy is occupied.

Exception: Adult changing stations shall be permitted to be located in family or ~~assisted use~~ companion toilet rooms required in Section 1110.2.1.

1112.3 Directional signage.
Directional signage indicating the route to the nearest like accessible element shall be provided at the following locations. These directional signs shall include the International Symbol of Accessibility and sign characters shall meet the visual character requirements in accordance with ICC A117.1.

1. Inaccessible *building* entrances.
2. Inaccessible public toilets and bathing *facilities*.
3. Elevators not serving an *accessible route*.
4. At each separate-sex toilet and bathing room indicating the location of the nearest family or companion ~~family/assisted use~~ toilet or bathing room where provided in accordance with Section 1110.2.1.
5. At *exits* and *exit stairways* serving a required accessible space, but not providing an *approved accessible means of egress*, signage shall be provided in accordance with Section 1009.10.

6. Where drinking fountains for *persons* using wheelchairs and drinking fountains for standing *persons* are not located adjacent to each other, directional signage shall be provided indicating the location of the other drinking fountains.

E126-24 Part I

E126-24 Part II

IBC: [P] 1210.3.2, [P] 2902.1.2, [P] 2902.3.6; IPC: SECTION 202 (New), 403.1.2, [BE] 403.3.6, 405.3.5

Proponents: Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org)

2024 International Building Code

Revise as follows:

[P] 1210.3.2 Urinal partitions.
Each urinal utilized by the public or employees shall occupy a separate area with walls or partitions to provide privacy. The walls or partitions shall begin at a height not more than 12 inches (305 mm) from and extend not less than 60 inches (1524 mm) above the finished floor surface. The walls or partitions shall extend from the wall surface at each side of the urinal not less than 18 inches (457 mm) or to a point not less than 6 inches (152 mm) beyond the outermost front lip of the urinal measured from the finished backwall surface, whichever is greater.

Exceptions:

1. Urinal partitions shall not be required in a single-occupant or family or ~~assisted use~~ companion toilet room with a lockable door.
2. Toilet rooms located in child day care *facilities* and containing two or more urinals shall be permitted to have one urinal without partitions.

[P] 2902.1.2 Fixtures in single-user toilet facilities and bathing rooms. The plumbing fixtures located in single-user toilet *facilities* and single-user rooms, including family or ~~assisted use~~ companion toilet *facilities* and bathing rooms, shall contribute toward the total number of required plumbing fixtures for a *building* or tenant space. The number of fixtures in single-user toilet *facilities*, single-user bathing rooms and family or ~~assisted use~~ companion toilet *facilities* shall be deducted proportionately from the required gender ratios of Table 2902.1. Single-user toilet facilities and bathing rooms, and family or ~~assisted use~~ companion toilet facilities and bathing rooms shall be identified as being available for use by all *persons* regardless of their sex. The total number of fixtures shall be based on the required number of separate *facilities* or based on the aggregate of any combination of single-user or separate *facilities*.

[P] 2902.3.6 Door locking.
Where a toilet facility is provided for the use of multiple occupants, the egress door for the room shall not be lockable from the inside of the room. This section does not apply to family or ~~assisted use~~ companion toilet facilities.

Exception: The egress door of a multiple occupant toilet room shall be permitted to be lockable from inside the room where all the following criteria are met:

1. The egress door shall be lockable from the inside of the room only by authorized personnel by the use of a key or other *approved* means.
2. The egress door shall be readily openable from the toilet room in accordance with Section 1010.2.
3. The egress door shall be capable of being unlocked from outside the room with a key or other *approved* means.

2024 International Plumbing Code

Add new definition as follows:

ASSISTED BATHING.
A roll-in shower designed for adults who need assistance and configured to allow space to enable a care giver to assist.

ASSISTED TOILETING.
A water closet designed for adults who need assistance and configured to allow space to enable a care giver to assist.

FAMILY OR COMPANION BATHING ROOM.
A room for toileting and bathing that provides privacy and designed for a family with children and for people with disabilities with a

companion or assistant.

FAMILY OR COMPANION TOILET ROOM.
A toilet room that provides privacy and designed for a family with children and for people with disabilities with a companion or assistant.

Revise as follows:

403.1.2 Fixtures in single-user toilet facilities and bathing rooms.
The plumbing fixtures located in single-user toilet facilities and single-user bathing rooms, including family or assisted-use toilet facilities and bathing rooms, shall contribute toward the total number of required plumbing fixtures for a building or tenant space. The number of fixtures in single-user toilet facilities, single-user bathing rooms and family or assisted-use toilet facilities shall be deducted proportionately from the required gender ratios of Table 403.1. Single-user toilet facilities and bathing rooms, and family or ~~assisted-use~~ companion toilet facilities and bathing rooms shall be identified as being available for use by all persons regardless of their sex.The total number of fixtures shall be based on the required number of separate facilities or based on the aggregate of any combination of single-user or multiple-user facilities.

403.3.6 Door locking.
Where a toilet facility is provided for the use of multiple occupants, the egress door for the room shall not be lockable from the inside of the room. This section does not apply to family or ~~assisted-use~~ companion toilet facilities.

Exception: The egress door of a multiple-occupant toilet room shall be permitted to be lockable from inside the room where all the following criteria are met:

1. The egress door shall be lockable from the inside of the room only by authorized personnel by the use of a key or other *approved* means.
2. The egress door shall be readily openable from the toilet room in accordance with *International Building Code* Section 1010.2.
3. The egress door shall be capable of being unlocked from outside the room with a key or other *approved* means.

405.3.5 Urinal partitions.
Each urinal utilized by the public or employees shall occupy a separate area with walls or partitions to provide privacy. The horizontal dimension between walls or partitions at each urinal shall be not less than 30 inches (762 mm). The walls or partitions shall begin at a height not greater than 12 inches (305 mm) from and extend not less than 60 inches (1524 mm) above the finished floor surface. The walls or partitions shall extend from the wall surface at each side of the urinal not less than 18 inches (457 mm) or to a point not less than 6 inches (152 mm) beyond the outermost front lip of the urinal measured from the finished backwall surface, whichever is greater.

Exceptions:

1. Urinal partitions shall not be required in a single occupant or ~~family/assisted-use~~ family or companion toilet room with a lockable door.
2. Toilet facilities located in child day care facilities and containing two or more urinals shall be permitted to have one urinal without partitions.

Reason: Both the family or assisted use bathrooms and assisted toileting and bathing options are needed in the code. This is not intended to change any technical requirements. However, the terminology is so close, it is causing confusion – especially when it comes to the options for the water closet and showers permitted in the family or assisted use toilet or bathroom. Do I have to use the water closet with two swing up grab bars or only a roll-in shower? That is not the intent. This change in terminology will clarify the options.

There will be a companion change to the IEBC in Group B.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC webpage.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is a clarification for where Section 1105.1 is intended to allow assisted use toilet and bathing rooms for Group I-1 and I-2 facilities (assisted living and nursing homes). The closeness of the terms is causing confusion with the requirements in family toilet rooms, especially with water closet requirements. This are not changed to construction requirements.

E126-24 Part II

E127-24 Part I

IBC: SECTION 202 (New), 1110.4.2, IAPMO (New)

Proponents: Misty Guard, Regulosity LLC, MAG Industries LLC (misty.guard@regulosity.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE IBC EGRESS CODE COMMITTEE. PART II WILL BE HEARD BY THE PLUMBING/PRIVATE SEWAGE CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Building Code

Add new definition as follows:

ADULT CHANGING STATIONS. An *assistive table* and the associated maneuvering clearances.

ASSISTIVE TABLE. A product produced, generally available, or used by or for persons with a physical, or cognitive disability intended to facilitate and support personal care or hygiene with a changing surface to support a user in a reclined or lying position. Assistive Tables can be fixed or adjustable height and have integrated plumbing fittings and fixtures.

1110.4 Adult changing stations.
Where provided, adult changing stations shall be accessible. Where required, adult changing stations shall be accessible and shall comply with Sections 1110.4.1 through 1110.4.4.

1110.4.1 Where required.
Not fewer than one adult changing station shall be provided in the following locations:

1. In assembly and mercantile occupancies, where family or assisted-use toilet or bathing rooms are required to comply with Section 1110.2.1.
2. In Group B occupancies providing educational *facilities* for students above the 12th grade, where an aggregate of 12 or more male and female water closets are required to serve the classrooms and lecture halls.
3. In Group E occupancies, where a room or space used for assembly purposes requires an aggregate of six or more male and female water closets for that room or space.
4. In highway rest stops and highway service plazas.

Revise as follows:

1110.4.2 Room.
Adult changing stations shall be located in toilet rooms that include only one water closet and only one lavatory. The assistive tables shall comply with IAPMO Z1390. Fixtures located in such rooms shall be included in determining the number of fixtures provided in an occupancy. The occupants shall have access to the required adult changing station at all times that the associated occupancy is occupied.

Exception: Adult changing stations shall be permitted to be located in family or assisted toilet rooms required in Section 1110.2.1.

1110.4.3 Prohibited location.
The *accessible route* from separate-sex toilet or bathing rooms to an accessible adult changing station shall not require travel through security checkpoints.

1110.4.4 Travel distance.
The adult changing station shall be located on an *accessible route* such that a *person* is not more than two *stories* above or below the *story* with the adult changing station and the path of travel to such *facility* shall not exceed 2,000 feet (609.6 m).

Add new standard(s) as follows:

IAPMO Z1390-20XX Assistive Tables

IAPMO Z1390-20XX: Assistive Tables

Staff Analysis: A review of the standard proposed for inclusion in the code, IAPMO Z1390-20XX Assistive Tables, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

E127-24 Part I

E127-24 Part II

IPC: SECTION 202 (New), SECTION 427 (New), 427.1 (New), 427.1.1 (New), 427.1.2 (New), 427.1.3 (New), 427.1.4 (New), IAPMO (New)

Proponents: Misty Guard, Regulosity LLC, MAG Industries LLC (misty.guard@regulosity.com)

2024 International Plumbing Code

Add new definition as follows:

ADULT CHANGING STATIONS. An *assistive table* and the associated maneuvering clearances.

ASSISTIVE TABLE. A product produced, generally available, or used by or for persons with a physical, or cognitive disability intended to facilitate and support personal care or hygiene with a changing surface to support a user in a reclined or lying position. Assistive Tables can be fixed or adjustable height and have integrated plumbing fittings and fixtures.

Add new text as follows:

SECTION 427
ASSISTIVE TABLES

427.1 Adult changing stations.. Where provided, adult changing stations shall be accessible. Where required, adult changing stations shall be accessible and shall comply with Sections 427.1.1 through 427.1.4.

427.1.1
Where required
. Not fewer than one adult changing station shall be provided in the following locations:

1. In assembly and mercantile occupancies, where family or assisted-use toilet or bathing rooms are required to comply with Section 1110.2.1 of the International Building Code.
2. In Group B occupancies providing educational *facilities* for students above the 12th grade, where an aggregate of 12 or more male and female water closets are required to serve the classrooms and lecture halls.
3. In Group E occupancies, where a room or space used for assembly purposes requires an aggregate of six or more male and female water closets for that room or space.
4. In highway rest stops and highway service plazas.

427.1.2 Room. Adult changing stations shall be located in toilet rooms that include only one water closet and only one lavatory. The assistive tables shall comply with IAPMO Z1390. Fixtures located in such rooms shall be included in determining the number of fixtures provided in an occupancy. The occupants shall have access to the required adult changing station at all times that the associated occupancy is occupied.

Exception: Adult changing stations shall be permitted to be located in family or assisted toilet rooms required in Section 1110.2.1.

427.1.3 Prohibited location. The *accessible route* from separate-sex toilet or bathing rooms to an accessible adult changing station shall not require travel through security checkpoints.

427.1.4 Travel distance. The adult changing station shall be located on an *accessible route* such that a *person* is not more than two *stories* above or below the *story* with the adult changing station and the path of travel to such *facility* shall not exceed 2,000 feet (609.6 m).

IAPMO **Z1390-20XX.** Assistive Tables

Staff Analysis: A review of the standard proposed for inclusion in the code, IAPMO Z1390-20XX Assistive Tables, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: Assistive tables are plumbing products that facilitate and support the personal hygiene of individuals who are physically challenged, disabled, or elderly. While the assistive table is not a new product, the products are required in new commercial buildings and substantial renovations of existing bathrooms in Arkansas, Arizona, California, New Hampshire, and Pennsylvania. Massachusetts, Michigan, Minnesota, and Wisconsin have pending legislation for these products. A technical subcommittee of manufacturers, consultants, installers, and disability experts wrote the product performance and safety standard, IAPMO Z1390 Assistive Tables. IAPMO Z1390 covers 1) product design requirements for user weight, maximum loads, heights, operation, locking safety mechanisms, mechanical wear, cleaning and disinfection, changing surface, grab rails, safety restraint systems, electrical, support structure, integrated plumbing fittings, integrated plumbing fixtures, 2) performance requirements for height, vertical movement, locking mechanisms, changing surface tests, grab bars, support structures, waste fitting connections, and body part entrapment, 3) marking and signage requirements, and 4) installation documentation.

Bibliography: IAPMO Z1390 Assistive Tables

Cost Impact: Increase

Estimated Immediate Cost Impact:

This requirement will increase the cost of these products by requiring the product manufacturer to obtain testing through a testing laboratory and third-party certification. Laboratory testing and third-party certification fees for products typically range between $3,000 to $20,000. The increase in cost is offset by the benefits to public health and safety of products that conform to product safety and performance standards resulting in a reduction of harm to users.

Estimated Immediate Cost Impact Justification (methodology and variables):

This requirement will increase the cost of these products by requiring the product manufacturer to obtain testing through a testing laboratory and third-party certification. The increase in cost is offset by the benefits to public health and safety of products that conform to product safety and performance standards resulting in a reduction of harm to users.

E127-24 Part II

2024 GROUP A – PROPOSED CHANGES TO THE INTERNATIONAL BUILDING CODE – FIRE SAFETY

FIRE SAFETY CODE COMMITTEE

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Principal
Arup US Inc
Northbridge, MA

Richard Soltis, Jr., *Vice Chair*
Fire Subcode Official
Ewing Township Code Enforcement
Hamilton, NJ

Mitchell Cady, MS
Rep: National Association of State Fire Marshals
Deputy State Fire Marshal
New Hampshire State Fire Marshal's Office
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Rep: National Association of Home Builders
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TENTATIVE ORDER OF DISCUSSION
2024 PROPOSED CHANGES TO THE
INTERNATIONAL BUILDING CODE – FIRE SAFETY

The following is the tentative order in which the proposed changes to the code will be discussed at the public hearings. Proposed changes which impact the same subject have been grouped to permit consideration in consecutive changes.

Proposed change numbers that are indented are those which are being heard out of numerical order. Indentation does not necessarily indicate that one change is related to another. Proposed changes may be grouped for purposes of discussion at the hearing at the discretion of the chair. Note that some FS code change proposals may not be included on this list, as they are being heard by another committee.

- G1-24 Part 1
- G4-24
- G5-24
- G6-24
- G7-24
- G11-24
- G12-24 Part I

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- S9-24

FS117-24
FS118-24
FS119-24
FS120-24
FS121-24
FS122-24
FS123-24

FS1-24

IBC: 703.2.1.2

Proponents: Tim Earl, GBH International, the Gypsum Association (tearl@gbhint.com)

2024 International Building Code

Revise as follows:

703.2.1.2 Combustible components.
Combustible aggregates are permitted in gypsum <u>concrete </u>and ~~P~~<u>p</u>ortland cement concrete mixtures for fire-resistance-rated construction. Any component material or admixture is permitted in assemblies if the resulting tested assembly meets the *fire-resistance* test requirements of this code.

Reason: This section clearly applies to poured cement mixtures. However, a reader may unintentionally read it as applying to any gypsum product, including gypsum panels, which is not intended. The addition of the word “concrete” will eliminate this possibility. Also, portland cement should not be capitalized.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is simply clarifying the application of this section and correcting a capitalization error.

FS1-24

FS2-24

IBC: 703.2.1.3

Proponents: Stephen Szoke, American Concrete Institute, American Concrete Institute (steve.szoke@concrete.org); Shamim Rashid-Sumar, National Ready Mixed Concrete Association, National Ready Mixed Concrete Association (ssumar@nrmca.org)

2024 International Building Code

Revise as follows:

703.2.1.3 Restrained classification.
Fire-resistance-rated assemblies tested under ASTM E119 or UL 263 shall not be considered to be restrained unless evidence satisfactory to the *building official* is furnished by the *registered design professional* showing that the construction qualifies for a restrained classification in accordance with ASTM E119 or UL 263. Restrained construction shall be identified on the *construction documents*.

> **Exception:** Unless otherwise determined by the *registered design professional*, concrete girders, beams, and slabs connected to structural concrete framing or structural concrete walls in accordance with ACI 318 shall be considered restrained. Restrained concrete construction shall be identified on the *construction documents*.

Reason: This code change proposal does not alter the technical requirements of the code. The exception is simply to avoid sending the Registered Design Professional (RDP) to ASTM E119 to discover that all concrete connections designed in accordance with ACI 318 restrain movement relative to the supporting structural members. This is consistent with the classification described in ASM E119 Standard Test Methods for Fire Tests of Building Construction and Materials. Appendix X3 Guide for Determining Condition of Restrain for Floor and Roof Assemblies and for Individual Beams of ASTM E119 advises that concrete framing is to be considered restrained for:

(1) Beams fastened to the framing members,

(2) All types of concrete cast-in-place floor or roof construction (such as beam-and-slabs, flat slabs, pan joists, and waffle slabs) where the floor or roof construction is cast with the framing members

(3) Interior and exterior spans of precast construction with cast-in-place joints resulting in restraint equivalent to that which would exist in condition (1).

(4) All types of prefabricated floor or roof construction where the structural members are secured to such construction.

The minimum structural integrity requirements of ACI 318 are such that horizontal structural concrete elements are required to have connections restraining movement relative to the supporting structural member. ACI 318 Table 4.10.2.1 – Minimum requirements for structural integrity based on member type directs the RDP to the appropriate structural integrity sections of ACI 318:

Nonprestressed one-way cast-in-place slabs – 7.7.7

Nonprestressed two-way slabs – 8.7.4.2

Prestressed two-way slabs – 8.7.5.6

Nonprestresssed two-way joint systems – 8.8.1.6

Cast-in-place beam – 9.7.7

Nonprestressed one-way joint system – 9.8.1.6

Precast joint and connection – 16.2.1.8

For those interested in the minimum structural integrity requirements of ACI 318, they are as follows:

Nonprestressed one-way cast-in-place slabs

7.7.7 *Structural integrity reinforcement in cast-in-place one-way slabs*

7.7.7.1 Longitudinal structural integrity reinforcement consisting of at least one-quarter of the maximum positive moment reinforcement shall be continuous.

7.7.7.2 Longitudinal structural integrity reinforcement at noncontinuous supports shall be anchored to develop f_y at the face of the support.

7.7.7.3 If splices are necessary in continuous structural integrity reinforcement, the reinforcement shall be spliced near supports. Splices shall be mechanical or welded in accordance with 25.5.7 or Class B tension lap splices in accordance with 25.5.2.

Nonprestressed two-way slabs

8.7.4.2 *Structural integrity*

8.7.4.2.1 All bottom deformed bars or deformed wires within the column strip, in each direction, shall be continuous or spliced using mechanical or welded splices in accordance with 25.5.7 or Class B tension lap splices in accordance with 25.5.2. Splices shall be located in accordance with Fig. 8.7.4.1.3.

8.7.4.2.2 At least two of the column strip bottom bars or wires in each direction shall pass within the region bounded by the longitudinal reinforcement of the column and shall be anchored at exterior supports.

Prestressed two-way slabs

8.7.5.6 *Structural integrity*

8.7.5.6.1 Except as permitted in 8.7.5.6.3, at least two tendons with 1/2 in. diameter or larger strand shall be placed in each direction at columns in accordance with (a) or (b):

(a) Tendons shall pass through the region bounded by the longitudinal reinforcement of the column.

(b) Tendons shall be anchored within the region bounded by the longitudinal reinforcement of the column, and the anchorage shall be located beyond the column centroid and away from the anchored span.

8.7.5.6.2 Outside of the column and shear cap faces, the two structural integrity tendons required by **8.7.5.6.1** shall pass under any orthogonal tendons in adjacent spans.

8.7.5.6.3 Slabs with tendons not satisfying 8.7.5.6.1 shall be permitted if bonded bottom deformed reinforcement is provided in each direction in accordance with 8.7.5.6.3.1 through 8.7.5.6.3.3.

8.7.5.6.3.1 Minimum bottom deformed reinforcement A_s in each direction shall be the larger of (a) and (b). The value of *fy* shall be limited to a maximum of 80,000 psi:

(a) $A_s = [\,4.5\,(f_c')^{0.5} c_2 d]/f_y$ (8.7.5.6.3.1a)

(b) $A_s = [300 c_2 d/f_y]$ (8.7.5.6.3.1b)

where c_2 is measured at the column faces through which the reinforcement passes.

8.7.5.6.3.2 Bottom deformed reinforcement calculated in 8.7.5.6.3.1 shall pass within the region bounded by the longitudinal reinforcement of the column and shall be anchored at exterior supports.

8.7.5.6.3.3 Bottom deformed reinforcement shall be anchored to develop $f_y$beyond the column or shear cap face.

Nonprestresssed two-way joint systems

8.8.1.6 For structural integrity, at least one bottom bar in each joist shall be continuous and shall be anchored to develop fy at the face of supports.

Cast-in-place beam

9.7.7 Structural integrity reinforcement in cast-in-place beams

9.7.7.1 For beams along the perimeter of the structure, structural integrity reinforcement shall be in accordance with (a) through (c):

(a) At least one-quarter of the maximum positive moment reinforcement, but not less than two bars or strands, shall be continuous

(b) At least one-sixth of the negative moment reinforcement at the support, but not less than two bars or strands, shall be continuous

(c) Longitudinal structural integrity reinforcement shall be enclosed by closed stirrups in accordance with 25.7.1.6 or hoops along the clear span of the beam

9.7.7.2 For other than perimeter beams, structural integrity reinforcement shall be in accordance with (a) or (b):

(a) At least one-quarter of the maximum positive moment reinforcement, but not less than two bars or strands, shall be continuous.

(b) Longitudinal reinforcement shall be enclosed by closed stirrups in accordance with 25.7.1.6 or hoops along the clear span of the beam.

9.7.7.3 Longitudinal structural integrity reinforcement shall pass through the region bounded by the longitudinal reinforcement of the column.

9.7.7.4 Longitudinal structural integrity reinforcement at noncontinuous supports shall be anchored to develop $f_y$at the face of the support.

9.7.7.5 If splices are necessary in continuous structural integrity reinforcement, the reinforcement shall be spliced in accordance with (a) and (b):

(a) Positive moment reinforcement shall be spliced at or near the support

(b) Negative moment reinforcement shall be spliced at or near midspan

9.7.7.6 Splices shall be mechanical or welded in accordance with 25.5.7 or Class B tension lap splices in accordance with 25.5.2.

Nonprestressed one-way joint system

9.8.1.6 For structural integrity, at least one bottom bar in each joist shall be continuous and shall be anchored to develop fy at the face of supports

Precast joint and connection

16.2.1.8 Integrity ties shall be provided in the vertical, longitudinal, and transverse directions and around the perimeter of a structure in accordance with 16.2.4 or 16.2.5

16.2.4 *Minimum connection strength and integrity tie requirements*

16.2.4.1 Except where the provisions of 16.2.5 govern, longitudinal and transverse integrity ties shall connect precast members to a lateral-force-resisting system, and vertical integrity ties shall be provided in accordance with 16.2.4.3 to connect adjacent floor and roof levels.

16.2.4.2 Where precast members form floor or roof diaphragms, the connections between the diaphragm and those members being laterally supported by the diaphragm shall have a nominal tensile strength of not less than 300 lb per linear ft.

16.2.4.3 Vertical integrity ties shall be provided at horizontal joints between all vertical precast structural members, except cladding, and shall satisfy (a) or (b):

(a) Connections between precast columns shall have vertical integrity ties, with a nominal tensile strength of at least 200$A_g$lb, where A_g is the gross area of the column. For columns with a larger cross section than required by consideration of loading, a reduced effective area based on the cross section required shall be permitted. The reduced effective area shall be at least one-half the gross area of

the column.

(b) Connections between precast wall panels shall have at least two vertical integrity ties, with a nominal tensile strength of at least 10,000 lb per tie.

16.2.5 Integrity tie requirements for precast concrete bearing wall structures three stories or more in height.

16.2.5.1 Integrity ties in floor and roof systems shall satisfy (a) through (f):

(a) Longitudinal and transverse integrity ties shall be provided in floor and roof systems to provide a

nominal tensile strength of at least 1500 lb per foot of width or length.

(b) Longitudinal and transverse integrity ties shall be provided over interior wall supports and between the floor or roof system and exterior walls.

(c) Longitudinal and transverse integrity ties shall be positioned in or within 2 ft of the plane of the floor or roof system.

(d) Longitudinal integrity ties shall be oriented parallel to floor or roof slab spans and shall be spaced not greater than 10 ft on center.

Provisions shall be made to transfer forces around openings.

(e) Transverse integrity ties shall be oriented perpendicular to floor or roof slab spans and shall be spaced not greater than the bearing wall spacing.

(f) Integrity ties at the perimeter of each floor and roof, within 4 ft of the edge, shall provide a nominal tensile strength of at least 16,000 lb.

16.2.5.2 Vertical integrity ties shall satisfy (a) through (c):

(a) Integrity ties shall be provided in all wall panels and shall be continuous over the height of the building.

(b) Integrity ties shall provide a nominal tensile strength of at least 3000 lb per horizontal foot of wall.

(c) At least two integrity ties shall be provided in each wall panel.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

No technical change to the provisions of the code. Proposal simply adds language to IBC that reflects the nature of the provisions in ASTM E119

FS2-24

FS3-24

IBC: 703.2.2, ASTM Chapter 35 (New)

Proponents: Marcelo Hirschler, GBH International, GBH International (mmh@gbhint.com)

2024 International Building Code

Revise as follows:

703.2.2 Analytical methods.
The fire resistance of *building elements*, components or assemblies established by an analytical method shall be by any of the methods listed in this section, based on the fire exposure and acceptance criteria specified in ASTM E119 or UL 263.

1. *Fire-resistance* designs documented in *approved sources*.
2. Prescriptive designs of fire-resistance-rated *building elements*, components or assemblies as prescribed in Section 721.
3. Calculations in accordance with Section 722.

4. Extension of fire resistance rating data obtained from tests in accordance with ASTM E119 or UL 263 for beams, floor and roof assemblies, columns; walls, and partitions, based on the principles contained in ASTM E2032.

~~4.~~ 5. Engineering analysis based on a comparison of *building element,* component or assemblies designs having *fire-resistance ratings* as determined by the test procedures set forth in ASTM E119 or UL 263.

~~5.~~ 6. *Fire-resistance* designs certified by an *approved agency*.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

E2032	Standard Practice for Extension of Data From Fire Resistance Tests Conducted in Accordance with ASTM E 119 (2021)

Staff Analysis: A review of the standard proposed for inclusion in the code, ASTM E2032 Standard Practice for Extension of Data From Fire Resistance Tests Conducted in Accordance with ASTM E 119 (2021), with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: ASTM E2032, Standard Practice for Extension of Data From Fire Resistance Tests Conducted in Accordance with ASTM E 119, has long been used to calculate fire resistance rating data for certain assemblies, as an extension of data obtained from actual fire resistance tests. ASTM E2032 cannot be used unless fire tests in accordance with ASTM E119 (or its equivalent, UL 263) have been successfully conducted.

This proposal, with the same intent, is different from proposal FS3-21, which was disapproved by a vote of 7-6.

1. ASTM E2032 is now a practice (and not a guide) and contains mandatory information and requirements.

2. The language proposed is based on the actual scope of ASTM E2032 (section 1.4, see below).

3. The new option (which is not a requirement) is placed ahead of the generic "engineering analysis" in item 4 (now item 5). It is one of the engineering analyses options.

4. The proposal contains reference to both ASTM E119 and UL 263, consistent with the generic "engineering analysis" in item 4 (now item 5).

The scope of ASTM E2032 (including boiler plate sections) reads as follows:

1. Scope

1.1 This practice covers the extension of fire resistance ratings obtained from fire tests performed in accordance with Test Method E119 to constructions that have not been tested. Test Method E119 evaluates the duration for which test specimens will contain a fire, retain their standard integrity, or both during a predetermined test exposure.

1.2 This practice is based on principles involving the extension of test data using simple considerations. The acceptance of these principles and their application is based substantially on an analogous worst case proposition.

1.3 These principles are only applicable to temperature conditions represented by the standard time-temperature curve described in Test Method E119. Test Method E119 is a fire-test-response standard.

1.4 The types of building constructions which are the subject of this practice are categorized as follows: beams; floor and roof assemblies; columns; and walls and partitions. Floor and roof assemblies include such assemblies with ceiling protective membranes.

1.5 The extension of test data using numerical calculations based on empirical data or theoretical models is not covered in this practice.

1.6 This practice does not cover the substitution of one proprietary material for another proprietary material, or materials for which fire test data are not presently available.

1.7 This practice does not purport to be comprehensive in its treatment of non-proprietary modifications of tested constructions. Engineering evaluation or tests are recommended for assessing modifications not specifically covered in this practice.

1.8 The values stated in SI units are to be regarded as standard. The values given in parentheses after SI units are provided for information only and are not considered standard.

1.9 This standard is used to determine certain fire-test responses of materials, products, or assemblies to heat and flame under controlled conditions by using results obtained from fire-test-response standards. The results obtained from using this standard do not by themselves constitute measures of fire hazard or fire risk.

1.10 This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.

1.11 This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.

(The proposed new standard has been developed by ASTM as a consensus standard and will be provided to ICC and the committee by ASTM staff together with all the other newly proposed ASTM standards).

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposal provides an additional (optional) method of calculating fire resistance ratings. No requirement is being added.

FS3-24

FS4-24

IBC: 703.3, 703.3.1

Proponents: Marcelo Hirschler, GBH International, GBH International (mmh@gbhint.com)

2024 International Building Code

703.3 Noncombustibility tests.
The tests indicated in Section 703.3.1 shall serve as criteria for acceptance of *building* materials as set forth in Sections 602.2, 602.3 and 602.4 in Types I, II, III and IV construction. The term “noncombustible” does not apply to the *flame spread* characteristics of *interior finish* or *trim* materials. A material shall not be classified as a noncombustible *building* construction material if it is subject to an increase in combustibility or *flame spread* beyond the limitations herein established through the effects of age, moisture or other atmospheric conditions.

Revise as follows:

703.3.1 Noncombustible materials.
Materials required to be noncombustible shall be tested in accordance with ASTM E136 <u>and pass the test</u>. Alternately, materials required to be noncombustible shall be tested in accordance with ASTM E2652 using the acceptance criteria prescribed by ASTM E136.

> **Exception:** Materials having a structural base of noncombustible material as determined in accordance with ASTM E136, or with ASTM E2652 using the acceptance criteria prescribed by ASTM E136, with a surfacing of not more than 0.125 inch (3.18 mm) in thickness having a *flame spread index* not greater than 50 when tested in accordance with ASTM E84 or UL 723 shall be acceptable as noncombustible.

Reason: The section implicitly states that a noncombustible materials needs to pass ASTM E136 but it does not explicitly state it. The danger, unless corrected, is that someone might suggest that simply conducting an ASTM E136 test and failing is acceptable: it is not. Note that the reference to the alternate test (ASTM E2652) specifically says that the material needs to pass the test with the acceptance criteria of ASTM E136.

A proposal has been submitted (by FCAC) to revise the IWUIC and to include the exact same language from the proposed revised 703.3.1, meaning that it includes the added words "and pass the test". Optional slightly modified language for the IBC is likely to be proposed and would also be suitable, but consistent language between the IBC and IWUIC would be helpful.

Also, FCAC is also submitting a proposal to the IFC to refer to IBC section 703.3.1 for the requirements of noncombustible materials, so consistency is important.

There may be one or more proposals with alternate revised language for section 703.3.1, with the same objective of ensuring that the section explicitly states that the material is noncombustible only if it has passed the ASTM E136 test. I suggest that, if other proposals are submitted, they should be heard together and the committee can then decide.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is simply clarification of what was always intended.

FS4-24

FS5-24

IBC: 703.3.1

Proponents: Tim Earl, GBH International, Self (tearl@gbhint.com)

2024 International Building Code

Revise as follows:

703.3.1 Noncombustible materials.
Materials required to be noncombustible shall ~~be tested in accordance with~~ pass ASTM E136. Alternately, materials required to be noncombustible shall be tested in accordance with ASTM E2652 ~~using~~ and meet the acceptance criteria prescribed by ASTM E136.

Exception: Materials having a structural base of noncombustible material as determined in accordance with ASTM E136, or with ASTM E2652 using the acceptance criteria prescribed by ASTM E136, with a surfacing of not more than 0.125 inch (3.18 mm) in thickness having a *flame spread index* not greater than 50 when tested in accordance with ASTM E84 or UL 723 shall be acceptable as noncombustible.

Reason: This section is unintentionally ambiguous, as it states that materials must be tested to ASTM E136 or E2652 but says nothing about the required result. This proposal clarifies the intent.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Clarification of the intent of the code with no technical change.

FS5-24

FS6-24

IBC: 703.3.1, 703.3.2 (New)

Proponents: Shamim Rashid-Sumar, National Ready Mixed Concrete Association, National Ready Mixed Concrete Association (ssumar@nrmca.org); Darryl Dixon, National Ready Mixed Concrete Association, National Ready Mixed Concrete Association (ddixon@nrmca.org)

2024 International Building Code

703.3.1 Noncombustible materials.
Materials required to be noncombustible shall be tested in accordance with ASTM E136. Alternately, materials required to be noncombustible shall be tested in accordance with ASTM E2652 using the acceptance criteria prescribed by ASTM E136.

Exception: Materials having a structural base of noncombustible material as determined in accordance with ASTM E136, or with ASTM E2652 using the acceptance criteria prescribed by ASTM E136, with a surfacing of not more than 0.125 inch (3.18 mm) in thickness having a *flame spread index* not greater than 50 when tested in accordance with ASTM E84 or UL 723 shall be acceptable as noncombustible.

Add new text as follows:

703.3.2 Inherently noncombustible materials. Inherently noncombustible materials, such as concrete and steel, shall not be required to be tested to be acceptable as noncombustible materials.

Reason: This code change provides a clarification to IBC Section 703.3.1, which requires that materials required to be noncombustible be tested in accordance with ASTM E136 or ASTM E2652. However, the testing requirements should not apply to clearly noncombustible materials such as concrete, masonry or steel.

The proposed text provides necessary clarification indicating that such materials are not required to be tested.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This code change provides an editorial clarification to the previous code section and will not increase or decrease the cost of construction.

FS6-24

FS7-24

IBC: 703.7

Proponents: Edward Lisinski, American Wood Council (elisinski@awc.org)

2024 International Building Code

Revise as follows:

703.7 Sealing of adjacent mass timber elements.
In *buildings* of Types IV-A, IV-B and IV-C construction, <u>where a *fire-resistant joint system* is not required at abutting *joints* or intersections in accordance with Section 715,</u> ~~sealant or adhesive~~ <u>sealants meeting the requirements of ASTM C920 or adhesives meeting the requirements of ASTM D3498</u> shall be provided to resist the passage of air ~~in~~ <u>at</u> the following locations:

1. ~~At abutting~~ <u>Abutting</u> edges and intersections of *mass timber building elements* required to be fire-resistance rated.
2. ~~At abutting~~ <u>Abutting</u> intersections of *mass timber building elements* and *building elements* of other materials where both are required to be fire-resistance rated.

~~Sealants shall meet the requirements of ASTM C920. Adhesives shall meet the requirements of ASTM D3498.~~

~~Exception~~ <u>Exceptions</u>: Sealants or adhesives need not be provided ~~where they are not a required component of a tested fire-resistance-rated assembly~~ <u>where any of the following apply:</u>

1. <u>The abutting edges or intersections were tested without sealants or adhesives as part of a *fire-resistance-rated* assembly.</u>
2. <u>The abutting edges or intersections occur entirely within a single *dwelling unit* or *fire area* in the same *story*.</u>
3. <u>Draftstopping material in accordance with Section 718.3.1 is installed on the unexposed side of the abutting edges or intersections.</u>

Reason: With the addition of Types IV-A, IV-B, and IV-C construction to the code, a prescriptive requirement for sealing the abutting edges and intersections of fire-resistance-rated mass timber elements was adopted to reduce the likelihood of flames and hot gasses passing between mass timber elements to adjacent fire areas. The requirement for use of adhesives or sealants was prescribed based on details from compartment fire testing, where adhesives or sealants were used at the intersections of mass timber panels. However, the existing code language has been misapplied to require sealants or adhesives between mass timber assemblies that already require a fire-resistant joint system and between mass timber elements that aren't required to perform a fire separation function, such as the bearing of a beam on a column or a mass timber panel on a beam. In addition, other alternatives exist to resist air movement between mass timber elements where fire separation is required. This change addresses these issues.

- The first sentence of Section 703.7 is modified to clarify that Section 703.7 only applies where a fire-resistant joint system is not required, since a fire-resistant joint system would serve the intended purpose of the sealant or adhesive required by Section 703.7, and the inclusion of additional sealants or adhesives might compromise the fire-resistant joint system.
- Exception #1 is modified to clarify that it only applies to abutting edges or intersections that were tested without sealants or adhesives as part of the fire-resistance-rated assembly.
- Exception #2 acknowledges that it is not necessary to prevent passage of air from one side of a building element to the other if both sides of the building element are within the same dwelling unit or fire area.
- Exception #3 is added to recognize that in lieu of using sealant or adhesive, draftstopping material can be installed on the unexposed side to prevent passage of air through the abutting edges or intersections.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

This code change proposal will decrease the cost of construction by approximately $50 per tube of sealant or adhesive for each tube not used due to Exception 2 or 3.

Estimated Immediate Cost Impact Justification (methodology and variables):

The proposal incorporates exceptions to the use of prescribed sealants or adhesives for conditions where such requirements are unnecessary. There will be both material (approximately $15 per tube of sealant or adhesive) and labor (approximately $35 of labor costs to install each tube) cost savings by reducing the locations where sealants or adhesives are installed.

FS7-24

FS8-24

IBC: 704.5

Proponents: Omar Al-Mansouri, CSTB, France, Centre Scientifique et Technique du Bâtiment (omar.almansouri@cstb.fr)

2024 International Building Code

Revise as follows:

704.5 Attachments to structural members.
The edges of lugs, brackets, rivets and bolt heads attached to structural members shall be permitted to extend to within 1 inch (25 mm) of the surface of the fire protection. <u>This provision is intended to limit the transfer of heat to the structural element from the connection elements by requiring the connection element to be protected with a minimum of 1 inch (25 mm) of some form of fire-resistance protection. This code provision shall not be interpreted as an exception from the verification of the fire resistance of attachments to structural members. Attachments to structural members shall be assessed for their fire resistance in accordance with a recognized standard.</u>

Reason: The way this code provision is written may leave room for interpretation that by applying 1 in. (25 mm) of fire protection around attachments, they do not need to be verified for fire resistance (regardless of the used fire protection material). The existing language is creating controversy in ACI committees 355 (Anchorage to Concrete) and 216 (Fire). The following is an explanation of why this provision needs to be clarified to avoid misuse of code language.

Attachments to structural members undergo a degradation of their mechanical resistance at high temperature and may fail prematurely before the collapse of the structural member under fire conditions despite the applied fire protection.

The fire resistance of attachments shall be considered even when fire protection is applied. Eurocode 3, Part 1-2, and Eurocode 2, Part 4, have provisions dealing with fire resistance of steel-to-steel attachments and steel-to-concrete attachments. Recent developments in the literature have shown that the temperature of attachments keeps on increasing despite the application of fire protection (see the PhD of Omar Al-Mansouri, 2020). The temperature of the attachment can reach levels at which the mechanical resistance can no longer withstand the applied load resulting in a premature failure of the attachment ensuring the support conditions of the structural member.

An attachment is always designed for a fire rating equal to or higher than that of the structural member. Premature failure of the attachment due to temperature increase presents a safety risk.

Bibliography: EN 1993-1-2:2005, Design of steel structures – Part 1-2: General rules – Structural fire design.

EN 1992-4:2018, Design of concrete structures – Part 4: Design of fastenings for use in concrete.

Al-Mansouri, O [Ph.D thesis]. Behavior of bonded anchors in concrete under fire. Civil Engineering. Ecole nationale supérieure Mines-Télécom Lille Douai, 2020. English. (NNT: 2020MTLD0011).

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This code proposal clarifies the scope of application of this specific provision to avoid misuse of the code language.

FS8-24

FS9-24

IBC: 704.5 (New), 704.5, 704.5.1, 704.5.2 (New), AWC Chapter 35 (New)

Proponents: Edward Lisinski, American Wood Council (elisinski@awc.org)

2024 International Building Code

Add new text as follows:

704.5 Protection of Connections and Attachments. Connections and attachments to structural members that are required to have a fire-resistance rating shall be protected in accordance with 704.5.1 and 704.5.2.

Revise as follows:

~~704.5~~ 704.5.1 Attachments to structural steel members.
The edges of lugs, brackets, rivets and bolt heads attached to structural steel members shall be permitted to extend to within 1 inch (25 mm) of the surface of the fire protection.

~~704.5.1~~ 704.5.1.1 Secondary attachments to structural steel members.
Where primary and secondary structural steel members require fire protection, any additional structural steel members having direct connection to the *primary structural frame* or *secondary structural members* shall be protected with the same fire-resistive material and thickness as required for the structural member. The protection shall extend away from the structural member a distance of not less than 12 inches (305 mm), or shall be applied to the entire length where the attachment is less than 12 inches (305 mm) long. Where an attachment is hollow and the ends are open, the fire-resistive material and thickness shall be applied to both exterior and interior of the hollow steel attachment.

Add new text as follows:

704.5.2 Connections to structural wood members.
Where a structural wood member is required to have a *fire-resistance rating*, structural connections to that member shall be protected from fire exposure for the time corresponding to the required *fire-resistance rating* of the member. Protection time shall be determined by one of the following:

1. Testing in accordance with Section 703.2.1 where the connection is part of the fire-resistance test.
2. Engineering analysis that demonstrates that the temperature rise at any portion of the connection is limited to an average temperature rise of 250°F (139°C), and a maximum temperature rise of 325°F (181°C), for a time corresponding to the required *fire-resistance rating* of the structural element being connected. For the purposes of this analysis, the connection includes connectors, fasteners and portions of wood members included in the structural design of the connection.
3. Engineering analysis in accordance with ANSI/AWC FDS.

Add new standard(s) as follows:

AWC

American Wood Council
222 Catoctin Circle SE, Suite 201
Leesburg, VA 20175

ANSI/AWC FDS-2024: Fire Design Specification (FDS) for Wood Construction

Staff Analysis: A review of the standard proposed for inclusion in the code, ANSI/AWC FDS-2024 Fire Design Specification (FDS) for Wood Construction, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: The intent of this proposal is to:

1. Relocate criteria for the protection of connections between structural wood members from Chapter 23 to Chapter 7, alongside

related criteria for structural steel connections and attachments.

2. Extend the requirements that currently apply specifically to connections in Types IV-A, IV-B, and IV-C construction to connections between fire-resistance-rated structural wood members in general.
3. Add a reference to ANSI/AWC *2024 Fire Design Specification (FDS) for Wood Construction*, which provides a design methodology for protecting connections with wood and/or gypsum, where protection times are assigned based on the temperature rise limitations established in ASTM E119 testing and Item #2 of existing Section 2304.10.1. The FDS was developed as an American National Standard through the AWC ANSI-approved consensus standards development process, and is available on the AWC website at the following location: https://awc.org/wp-content/uploads/2023/11/AWC_FDS2024_20231103_AWCWEBSITE.pdf
4. Clarify in the charging paragraph that connections must be protected for the time associated with the members being connected.

If this proposal is successful, the intention is to remove Section 2304.10.1 in the Group B code development process so there are not duplicative requirements in the code.

Bibliography: ANSI/AWC 2024 Fire Design Specification (FDS) for Wood Construction. View this document online: https://awc.org/wp-content/uploads/2023/11/AWC_FDS2024_20231103_AWCWEBSITE.pdf.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0

Estimated Immediate Cost Impact Justification (methodology and variables):

This proposal relocates a code section from Chapter 23 into a more proper location in Chapter 7. However, it does allow for this section to be available for design of wood members in other types of construction besides Type IV. It provides additional options for compliance with existing connection protection requirements specified in IBC 704.2 and IBC 704.3 without removing any of the existing options for demonstrating compliance. The inclusion of these additional options does not in and of itself increase or decrease the overall cost impact of the code, because these options may not be chosen. The existing options are still relevant, and if chosen, have no cost impact on the actual code requirements.

FS9-24

FS10-24

IBC: 704.5.1

Proponents: Richard Walke, Creative Technology Inc. and CM Services, National Fireproofing Contractors Association (richwalke61@gmail.com)

2024 International Building Code

Revise as follows:

704.5.1 Secondary attachments to structural members.
Where primary and secondary structural steel members require fire protection, any additional ~~structural~~ steel members having direct connection to the *primary structural frame* or *secondary structural member*, *and* having a cumulative unprotected footprint greater than 4.65 square inches (3,000 mm^2) per 3 linear feet or per linear meter of primary or secondary steel, shall be protected with the same fire-resistive material and thickness as required for the structural member. The protection shall extend away from the structural member a distance of not less than ~~12~~18 inches (~~305~~457 mm), or shall be applied to the entire length where the attachment is less than ~~12~~18 inches (~~305~~457 mm) long. Where an attachment is hollow and the ends are open, the fire-resistive material and thickness shall be applied to both exterior and interior of the hollow steel attachment.

Reason: Section 704.6.1 of the 2021 IBC was establish based on a Proposal FS8-18 submitted by the California State Fire Marshal's Office. We supported the original intent of the proposal which was to protect secondary non-structural tubular steel attachments. However, during the code development process, the scope of the proposal changed significantly. In the end this section required protection of all "secondary steel attachments" to primary and second structural steel members.

But what is a "secondary steel attachment"? Members of the National Fireproofing Contactors Association (NFCA) have reported code officials are asking for anything and everything attached to the primary and second structural steel members be protected, including sometimes, the tie wires which support acoustical ceilings. That clearly was not the intent of the original proposal.

Section 704.6.1 was updated in the 2024 IBC as a result of Proposal FS11-21 submitted by National Fireproofing Contractors Association (NFCA) with help from the American Iron and Steel Institute. The focus of the changes was to limited the application of the section to structural members having direct connection to the primary structural frame or secondary structural members. Without having hard data to support a more surgical approach to what attachments truly impact the fire performance of the primary and second structural steel members, we believe this was a reasonable compromise.

After further research, we found guidance on the protection of attachments in a UL Solutions United Kingdom document. The 4.65 square inches (3,000 mm^2) per 3 linear feet or per linear meter of structural element length limitation included in this proposal is based on recommendation from *UL Solutions' guide to steelwork fire protection*. The same limitation is also stated in several other international documents relating to fireproofing, including:

1. The Fire and Blast Information Group (FABIG) Technical Note 11, entitled, *Fire Loading and Structural Response*.
2. International Coating's *Intertherm 750 Application Manual*.

Cost Impact: Increase

Estimated Immediate Cost Impact:

Based on industry and manufacturer input, the average cost of protecting an intermediate size attachment for a distance of 18 in. from the primary or secondary steel is approximately $1 to $2.

Estimated Immediate Cost Impact Justification (methodology and variables):

This includes materials and labor costs for protecting a typical attachment for a distance of 18 in. The total cost in any given building will depend upon the number of attachments which will ultimately require protection.

FS10-24

FS11-24

IBC: 704.9

Proponents: David Renn, PE, SE, City and County of Denver, Colorado Chapter Code Development Committee (david.renn@denvergov.org)

2024 International Building Code

Revise as follows:

704.9 Exterior structural members.
Load-bearing structural members located within the *exterior walls* or on the outside of a *building* or *structure* shall be provided with the highest *fire-resistance rating* as determined in accordance with the following:

1. As required by Table 601 for the type of *building element* based on the type of construction of the building.
2. As required by Table 601 for exterior bearing walls based on the type of construction.
3. As required by Table 705.5 for *exterior walls* based on the *fire separation distance*. <u>For the purpose of this item only, where load-bearing structural members are located on the outside of a *building* or *structure*, *fire separation distance* shall be measured to the load-bearing structural members.</u>

Reason: Section 704.9 deals with the fire-resistance rating (FRR) of load-bearing structural members that are either located within the exterior wall or outside of a building or structure, and Item 3 requires a FRR based on fire separation distance (FSD). Per definition in Chapter 2, FSD is measured from the "building face". Where a structural member is located within an exterior wall, it is clear that FSD for Item 3 is measured from the exterior wall, which would be the "building face". However, it is not clear where to measure FSD from where the structural member is outside the building, since FSD is measured to the "building face".

For example, per Table 705.5 an exterior wall of a Type IIB or VB building typically can have a 0-hour FRR for FSD greater than or equal to 10' and is required to have a 1-hour FRR when FSD is less than 10'. So, if an exterior wall has 12' FSD and structural members outside the exterior wall are located at 8' from a lot line, what FRR is required for the structural members to comply with Item 3? Since the exterior wall FRR requirements are partially intended to protect a building and its structural members from a fire on an adjacent lot, it is believed the intent of Item 3 is to measure the FSD to the structural members in question, not the "building face" at the exterior wall. For this case, this results in a 1-hour FRR for the structural members and a 0-hour FRR for the exterior wall. To clarify this intent, this proposal adds a requirement that FSD for such members be measured to the structural member, since this is not covered in the definition of FSD. Since the FRR and opening limitations of the exterior wall would be based on FSD measured from the exterior wall, the new language indicates that the FSD to the structural members is for the purpose of this item only.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is intended to clarify the intent of the code only, so it has no cost impact.

FS11-24

FS12-24

IBC: 705.2.1, 705.2.2, 705.2.3.1, 705.2.4

Proponents: Julius Carreon, City of Bellevue, Washington Association of Building Officials Technical Code Development Committee (jcarreon@bellevuewa.gov); Quyen Thai, City of Tacoma, Washington Association of Building Officials Technical Code Development Committee (qthai@cityoftacoma.org); Micah Chappell, Seattle Department of Construction and Inspections, Washington Association of Building Officials Technical Code Development Committee (micah.chappell@seattle.gov)

2024 International Building Code

Revise as follows:

705.2.1 Types I and II construction.
Projections from walls of Type I or II construction shall be of noncombustible materials or combustible materials as allowed by Sections ~~705.2.3.1 and~~ 705.2.4 and 705.2.5.

705.2.2 Type III, IV or V construction.
Projections from walls of Type III, IV or V construction shall be of any *approved* material. Balconies and similar projections of combustible construction shall comply with Section 705.2.4.

~~705.2.3.1~~705.2.4 Combustible Balconies and similar projections.
Balconies and similar projections of combustible construction other than *fire-retardant-treated wood* shall be *fire-resistance* rated where required by Table 601 for floor construction or shall be of heavy timber construction in accordance with Section 2304.11. The aggregate length of the projections shall not exceed 50 percent of the *building*'s perimeter on each floor.

Exceptions:

1. On *buildings* of Types I and II construction, three *stories* or less above *grade plane*, *fire-retardant-treated wood* shall be permitted for balconies, porches, decks and exterior *stairways* not used as required exits.
2. Untreated *wood and plastic composites* that comply with ASTM D7032 and Section 2612 are permitted for pickets, rails and similar *guard* components that are limited to 42 inches (1067 mm) in height.
3. Balconies and similar projections on *buildings* of Types III, IV-HT and V construction shall be permitted to be of Type V construction and shall not be required to have a *fire-resistance rating* where sprinkler protection is extended to these areas.
4. Where sprinkler protection is extended to the balcony areas, the aggregate length of the balcony on each floor shall not be limited.

~~705.2.4~~705.2.5 Bay and oriel windows.
Bay and oriel windows constructed of combustible materials shall conform to the type of construction required for the *building* to which they are attached.

Exception: *Fire-retardant-treated wood* shall be permitted on *buildings* three *stories* or less above *grade plane* of Type I, II, III or IV construction.

Reason: This code change is to undo the inadvertent substantive change when the section of the code was moved from Section 1406.3 to Section 705.2.3.1 between 2015 and 2018 code (See FS15-15: http://media.iccsafe.org/codes/2015-2017/GroupA/PCH/IBC-Fire-Safety.pdf).

Based on FS15-15 code change (reasoning is just relocation of the Section and no intended change) and old 2015 IBC Section 1406.3, Section 705.2.3.1 should be applied independently from Section 705.2.3. Section 705.2.3 applies anytime your projection has an fire separation distance of less than 5 feet, and Section 705.2.3.1 applies anytime your projection is of “combustible construction other than fire-retardant-treated wood. However, because of the logic of applying the code sections based on hierarchy, users could interpret the “combustible construction requirements" (705.2.3.1) will only apply when fire separation distance is 5-feet or less. This proposal is intended to correct this by moving 705.2.3.1 into a separate section from 705.2.3 and clarify, by adding a pointer in Section 705.2.2, that combustible construction requirements for balconies and similar projections should apply to all construction types.

Section Numbering Coordination:

With the renumbering of Section 705.2.3.1 to 705.2.4, this proposal contains the section renumbering necessary in 705.2. However, correlating changes will also need to be made to revise "705.2.3.1" to "705.2.4" in the following sections in the IBC:

- Section 603.1, Items 13 and 19
- Section 705.2.1
- Section 705.2.3, Item 5
- Chapter 35 (ASTM D7032)

In addition, the same change would be required to be made in IFC Section 903.3.1.2.1, which would then translate over to IBC Section 903.3.1.2.1.

WABO TCD has submitted a separate code change proposal to revise Sections 705.2.2 and 705.2.3.1 to address Types IV-A/B/C construction. It is our intent that in the event that both proposals are approved, this renumbering would govern over the section numbering shown in the other proposal.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The code change proposal will not increase or decrease the cost of construction. See also the Reason Statement.

FS12-24

FS13-24

IBC: 705.2.2, 705.2.3.1

Proponents: Julius Carreon, City of Bellevue, Washington Association of Building Officials Technical Code Development Committee (jcarreon@bellevuewa.gov); Quyen Thai, City of Tacoma, Washington Association of Building Officials Technical Code Development Committee (qthai@cityoftacoma.org); Micah Chappell, Seattle Department of Construction and Inspections, Washington Association of Building Officials Technical Code Development Committee (micah.chappell@seattle.gov)

2024 International Building Code

Revise as follows:

705.2.2 Type III, IV or V construction.
Projections from walls of Type III, IV or V construction shall be of any *approved* material. Balconies and similar projections of combustible construction shall comply with Section 705.2.3.1.

705.2.3.1 Balconies and similar projections.
Balconies and similar projections of combustible construction other than *fire-retardant-treated wood* shall be *fire-resistance* rated where required by Table 601 for floor construction or shall be of heavy timber construction in accordance with Section 2304.11. *Fire-retardant-treated wood* shall not be permitted for balconies and similar projections on buildings of Type IV-A, IV-B, or IV-C construction. The aggregate length of the projections shall not exceed 50 percent of the *building*'s perimeter on each floor.

Exceptions:

1. On *buildings* of Types I and II construction, three *stories* or less above *grade plane*, *fire-retardant-treated wood* shall be permitted for balconies, porches, decks and exterior *stairways* not used as required exits.
2. Untreated *wood and plastic composites* that comply with ASTM D7032 and Section 2612 are permitted for pickets, rails and similar *guard* components that are limited to 42 inches (1067 mm) in height.
3. Balconies and similar projections on *buildings* of Types III, IV-HT and V construction shall be permitted to be of Type V construction and shall not be required to have a *fire-resistance rating* where sprinkler protection is extended to these areas.
4. Where sprinkler protection is extended to the balcony areas, the aggregate length of the balcony on each floor shall not be limited.
5. On buildings of Types IV-A or IV-B construction three stories or less above grade plane, and Type IV-C construction not classified as *high-rise*, non-fire-resistance rated heavy timber building elements shall be permitted for balconies, porches, decks and exterior stairways not used as required exits.

Reason: This code change proposal is intended to clarify the requirements for combustible projections of Type III, IV or V construction in Section 705.2.2 and provides a new/separate exception for combustible projections of Types IV-A, IV-B and IV-C construction, three new construction types added in 2021 code cycle.

For projections of Type III, IV or V construction, the current construction requirements are not clear since Section 705.2.2 simply indicates the construction shall be of any "approved" material. What does an “approved” material mean, particularly when the construction material is combustible, and the type of construction requires fire protection such as for type III-A, IV-A, IV-B, IV-C and V-A? Section 705.2.3.1 provides the requirements when combustible materials are used but there is no direct code path to the section, since it is located as a subsection of 705.2.3 that applies only if the balcony/projection has fire separation distance (FSD) of less than 5-ft.

In addition, the 2021 IBC added three new construction types—IV-A, IV-B and IV-C—that allow the use of mass timber in buildings up to 18, 12 and nine stories. These new types are based on the previous Heavy Timber construction type (renamed Type IV-HT) but with additional fire-resistance ratings and levels of required noncombustible protection, to match the level of performance of Types I and II construction. It is not clear whether the additional fire-resistance ratings and levels of required noncombustible protection will also need to be applied for balconies and similar projections on these new mass timber construction types. It is our understanding that the current construction requirements in IBC Section 705.2 (projections) is intended for the traditional IV construction type (now classified as Type IV-HT) and therefore not intended for high-rise buildings. The 2024 IBC has clarified exception #3 in 705.2.3.1, which permits the use of type V construction where sprinkler protection is provided, is limited to IV-HT but silent on IV-A, IV-B and IV-C. Hence, depending how the designer and code official interpret what is considered "approved" material in 705.2.2, the projection construction for these new types of construction could be conservative (i.e., all projections need the additional fire resistance rating and non-combustible protection per Table 601) or non-conservative (i.e., use type V, FRT, or exposed/non-rated heavy timber on 18 story high rise).

To address the ambiguity of the code language in Section 705.2.2 and the requirements for combustible projections on the new types of mass timber construction, we are proposing the following:

- Add a pointer on Section 705.2.2 to address combustible projection requirements on fire resistance rated construction types such as Types III-A, IV-A, V-A and new mass timber construction types IV-A/B/C. WABO TCD has also submitted a separate code change proposal that renumbers Section 705.2.3.1 to Section 705.2.4, to clarify and undo the inadvertent substantive change when the section of the code was moved from Section 1406.3 to Section 705.2.3.1 between 2015 and 2018 code (See FS15-15: http://media.iccsafe.org/codes/2015-2017/GroupA/PCH/IBC-Fire-Safety.pdf). Based on the reason statement for FS15-15 and its previous location in 2015 code, Section 705.2.3.1 should be applied independently from Section 705.2.3, which means it should not be constrained by fire separation distance requirements. By adding a pointer on Section 705.2.2, it makes it clear that where fire resistance rating is required by Table 601 for floor construction (i.e., Types III-A, IV-A, V-A and IV-A/B/C), any combustible projection construction will need to comply with 705.2.3.1 regardless if the projection is beyond the 5 feet separation distance trigger in Section 705.2.3. If both proposals are approved, our intent is that the other proposal (renumbering the section) would govern for both Section 705.2.3.1 and the pointer in Section 705.2.2.
- Add a clarifying prohibition and an exception in 705.2.3.1, to deal with combustible projections on Type IV-A, IV-B and IV-C construction.
  - Consistent with the intent of the original proponents of the proposal to introduce Types IV-A, IV-B, and IV-C into the code, fire-retardant treated wood is prohibited in those types of construction. This only affects stick-framed FRT wood, since FRT mass timber does not exist.
  - However, the exception will permit the use of (exposed) non-rated heavy timber construction on buildings of Types IV-A or IV-B construction three stories or less above grade plane, and Type IV-C construction not classified as high rise. This implies that combustible balconies and similar projections on Type IV-A and Type IV-B buildings more than 3-stories and Type IV-C buildings classified as high rise shall meet the type of construction in accordance with Table 601. We understand the fire performance requirements on Types IV-A and IV-B construction were developed based on Type I and Type II construction, hence, the proposed 3-stories cut-off for the exception on Type IV-A and Type IV-B is intended to align with the exception for Type I and Type II (705.2.3.1 exception 1). For Type IV-C, we are proposing a non-high rise cut-off to align with traditional Type IV-HT construction, which does not require fire rated construction (and both Type IV-C and Type IV-HT have 85 feet maximum building height limit).
  - WABO TCD sent a draft of the proposal to AWC and one comment that we received from them is that their preferred terminology was "heavy timber building elements," as opposed to "heavy timber construction" currently use in the IBC. The "heavy timber construction" terminology occurs in (9) other locations in the IBC but we have not proposed to change those in this proposal. If the committee agrees on replacing the terminology with "heavy timber building elements", we can submit an editorial change in the second CAH.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

As noted in the reason statement of the proposal, the construction requirements for combustible balconies and similar projections on the three construction Types IV-A, IV-B and IV-C is currently very ambiguous. Depending how the designer and code official interpret what is considered "approved" material in the current code will determine if this code change proposal will increase or decrease the cost of construction. In general, construction for Types IV-A/B buildings 3-stories or less and Type IV-C buildings that aren't high rises may see a small decrease in cost as this code proposal makes it clear that exposed/non-rated heavy timber is permitted, as opposed to fire-resistance rated mass timber.

Recognizing that the choice of materials used in construction is an option, in jurisdictions where designers and code officials have allowed non-fire-resistance rated heavy timber for these balconies/projections, construction cost for Types IV-A/B buildings that are more than 3-stories and Type IV-C high rise buildings may see a small increase in cost as this code proposal implies the balconies/projection construction for these buildings will need additional fire resistance rating protection per Table 601. Data on the increase in cost is not readily available to people who aren't professional estimators, but a 2022 online article (https://www.checkatrade.com/blog/cost-guides/cross-laminated-timber-cost/) estimates adding fire protection and soundproofing to cross-laminated timber costs approximately $3 to $7 per square foot. We assume the cost increase will be in this ballpark.

We do not consider the prohibition on FRT wood to be a cost increase since no amount of stick framing should have been allowed in these types of construction.

FS13-24

FS14-24

IBC: 705.6, 705.6.1 (New)

Proponents: Edward Lisinski, American Wood Council (elisinski@awc.org)

2024 International Building Code

Delete and substitute as follows:

~~**705.6 Continuity.**~~
~~The *fire-resistance rating* of *exterior walls* shall extend from the top of the foundation or floor/ceiling assembly below to one of the following:~~

1. ~~The underside of the floor sheathing, roof sheathing, deck or slab above.~~
2. ~~The underside of a floor/ceiling or roof/ceiling assembly having a *fire-resistance rating* equal to or greater than the *exterior wall* and the *fire separation distance* is greater than 10 feet.~~

~~Parapets shall be provided as required by Section 705.12.~~

705.6 Continuity. The continuity of the *fire-resistance rating* shall extend from the top of the foundation to the top of the parapet. If a parapet is not required by Section 705.12, the *fire-resistance rating* shall extend to the underside of the roof sheathing, deck or slab.

Add new text as follows:

705.6.1 Supporting Construction. Where a floor or roof assembly supports an *exterior wall* or parapet above, the portion of the floor or roof assembly that supports the *exterior wall* or parapet shall have a *fire-resistance rating* of not less than the *fire-resistance rating* required for the *exterior wall* or parapet.

Reason: The proposed revision coordinates with existing requirements for fire-resistance rating (FRR) continuity for all types of supporting construction. Existing language, added in 2024 code development cycle (FS18-21), has caused confusion in application to platform construction because walls in platform construction are not continuous from foundation to roof. In platform construction, FRR continuity must be maintained through portions of floor or roof elements supporting the wall or parapet above, however, the wall itself is not continuous. The proposed revisions clarify that FRR continuity is to be maintained to the top of the parapet or to the underside of the roof deck where a parapet is not required. By clarifying the concept of FRR continuity versus continuity of the exterior wall, the intent of Item 2 in existing language is addressed more broadly and no longer necessary in the code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal clarifies that the important aspect of fire protection is the continuity of the fire-resistance as required in IBC 705.7.1, and not the continuity of the exterior wall itself.

FS14-24

FS15-24

IBC: 705.7.1

Proponents: Edward Lisinski, American Wood Council (elisinski@awc.org)

2024 International Building Code

Revise as follows:

705.7.1 Floor assemblies supporting exterior walls in Type III, IV and V construction.
In Type III, IV and V construction where a floor assembly supports gravity loads from an *exterior wall*, the *fire-resistance rating* of the portion of the floor assembly that supports the *exterior wall* shall be not less than the *fire-resistance rating* required for the *exterior wall* in Table 601. The *fire-resistance rating* provided by the portion of the floor assembly supporting and within the plane of the *exterior wall* shall be permitted to include the contribution of the ceiling membrane when considering exposure to fire from the inside. Where a floor assembly supports gravity loads from an *exterior wall*, the *building elements* of the floor construction within the plane of the *exterior wall*, including but not limited to rim joists, rim boards and blocking, shall be in accordance with the requirements for interior *building elements* of ~~Type III~~ the applicable type of construction.

Reason: Existing Section 705.7.1 was added by change proposal FS19-21 to address continuity of fire-resistance rating for exterior walls of Type III platform construction. These same structural stability requirements that are appliable to Type III construction are equally applicable to Type IV and V construction where platform construction is used.

The AWC *Design for Code Acceptance No. 3 (DCA 3)* document has design details to maintain the required fire resistance of the wall for fire exposure from the interior of the building, and, when required by IBC Section 705.5, for exposure from the exterior as well. Examples of these details can be found in the AWC DCA 3 document (a link has been provided in the bibliography section below). A ceiling membrane may or may not be present, but as shown in the existing language of Section 705.7.1 and the AWC DCA 3, it is an appropriate design assumption to consider its contribution when the fire rating of the floor assembly supporting the exterior wall is to be based on fire exposure from the interior of the building. This situation could occur in Type IV and V construction as well and the building elements will respond the same way in a fire, so those construction types should be included in this code section.

AWC has a separate change proposal to Section 705.6 to provide general language that supports the concept of continuity of fire-resistance rating applicable when exterior walls are continuous, and when floors intersect the exterior wall in typical platform construction.

Bibliography: American Wood Council *Design for Code Acceptance No. 3.* View this document online: https://awc.org/wp-content/uploads/2021/12/awc-dca3_20210209_awcwebsite.pdf

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal provides clarification of the applicability of existing code requirements for platform construction.

FS15-24

FS16-24

IBC: 705.7.1, 705.8 (New)

Proponents: David Renn, PE, SE, City and County of Denver, Colorado Chapter Code Development Committee (david.renn@denvergov.org)

2024 International Building Code

Revise as follows:

~~705.7.1~~ 705.8.1 Floor assemblies in Type III construction.
In Type III construction where a floor assembly supports gravity loads from an *exterior wall*, the ~~*fire-resistance rating* of the portion of the floor assembly that supports the *exterior wall* shall be not less than the *fire-resistance rating* required for the *exterior wall* in Table 601. The~~ *fire-resistance rating* provided by the portion of the floor assembly supporting and within the plane of the *exterior wall* shall be permitted to include the contribution of the ceiling membrane when considering exposure to fire from the inside. Where a floor assembly supports gravity loads from an *exterior wall*, the *building elements* of the floor construction within the plane of the *exterior wall*, including but not limited to rim joists, rim boards and blocking, shall be in accordance with the requirements for interior *building elements* of Type III construction.

Add new text as follows:

705.8 Supporting construction. The supporting construction for an exterior wall shall have a fire-resistance rating as required by Section 704.1.1.

Reason: Currently, there is no specific requirement in Section 705 for supporting construction of exterior walls. However, such supporting construction must still meet the requirement of 704.1.1 that "The fire-resistance ratings of supporting structural members and assemblies shall be not less than the ratings required for the fire-resistance-rated assemblies supported by the structural members." The fire-resistance rating continuity requirements in 705.6 and the structural stability requirements of 705.7 essentially require supporting construction within the plane of an exterior wall to have the same fire-resistance rating as the wall supported. However, there are often cases where a fire-resistance rated exterior curtain wall is supported by a floor or beam that is inside the exterior wall, which is not covered by these sections. Also, where exterior walls step back at an upper floor, the exterior wall is supported on a floor or beam below the wall. For these cases, 704.1.1 currently requires the supporting construction to have a fire-resistance rating not less than the wall supported, but this is often missed by designers.

As an example, a 5-story Type III building could have a set-back exterior wall at the 5th story that is a bearing wall for the roof, and this wall requires a 2-hour fire-resistance rating per Table 601. Designers often miss that the floor or beam supporting this wall at Level 5 also needs to have a 2-hour fire-resistance rating, as well as all supporting construction below this floor or beam down to the foundation. When this is discovered in plan review, there are significant changes needed to the drawings to meet the requirements. This proposal is intended to avoid this by providing a direct reference to 704.1.1 in a new supporting construction section, 705.8, which will located after 705.7 that includes structural stability requirements for lateral bracing of the wall.

Current Section 705.7.1 for floor assemblies in Type III construction is relocated to be a subsection to the new supporting construction section since it addresses supporting construction requirements directly. Some wording in this section is proposed to be deleted since it is redundant with the new 705.8 section.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is a clarification with a pointer to an existing requirement, so there is no cost impact.

FS16-24

FS17-24

IBC: 705.7.2 (New)

Proponents: Edward Lisinski, American Wood Council (elisinski@awc.org)

2024 International Building Code

Add new text as follows:

705.7.2 Roof assemblies supporting parapets in Type III, IV and V construction. In Type III, IV and V construction where a roof assembly supports gravity loads from a parapet, the *fire-resistance rating* of the portion of the roof assembly that supports the parapet shall be not less than the *fire-resistance rating* required for the parapet in Section 705.12. The *fire-resistance rating* provided by the portion of the roof assembly supporting the parapet shall be permitted to include the contribution of the ceiling membrane when considering exposure to fire from the inside. Where a roof assembly supports gravity loads from a parapet, the *building elements* of the roof construction within the plane of the *exterior wall*, including but not limited to, rim joists, rim boards, and blocking, shall be in accordance with the requirements for roof assemblies of the applicable type of construction.

Reason: The proposed new section adds criteria that parallels Section 705.7.1, except that Section 705.7.1 is specific to floor assemblies supporting an exterior wall above. This change is necessary to clarify that the same criteria would also apply to a roof assembly supporting a parapet above. This is further necessary because parapet construction is addressed by the requirements of Section 705.12 and does not fall under the definition of exterior wall. The change clarifies that fire resistance is permitted to include the contribution of the ceiling membrane when considering exposure from the inside, just as it is for floor assemblies in platform construction.

AWC has a separate change proposal to Section 705.6 that provides general language in support of the concept of continuity of fire-resistance rating for roof assemblies supporting a parapet as it occurs in typical platform construction.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This code change proposal provides clarification that roof assemblies supporting a parapet above shall have the same criteria as floor assemblies supporting an exterior wall above.

FS17-24

FS18-24

IBC: 705.11 (New), 714.4 (New)

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Building Code

Add new text as follows:

705.11 Penetrations. Penetrations into or through exterior walls required to have a fire-resistance rating shall comply with Section 714. Penetrations by ducts and air transfer openings shall comply with Section 705.10.

> **Exception:** Exterior walls that are permitted to have unprotected openings in accordance with Section 705.8 do not require protection of penetrations.

Revise as follows:

714.4 Fire-resistance-rated walls.
Penetrations into or through exterior walls, fire walls, fire barriers, smoke barrier walls and fire partitions shall comply with Sections 714.4.1 through 714.4.3. Penetrations in smoke barrier walls shall also comply with Section 714.5.4.

> **Exception:** Exterior walls that are permitted to have unprotected openings in accordance with Section 705.8 do not require protection of penetrations.

Reason: This proposal adds a requirement to protect penetrations where a fire-resistance rated exterior wall is not allowed to have any other unprotected openings. Similar language and requirements already exist in IBC Sections 705.9, 705.10 and 717.5.6 to protect joints, and duct and air transfer openings in exterior walls. In addition, the International Residential Code (IRC) requires penetrations in exterior walls to be protected where the fire separation distance is less than 3 feet in accordance with IRC Tables R302.1(1) and R302.1(2).

Since the current code language is silent on prescriptive requirements, it can be confusing for code officials which may lead to either over-prescribing requirements such as treating penetrations as openings or under-prescribing requirements when everything is required to be protected. This change would only apply in very limited situations where buildings are in close proximity to a property line as identified in Table 705.8 (e.g. within 3 feet for sprinklered protected buildings, or within 5 ft for unprotected nonsprinklered buildings).

Some jurisdictions have already been enforcing this proposed provision because it seems consistent with the intent of the current IBC.

The current language does not limit the size, type, or number of unprotected penetrations through exterior walls, even when no other unprotected elements are allowed, including windows, doors, joints and vents. Fires can spread through unprotected penetrations just as easily as through other unprotected elements. If an exterior wall does not allow unprotected openings, it is because the building is close to a property line. This need for defined limiting distances is well established in the IBC.

By comparison, IBC 705.9 and 705.10 states:

> **705.9 Joints.** Joints made in or between exterior walls required by this section to have a fire-resistance rating shall comply with Section 715.
>
> **Exception:** Joints in exterior walls that are permitted to have unprotected openings.
>
> **705.10 Ducts and air transfer openings.** Penetrations by air ducts and air transfer openings in fire-resistance-rated exterior walls required to have protected openings shall comply with Section 717.
>
> **Exception:** Foundation vents installed in accordance with this code are permitted.

Although this is for very limited situations, being silent on protection of penetrations through fire resistance rated exterior walls which are not otherwise permitted to have unprotected openings is a glaring omission.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting

open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: Increase

Estimated Immediate Cost Impact:

The average cost of an installed firestop system for exterior walls is $50 - $60 per penetration

Estimated Immediate Cost Impact Justification (methodology and variables):

The cost provided is based on industry and manufacturer input. This includes average materials and labor costs for any type of penetrant through or into the wall assembly. The cost range includes both sides of wall assembly and any additional requirements for weather protection. The total cost in any given exterior wall will depend upon the number of penetrations.

FS18-24

FS19-24

IBC: 705.12, 706.6, TABLE 721.1(3), 2603.3, 2603.4.1.5, 2610.1

Proponents: Aaron Phillips, Asphalt Roofing Manufacturers Association (ARMA), Asphalt Roofing Manufacturers Association (aphillips@asphaltroofing.org)

2024 International Building Code

Revise as follows:

705.12 Parapets.
Parapets shall be provided on *exterior walls* of *buildings*.

Exceptions: A parapet need not be provided on an exterior wall where any of the following conditions exist:

1. The wall is not required to be *fire-resistance rated* in accordance with Table 705.5 because of *fire separation distance*.
2. The *building* has an area of not more than 1,000 square feet (93 m^2) on any floor.
3. Walls that terminate at roofs of not less than 2-hour fire-resistance-rated construction or where the roof, including the deck or slab and supporting construction, is constructed entirely of noncombustible materials.
4. One-hour fire-resistance-rated *exterior walls* that terminate at the underside of the roof sheathing, deck or slab, provided that:
   - 4.1. Where the roof/ceiling framing elements are parallel to the walls, such framing and elements supporting such framing shall not be of less than 1-hour fire-resistance-rated construction for a width of 4 feet (1220 mm) for Groups R and U and 10 feet (3048 mm) for other occupancies, measured from the interior side of the wall.
   - 4.2. Where roof/ceiling framing elements are not parallel to the wall, the entire span of such framing and elements supporting such framing shall not be of less than 1-hour fire-resistance-rated construction.
   - 4.3. Openings in the roof shall not be located within 5 feet (1524 mm) of the 1-hour fire-resistance-rated *exterior wall* for Groups R and U and 10 feet (3048 mm) for other occupancies, measured from the interior side of the wall.
   - 4.4. The entire *building* shall be provided with not less than a Class B *roof assembly*~~*roof covering*~~.
5. In Groups R-2 and R-3 where the entire *building* is provided with a Class C *roof assembly*~~*roof covering*~~, the *exterior wall* shall be permitted to terminate at the underside of the roof sheathing or deck in Types III, IV and V construction, provided that one or both of the following criteria is met:
   - 5.1. The roof sheathing or deck is constructed of *approved* noncombustible materials or of *fire-retardant-treated wood* for a distance of 4 feet (1220 mm).
   - 5.2. The roof is protected with 0.625-inch (16 mm) *Type X gypsum board* directly beneath the underside of the roof sheathing or deck, supported by not less than nominal 2-inch (51 mm) ledgers attached to the sides of the roof framing members for a minimum distance of 4 feet (1220 mm).
6. Where the wall is permitted to have not less than 25 percent of the *exterior wall* areas containing unprotected openings based on *fire separation distance* as determined in accordance with Section 705.9.

706.6 Vertical continuity.
Fire walls shall extend from the foundation to a termination point not less than 30 inches (762 mm) above both adjacent roofs.

Exceptions:

1. Stepped *buildings* in accordance with Section 706.6.1.

2. Two-hour fire-resistance-rated walls shall be permitted to terminate at the underside of the roof sheathing, deck or slab, provided that all of the following requirements are met:
   2.1. The lower *roof assembly* within 4 feet (1220 mm) of the wall has not less than a 1-hour *fire-resistance rating* and the entire length and span of supporting elements for the rated *roof assembly* has a *fire-resistance rating* of not less than 1 hour.

   2.2. Openings in the roof shall not be located within 4 feet (1220 mm) of the *fire wall*.

   2.3. Each *building* shall be provided with not less than a Class B *roof assembly*~~*roof covering*~~.

3. Walls shall be permitted to terminate at the underside of noncombustible roof sheathing, deck or slabs where both *buildings* are provided with not less than a Class B *roof assembly*~~*roof covering*~~. Openings in the roof shall not be located within 4 feet (1220 mm) of the *fire wall*.

4. In *buildings* of Types III, IV and V construction, walls shall be permitted to terminate at the underside of combustible roof sheathing or decks, provided that all of the following requirements are met:
   4.1. Roof openings are not less than 4 feet (1220 mm) from the *fire wall*.

   4.2. The roof is covered with a minimum Class B *roof assembly*~~*roof covering*~~.

   4.3. The roof sheathing or deck is constructed of *fire-retardant-treated wood* for a distance of 4 feet (1220 mm) on both sides of the wall or the roof is protected with $^5/_8$-inch (15.9 mm) *Type X gypsum board* directly beneath the underside of the roof sheathing or deck, supported by not less than 2-inch (51 mm) nominal ledgers attached to the sides of the roof framing members for a distance of not less than 4 feet (1220 mm) on both sides of the *fire wall*.

5. In *buildings* designed in accordance with Section 510.2, *fire walls* located above the 3-hour *horizontal assembly* required by Section 510.2, Item 1 shall be permitted to extend from the top of this *horizontal assembly*.

6. *Buildings* with sloped roofs in accordance with Section 706.6.2.

TABLE 721.1(3) MINIMUM PROTECTION FOR FLOOR AND ROOF SYSTEMS [a, q]

FLOOR OR ROOF CONSTRUCTION	ITEM NUMBER	CEILING CONSTRUCTION	THICKNESS OF FLOOR OR ROOF SLAB (inches)				MINIMUM THICKNESS OF CEILING (inches)			
			4 hours	3 hours	2 hours	1 hour	4 hours	3 hours	2 hours	1 hour
1. Siliceous aggregate concrete	1-1.1	Slab (ceiling not required). Minimum cover over nonprestressed reinforcement shall be not less than $^3/_4$".[b]	7.0	6.2	5.0	3.5	—	—	—	—
2. Carbonate aggregate concrete	2-1.1		6.6	5.7	4.6	3.2	—	—	—	—
3. Sand-lightweight concrete	3-1.1		5.4	4.6	3.8	2.7	—	—	—	—
4. Lightweight concrete	4-1.1		5.1	4.4	3.6	2.5	—	—	—	—
5. Reinforced concrete	5-1.1	Slab with suspended ceiling of vermiculite gypsum plaster over metal lath attached to $^3/_4$" cold-rolled channels spaced 12" on center. Ceiling located 6" minimum below joists.	3	2	—	—	1	$^3/_4$	—	—
	5-2.1	$^5/_8$" Type X gypsum wallboard[c] attached to 0.018 inch (No.25 carbon sheet steel gage) by $^7/_8$" deep by $2^5/_8$" hat-shaped galvanized steel channels with 1"-long No. 6 screws. The channels are spaced 24" on center, span 35" and are supported along their length at 35" intervals by 0.033" (No. 21 galvanized sheet gage) galvanized steel flat strap hangers having formed edges that engage the lips of the channel. The strap hangers are attached to the side of the concrete joists with $^5/_{32}$" by $1^1/_4$"-long power-driven fasteners. The wallboard is installed with the long dimension perpendicular to the channels. End joints occur on channels and supplementary channels are installed parallel to the main channels, 12" each side, at end joint occurrences. The finished ceiling is located approximately 12" below the soffit of the floor slab.	—	—	$2^1/_2$	—	—	—	$^5/_8$	—
6. Steel joists constructed with a poured reinforced concrete slab on metal lath forms or steel form units.[d, e]	6-1.1	Gypsum plaster on metal lath attached to the bottom cord with single No. 16 gage or doubled No. 18 gage wire ties spaced 6" on center. Plaster mixed 1:2 for scratch coat, 1:3 for brown coat, by weight, gypsum-to-sand aggregate for 2-hour system. For 3-hour system plaster is neat.	—	—	$2^1/_2$	$2^1/_4$	—	—	$^3/_4$	$^5/_8$

FLOOR OR ROOF CONSTRUCTION	ITEM NUMBER	CEILING CONSTRUCTION	THICKNESS OF FLOOR OR ROOF SLAB (inches)				MINIMUM THICKNESS OF CEILING (inches)			
			4 hours	3 hours	2 hours	1 hour	4 hours	3 hours	2 hours	1 hour
	6-2.1	Vermiculite gypsum plaster on metal lath attached to the bottom chord with single No. 16 gage or doubled 0.049-inch (No. 18 B.W. gage) wire ties 6" on center.	—	2	—	—	—	5/8	—	—
	6-3.1	Cement plaster over metal lath attached to the bottom chord of joists with single No. 16 gage or doubled 0.049" (No. 18 B.W. gage) wire ties spaced 6" on center. Plaster mixed 1:2 for scratch coat, 1:3 for brown coat for 1-hour system and 1:1 for scratch coat, 1:1 1/2 for brown coat for 2-hour system, by weight, cement to sand.	—	—	—	2	—	—	—	5/8[f]
	6-4.1	Ceiling of 5/8" Type X wallboard[c] attached to 7/8" deep by 2 5/8" by 0.021 inch (No. 25 carbon sheet steel gage) hat-shaped furring channels 12" on center with 1"-long No. 6 wallboard screws at 8" on center. Channels wire tied to bottom chord of joists with doubled 0.049 inch (No. 18 B.W. gage) wire or suspended below joists on wire hangers.[g]	—	—	2 1/2	—	—	—	5/8	—
	6-5.1	Wood-fibered gypsum plaster mixed 1:1 by weight gypsum to sand aggregate applied over metal lath. Lath tied 6" on center to 3/4" channels spaced 13 1/2" on center. Channels secured to joists at each intersection with two strands of 0.049 inch (No. 18 B.W. gage) galvanized wire.	—	—	2 1/2	—	—	—	3/4	—
7. Reinforced concrete slabs and joists with hollow clay tile fillers laid end to end in rows 2 1/2" or more apart; reinforcement placed between rows and concrete cast around and over tile.	7-1.1	5/8" gypsum plaster on bottom of floor or roof construction.	—	—	8[h]	—	—	—	5/8	—
	7-1.2	None	—	—	—	5 1/2[i]	—	—	—	—
8. Steel joists constructed with a reinforced concrete slab on top poured on a 1/2"-deep steel deck.[e]	8-1.1	Vermiculite gypsum plaster on metal lath attached to 3/4" cold-rolled channels with 0.049" (No. 18 B.W. gage) wire ties spaced 6" on center.	2 1/2[j]	—	—	—	3/4	—	—	—
9. 3"-deep cellular steel deck with concrete slab on top. Slab thickness measured to top.	9-1.1	Suspended ceiling of vermiculite gypsum plaster base coat and vermiculite acoustical plaster on metal lath attached at 6" intervals to 3/4" cold-rolled channels spaced 12" on center and secured to 1 1/2" cold-rolled channels spaced 36" on center with 0.065" (No. 16 B.W. gage) wire. 1 1/2" channels supported by No. 8 gage wire hangers at 36" on center. Beams within envelope and with a 2 1/2" airspace between beam soffit and lath have a 4-hour rating.	2 1/2	—	—	—	1 1/8[k]	—	—	—
10. 1 1/2"-deep steel roof deck on steel framing. Insulation board, 30 pcf density, composed of wood fibers with cement binders of thickness shown bonded to deck with unified asphalt adhesive. Covered with a Class A or B _roof assembly_~~roof covering~~ .	10-1.1	Ceiling of gypsum plaster on metal lath. Lath attached to 3/4" furring channels with 0.049" (No. 18 B.W. gage) wire ties spaced 6" on center. 3/4" channel saddle tied to 2" channels with doubled 0.065" (No. 16 B.W. gage) wire ties. 2"channels spaced 36" on center suspended 2" below steel framing and saddle tied with 0.165" (No. 8 B.W. gage) wire. Plaster mixed 1:2 by weight, gypsum-to-sand aggregate.	—	—	1 7/8	1	—	—	3/4[i]	3/4[i]
11. 1 1/2"-deep steel roof deck on steel-framing wood fiber insulation board, 17.5 pcf density on top applied over a 15-lb asphalt-saturated felt. Class A or B _roof assembly_~~roof covering~~.	11-1.1	Ceiling of gypsum plaster on metal lath. Lath attached to 3/4" furring channels with 0.049" (No. 18 B.W. gage) wire ties spaced 6" on center. 3/4" channels saddle tied to 2" channels with doubled 0.065" (No. 16 B.W. gage) wire ties. 2" channels spaced 36" on center suspended 2" below steel framing and saddle tied with 0.165" (No. 8 B.W. gage) wire. Plaster mixed 1:2 for scratch coat and 1:3 for brown coat, by weight, gypsum-to-sand aggregate for 1-hour system. For 2-hour system, plaster mix is 1:2 by weight, gypsum-to-sand aggregate.	—	—	1 1/2	1	—	—	7/8[g]	3/4[i]
12. 1 1/2" deep steel roof deck on steel-framing insulation of rigid board consisting of expanded perlite and fibers impregnated with integral asphalt waterproofing; density 9 to 12 pcf secured to metal roof deck by 1/2"-wide ribbons of waterproof, cold-process liquid adhesive spaced 6" apart. Steel joist or light steel construction with metal roof deck, insulation, and Class A or B built-up _roof assembly_~~roof covering~~.[e]	12-1.1	Gypsum-vermiculite plaster on metal lath wire tied at 6" intervals to 3/4" furring channels spaced 12" on center and wire tied to 2" runner channels spaced 32" on center. Runners wire tied to bottom chord of steel joists.	—	—	1	—	—	—	7/8	—
13. Double wood floor over wood joists spaced 16" on center.[m, n]	13-1.1	Gypsum plaster over 3/8" Type X gypsum lath. Lath initially applied with not less than four 1 1/8" by No. 13 gage by 19/64" head plasterboard blued nails per bearing. Continuous stripping over lath along all joist lines. Stripping consists of 3"-wide strips of metal lath attached by 1 1/2" by No. 11 gage by 1/2" head roofing nails spaced 6" on center. Alternate stripping consists of 3"-wide 0.049" diameter wire stripping weighing 1 pound per square yard and attached by No. 16 gage by 1 1/2" by 3/4" crown width staples, spaced 4" on center. Where alternate stripping is used, the lath nailing shall consist of two nails at each end and one nail at each intermediate bearing. Plaster mixed 1:2 by weight, gypsum-to-sand aggregate.	—	—	—	—	—	—	—	7/8
	13-1.2	Cement or gypsum plaster on metal lath. Lath fastened with 1 1/2" by No. 11 gage by 7/16" head barbed shank roofing nails spaced 5" on center. Plaster mixed 1:2 for scratch coat and 1:3 for brown coat, by weight, cement to sand aggregate.	—	—	—	—	—	—	—	5/8

FLOOR OR ROOF CONSTRUCTION	ITEM NUMBER	CEILING CONSTRUCTION	THICKNESS OF FLOOR OR ROOF SLAB (inches)				MINIMUM THICKNESS OF CEILING (inches)			
			4 hours	3 hours	2 hours	1 hour	4 hours	3 hours	2 hours	1 hour
	13-1.3	Perlite or vermiculite gypsum plaster on metal lath secured to joists with 1 1/2" by No. 11 gage by 7/16" head barbed shank roofing nails spaced 5" on center.	—	—	—	—	—	—	—	5/8
	13-1.4	1/2" Type X gypsum wallboard[c] nailed to joists with 5d cooler[o] or wallboard[o] nails at 6" on center. End joints of wallboard centered on joists.	—	—	—	—	—	—	—	1/2
14. Plywood stressed skin panels consisting of 5/8"-thick interior C-D (exterior glue) top stressed skin on 2" × 6" nominal (minimum) stringers. Adjacent panel edges joined with 8d common wire nails spaced 6" on center. Stringers spaced 12" maximum on center.	14-1.1	1/2"-thick wood fiberboard weighing 15 to 18 pounds per cubic foot installed with long dimension parallel to stringers or 3/8" C-D (exterior glue) plywood glued and/or nailed to stringers. Nailing to be with 5d cooler[o] or wallboard[o] nails at 12" on center. Second layer of 1/2" Type X gypsum wallboard[c] applied with long dimension perpendicular to joists and attached with 8d cooler[o] or wallboard[o] nails at 6" on center at end joints and 8" on center elsewhere. Wallboard joints staggered with respect to fiberboard joints.	—	—	—	—	—	—	—	1
15. Vermiculite concrete slab proportioned 1:4 (Portland cement to vermiculite aggregate) on a 1 1/2"-deep steel deck supported on individually protected steel framing. Maximum span of deck 6′-10" where deck is less than 0.019 inch (No. 26 carbon steel sheet gage) or greater. Slab reinforced with 4" × 8" 0.109/0.083" (No. 12/14 B.W. gage) welded wire mesh.	15-1.1	None	—	—	—	3[j]	—	—	—	—
16. Perlite concrete slab proportioned 1:6 (Portland cement to perlite aggregate) on a 1 1/4"-deep steel deck supported on individually protected steel framing. Slab reinforced with 4" × 8" 0.109/0.083" (No. 12/14 B.W. gage) welded wire mesh.	16-1.1	None	—	—	—	3 1/2[j]	—	—	—	—
17. Perlite concrete slab proportioned 1:6 (Portland cement to perlite aggregate) on a 9/16"-deep steel deck supported by steel joists 4′ on center. Class A or B _roof assembly_~~roof covering~~ on top.	17-1.1	Perlite gypsum plaster on metal lath wire tied to 3/4" furring channels attached with 0.065" (No. 16 B.W. gage) wire ties to lower chord of joists.	—	2[p]	2[p]	—	—	7/8	3/4	—
18. Perlite concrete slab proportioned 1:6 (Portland cement to perlite aggregate) on 1 1/4"-deep steel deck supported on individually protected steel framing. Maximum span of deck 6′-10" where deck is less than 0.019" (No. 26 carbon sheet steel gage) and 8′-0" where deck is 0.019" (No. 26 carbon sheet steel gage) or greater. Slab reinforced with 0.042" (No. 19 B.W. gage) hexagonal wire mesh. Class A or B _roof assembly_~~roof covering~~ on top.	18-1.1	None	—	2 1/4[p]	2 1/4[p]	—	—	—	—	—
19. Floor and beam construction consisting of 3"-deep cellular steel floor unit mounted on steel members with 1:4 (proportion of Portland cement to perlite aggregate) perlite-concrete floor slab on top.	19-1.1	Suspended envelope ceiling of perlite gypsum plaster on metal lath attached to 3/4" cold-rolled channels, secured to 1 1/2" cold-rolled channels spaced 42" on center supported by 0.203 inch (No. 6 B.W. gage) wire 36" on center. Beams in envelope with 3" minimum airspace between beam soffit and lath have a 4-hour rating.	2[p]	—	—	—	1[l]	—	—	—
20. Perlite concrete proportioned 1:6 (Portland cement to perlite aggregate) poured to 1/8" thickness above top of corrugations of 1 5/16"-deep galvanized steel deck maximum span 8′-0" for 0.024" (No. 24 galvanized sheet gage) or 6′-0" for 0.019" (No. 26 galvanized sheet gage) with deck supported by individually protected steel framing. Approved polystyrene foam plastic insulation board having a flame spread not exceeding 75 (1" to 4" thickness) with vent holes that approximate 3 percent of the board surface area placed on top of perlite slurry. A 2′ by 4′ insulation board contains six 2 3/4" diameter holes. Board covered with 2 1/4" minimum perlite concrete slab. Slab reinforced with mesh consisting of 0.042" (No.19 B.W. gage) galvanized steel wire twisted together to form 2" hexagons with straight 0.065" (No. 16 B.W. gage) galvanized steel wire woven into mesh and spaced 3". Alternate slab reinforcement shall be permitted to consist of 4" × 8", 0.109/0.238" (No. 12/4 B.W. gage), or 2" × 2", 0.083/0.083" (No. 14/14 B.W. gage) welded wire fabric. Class A or B _roof assembly_~~roof covering~~ on top.	20-1.1	None	—	—	Varies	—	—	—	—	—
21. Wood joists, wood I-joists, floor trusses and flat or pitched roof trusses spaced a maximum 24" o.c. with 1/2" wood structural panels with exterior glue applied at right angles to top of joist or top chord of trusses with 8 dnails. The wood structural panel thickness shall be not less than nominal 1/2" nor less than required by Chapter 23.	21-1.1	Base layer 5/8" Type X gypsum wallboard applied at right angles to joist or truss 24" o.c. with 1 1/4" Type S or Type W drywall screws 24" o.c. Face layer 5/8" Type X gypsum wallboard or veneer base applied at right angles to joist or truss through base layer with 1 7/8" Type S or Type W drywall screws 12" o.c. at joints and intermediate joist or truss. Face layer Type G drywall screws placed 2" back on either side of face layer end joints, 12" o.c.	—	—	—	Varies	—	—	—	1 1/4
22. Steel joists, floor trusses and flat or pitched roof trusses spaced a maximum 24" o.c. with 1/2" wood structural panels with exterior glue applied at right angles to top of joist or top chord of trusses with No. 8 screws. The wood structural panel thickness shall be not less than nominal 1/2" nor less than required by Chapter 23.	22-1.1	Base layer 5/8" Type X gypsum board applied at right angles to steel framing 24" on center with 1" Type S dry wall screws spaced 24" on center. Face layer 5/8" Type X gypsum board applied at right angles to steel framing attached through base layer with 1 5/8" Type S dry wall screws 12" on center at end joints and intermediate joints and 1 1/2" Type G dry wall screws 12 inches on center placed 2" back on either side of face layer end joints. Joints of the face layer are offset 24" from the joints of the base layer.	—	—	—	Varies	—	—	—	1 1/4

FLOOR OR ROOF CONSTRUCTION	ITEM NUMBER	CEILING CONSTRUCTION	THICKNESS OF FLOOR OR ROOF SLAB (inches) 4 hours	3 hours	2 hours	1 hour	MINIMUM THICKNESS OF CEILING (inches) 4 hours	3 hours	2 hours	1 hour
23. Wood I-joist (minimum joist depth $9^{1}/_{4}$" with a minimum flange depth of $1^{5}/_{16}$" and a minimum flange cross-sectional area of 2.25 square inches) at 24" o.c. spacing with a minimum 1 × 4 ($^{3}/_{4}$" × 3.5"actual) ledger strip applied parallel to and covering the bottom of the bottom flange of each member, tacked in place. 2" mineral wool insulation, 3.5 pcf (nominal) installed adjacent to the bottom flange of the I-joist and supported by the 1 × 4 ledger strip.	23-1.1	$^{1}/_{2}$"-deep single-leg resilient channel 16" on center (channels doubled at wallboard end joints), placed perpendicular to the furring strip and joist and attached to each joist by $1\,^{7}/_{8}$" Type S drywall screws. $^{5}/_{8}$" Type C gypsum wallboard applied perpendicular to the channel with end joints staggered not less than 4′ and fastened with $1^{1}/_{8}$" Type S drywall screws spaced 7" on center. Wallboard joints to be taped and covered with joint compound.	—	—	—	Varies	—	—	—	$^{5}/_{8}$
24. Wood I-joist (minimum I-joist depth $9^{1}/_{4}$" with a minimum flange depth of $1^{1}/_{2}$" and a minimum flange cross-sectional area of 5.25 square inches; minimum web thickness of $^{3}/_{8}$") @ 24" o.c., $1^{1}/_{2}$" mineral wool insulation (2.5 pcf-nominal) resting on hat-shaped furring channels.	24-1.1	Minimum 0.026" thick hat-shaped channel 16" o.c. (channels doubled at wallboard end joints), placed perpendicular to the joist and attached to each joist by $1^{1}/_{4}$" Type S drywall screws. $^{5}/_{8}$" Type C gypsum wallboard applied perpendicular to the channel with end joints staggered and fastened with $1^{1}/_{8}$" Type S drywall screws spaced 12" o.c. in the field and 8" o.c. at the wallboard ends. Wallboard joints to be taped and covered with joint compound.	—	—	—	Varies	—	—	—	$^{5}/_{8}$
25. Wood I-joist (minimum I-joist depth $9^{1}/_{4}$" with a minimum flange depth of $1^{1}/_{2}$" and a minimum flange cross-sectional area of 5.25 square inches; minimum web thickness of $^{7}/_{16}$") @ 24" o.c., $1^{1}/_{2}$" mineral wool insulation (2.5 pcf-nominal) resting on resilient channels.	25-1.1	Minimum 0.019"-thick resilient channel 16" o.c. (channels doubled at wallboard end joints), placed perpendicular to the joist and attached to each joist by $1^{5}/_{8}$" Type S drywall screws. $^{5}/_{8}$" Type C gypsum wallboard applied perpendicular to the channel with end joints staggered and fastened with 1" Type S drywall screws spaced 12" o.c. in the field and 8" o.c. at the wallboard ends. Wallboard joints to be taped and covered with joint compound.	—	—	—	Varies	—	—	—	$^{5}/_{8}$
26. Wood I-joist (minimum I-joist depth $9^{1}/_{4}$" with a minimum flange thickness of $1^{1}/_{2}$" and a minimum flange cross-sectional area of 2.25 square inches; minimum web thickness of $^{3}/_{8}$") @ 24" o.c.	26-1.1	Two layers of $^{1}/_{2}$" Type X gypsum wallboard applied with the long dimension perpendicular to the I-joists with end joints staggered. The base layer is fastened with $1^{5}/_{8}$" Type S dry wall screws spaced 12" o.c. and the face layer is fastened with 2" Type S drywall screws spaced 12" o.c. in the field and 8" o.c. on the edges. Face layer end joints shall not occur on the same I-joist as base layer end joints and edge joints shall be offset 24"from base layer joints. Face layer to also be attached to base layer with $1^{1}/_{2}$" Type G drywall screws spaced 8" o.c. placed 6" from face layer end joints. Face layer wallboard joints to be taped and covered with joint compound.	—	—	—	Varies	—	—	—	1
27. Wood I-joist (minimum I-joist depth $9^{1}/_{2}$" with a minimum flange depth of $1^{5}/_{16}$" and a minimum flange cross-sectional area of 1.95 square inches; minimum web thickness of $^{3}/_{8}$") @ 24" o.c.	27-1.1	Minimum 0.019" thick resilient channel 16" o.c. (channels doubled at wallboard end joints), placed perpendicular to the joist and attached to each joist by $1^{1}/_{4}$" Type S drywall screws. Two layers of $^{1}/_{2}$" Type X gypsum wallboard applied with the long dimension perpendicular to the resilient channels with end joints staggered. The base layer is fastened with $1^{1}/_{4}$" Type S drywall screws spaced 12" o.c. and the face layer is fastened with $1^{5}/_{8}$" Type S drywall screws spaced 12" o.c. Face layer end joints shall not occur on the same I-joist as base layer end joints and edge joints shall be offset 24" from base layer joints. Face layer to also be attached to base layer with $1^{1}/_{2}$" Type G drywall screws spaced 8" o.c. placed 6" from face layer end joints. Face layer wallboard joints to be taped and covered with joint compound.	—	—	—	Varies	—	—	—	1
28. Wood I-joist (minimum I-joist depth $9^{1}/_{4}$" with a minimum flange depth of $1^{1}/_{2}$" and a minimum flange cross-sectional area of 2.25 square inches; minimum web thickness of $^{3}/_{8}$") @ 24" o.c. Unfaced fiberglass insulation or mineral wool insulation is installed between the I-joists supported on the upper surface of the flange by stay wires spaced 12" o.c.	28-1.1	Base layer of $^{5}/_{8}$" Type C gypsum wallboard attached directly to I-joists with $1^{5}/_{8}$" Type S drywall screws spaced 12" o.c. with ends staggered. Minimum 0.0179"-thick hat-shaped $^{7}/_{8}$-inch furring channel 16" o.c. (channels doubled at wallboard end joints), placed perpendicular to the joist and attached to each joist by $1^{5}/_{8}$" Type S drywall screws after the base layer of gypsum wallboard has been applied. The middle and face layers of $^{5}/_{8}$" Type C gypsum wallboard applied perpendicular to the channel with end joints staggered. The middle layer is fastened with 1" Type S drywall screws spaced 12" o.c. The face layer is applied parallel to the middle layer but with the edge joints offset 24" from those of the middle layer and fastened with $1^{5}/_{8}$" Type S drywall screws 8" o.c. The joints shall be taped and covered with joint compound.	—	—	—	Varies	—	—	$2^{3}/_{4}$	—

FLOOR OR ROOF CONSTRUCTION	ITEM NUMBER	CEILING CONSTRUCTION	THICKNESS OF FLOOR OR ROOF SLAB (inches)				MINIMUM THICKNESS OF CEILING (inches)			
			4 hours	3 hours	2 hours	1 hour	4 hours	3 hours	2 hours	1 hour
29. Channel-shaped 18 gage steel joists (minimum depth 8") spaced a maximum 24" o.c. supporting tongue-and-groove wood structural panels (nominal minimum $^{3}/_{4}$"-thick) applied perpendicular to framing members. Structural panels attached with $1^{5}/_{8}$" Type S-12 screws spaced 12" o.c.	29-1.1	Base layer $^{5}/_{8}$" Type X gypsum board applied perpendicular to bottom of framing members with $1^{1}/_{8}$" Type S-12 screws spaced 12" o.c. Second layer $^{5}/_{8}$" Type X gypsum board attached perpendicular to framing members with $1^{5}/_{8}$" Type S-12 screws spaced 12" o.c. Second layer joints offset 24" from base layer. Third layer $^{5}/_{8}$" Type X gypsum board attached perpendicular to framing members with $2^{3}/_{8}$" Type S-12 screws spaced 12" o.c. Third layer joints offset 12" from second layer joints. Hat-shaped $^{7}/_{8}$-inch rigid furring channels applied at right angles to framing members over third layer with two $2^{3}/_{8}$" TypeS-12 screws at each framing member. Face layer $^{5}/_{8}$" Type X gypsum board applied at right angles to furring channels with $1^{1}/_{8}$" Type S screws spaced 12" o.c.	—	—	Varies	—	—	—	$3^{3}/_{8}$	—
30. Wood I-joist (minimum I-joist depth $9^{1}/_{2}$" with a minimum flange depth of $1^{1}/_{2}$" and a minimum flange cross-sectional area of 2.25 square inches; minimum web thickness of $^{3}/_{8}$") @ 24" o.c. Fiberglass insulation placed between I-joists supported by the resilient channels.	30-1.1	Minimum 0.019"-thick resilient channel 16" o.c. (channels doubled at wallboard end joints), placed perpendicular to the joists and attached to each joist by $1^{1}/_{4}$" Type S dry wall screws. Two layers of $^{1}/_{2}$" Type X gypsum wallboard applied with the long dimension perpendicular to the resilient channels with end joints staggered. The base layer is fastened with $1^{1}/_{4}$" Type S drywall screws spaced 12" o.c. and the face layer is fastened with $1^{5}/_{8}$" Type S drywall screws spaced 12" o.c. Face layer end joints shall not occur on the same I-joist as base layer end joints and edge joints shall be offset 24" from base layer joints. Face layer to be attached to base layer with $1^{1}/_{2}$" Type G drywall screws spaced 8" o.c. placed 6" from face layer end joints. Face layer wallboard joints to be taped and covered with joint compound.	—	—	—	Varies	—	—	—	1
31. Wood I-joist (minimum I-joist depth $9^{1}/_{4}$" with a minimum flange thickness of $1^{1}/_{2}$" and a minimum flange crosssectional area of 2.25 square inches; minimum web thickness of $^{3}/_{8}$") @ 24" o.c.	31- 1.1	Two layers of $^{1}/_{2}$" Type C gypsum wallboard applied with the long dimension perpendicular to the I-joists with end joints staggered. The base layer is fastened with 1" Type S drywall screws spaced 12" o.c. and the face layer is fastened with $1^{5}/_{8}$" Type S drywall screws spaced 12" o.c. in the field and 8" o.c. on the edges. Face layer edge joints shall not occur on the same I-joist as base layer end joints and edge joints shall be offset 24" from base layer joints. End joints centered on bottom flange of I-joists and offset a minimum of 48" from those of base layer. Face layer to also be attached to base layer with $1^{1}/_{2}$" Type G drywall screws spaced 8" o.c. with a 4" stagger, placed 6" from face layer end joints. Face layer wallboard joints taped and covered with joint compound. Screw heads covered with joint compound.	—	—	Varies	—	—	—	—	—

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound = 0.454 kg, 1 cubic foot = 0.0283 m^3,

1 pound per square inch = 6.895 kPa, 1 pound per linear foot = 1.4882 kg/m.

a. Staples with equivalent holding power and penetration shall be permitted to be used as alternate fasteners to nails for attachment to wood framing.

b. Where the slab is in an unrestrained condition, minimum reinforcement cover shall be not less than $1^{5}/_{8}$ inches for 4 hours (siliceous aggregate only); $1^{1}/_{4}$ inches for 4 and 3 hours; 1 inch for 2 hours (siliceous aggregate only); and $^{3}/_{4}$ inch for all other restrained and unrestrained conditions.

c. For all of the construction with gypsum wallboard described in this table, gypsum base for veneer plaster of the same size, thickness and core type shall be permitted to be substituted for gypsum wallboard, provided that attachment is identical to that specified for the wallboard, and the joints on the face layer are reinforced and the entire surface is covered with not less than $^{1}/_{16}$-inch gypsum veneer plaster.

d. Slab thickness over steel joists measured at the joists for metal lath form and at the top of the form for steel form units.

e. (a) The maximum allowable stress level for H-Series joists shall not exceed 22,000 psi.

(b) The allowable stress for K-Series joists shall not exceed 26,000 psi, the nominal depth of such joist shall be not less than 10 inches and the nominal joist weight shall be not less than 5 pounds per linear foot.

f. Cement plaster with 15 pounds of hydrated lime and 3 pounds of approved additives or admixtures per bag of cement.

g. Gypsum wallboard ceilings attached to steel framing shall be permitted to be suspended with $1^{1}/_{2}$-inch cold-formed carrying channels spaced 48 inches on center, that are suspended with No. 8 SWG galvanized wire hangers spaced 48 inches on center. Cross-furring channels are tied to the carrying channels with No. 18 SWG galvanized wire hangers spaced 48 inches on center. Cross-furring channels are tied to the carrying channels with No. 18 SWG galvanized wire (double strand) and spaced as required for direct attachment to the framing. This alternative is applicable to those steel framing assemblies recognized under Note q.

h. Six-inch hollow clay tile with 2-inch concrete slab above.

i. Four-inch hollow clay tile with 1 $^{1}/_{2}$-inch concrete slab above.

j. Thickness measured to bottom of steel form units.

k. Five-eighths inch of vermiculite gypsum plaster plus $^{1}/_{2}$ inch of approved vermiculite acoustical plastic.

l. Furring channels spaced 12 inches on center.

m. Double wood floor shall be permitted to be either of the following:

(a) Subfloor of 1-inch nominal boarding, a layer of asbestos paper weighing not less than 14 pounds per 100 square feet and a layer of 1-inch nominal tongue-and-groove finished flooring.

(b) Subfloor of 1-inch nominal tongue-and-groove boarding or $^{15}/_{32}$-inch wood structural panels with exterior glue and a layer of 1-inch nominal tongue-and-groove finished flooring or $^{19}/_{32}$-inch wood structural panel finish flooring or a layer of Type I Grade M-1 particleboard not less than $^{5}/_{8}$-inch thick.

n. The ceiling shall be permitted to be omitted over unusable space, and flooring shall be permitted to be omitted where unusable space occurs above.

o. For properties of cooler or wallboard nails, see ASTM C514, ASTM C547 or ASTM F1667.

p. Thickness measured on top of steel deck unit.

q. Generic fire-resistance ratings (those not designated as PROPRIETARY* in the listing) in the GA-600 shall be accepted as if herein specified.

2603.3 Surface-burning characteristics.

Unless otherwise indicated in this section, *foam plastic insulation* and foam plastic cores of manufactured assemblies shall have a *flame spread index* of not more than 75 and a *smoke-developed index* of not more than 450 where tested in the maximum thickness intended for use in accordance with ASTM E84 or UL 723. Loose fill-type *foam plastic insulation* shall be tested as board stock for the *flame spread* and smoke-developed indices.

Exceptions:

1. *Smoke-developed index* for interior *trim* as provided for in Section 2604.2.
2. In cold storage *buildings*, ice plants, food plants, food processing rooms and similar areas, *foam plastic insulation* where tested in a thickness of 4 inches (102 mm) shall be permitted in a thickness up to 10 inches (254 mm) where the *building* is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1. The *approved automatic sprinkler system* shall be provided in both the room and that part of the *building* in which the room is located.

3. *Foam plastic insulation* that is a part of a Class A, B or C *roof assembly* where tested in accordance with ASTM E108 or UL 790~~roof covering assembly~~ provided that the assembly with the *foam plastic insulation* satisfactorily passes NFPA 276 or UL 1256. The *smoke-developed index* shall not be limited for roof applications.
4. *Foam plastic insulation* greater than 4 inches (102 mm) in thickness shall have a maximum *flame spread index* of 75 and a *smoke-developed index* of 450 where tested at a minimum thickness of 4 inches (102 mm), provided that the end use is *approved* in accordance with Section 2603.9 using the maximum thickness and density intended for use.
5. *Flame spread* and smoke-developed indices for foam plastic interior signs in *covered and open mall buildings* provided that the signs comply with Section 402.6.4.

2603.4.1.5 Roofing.

A thermal barrier is not required for *foam plastic insulation* that is a part of a Class A, B or C *roof assembly*~~roof covering assembly~~ that is installed in accordance with the code and the manufacturer's instructions and is either constructed as described in Item 1 or tested as described in Item 2.

1. The roof assembly is separated from the interior of the *building* by *wood structural panel* sheathing not less than 0.47 inch (11.9 mm) in thickness bonded with exterior glue, with edges supported by blocking, tongue-and-groove joints, other *approved* type of edge support or an equivalent material.
2. The assembly with the *foam plastic insulation* satisfactorily passes NFPA 276 or UL 1256.

2610.1 Light-transmitting plastic glazing of skylight assemblies.

Skylight assemblies glazed with light-transmitting plastic shall conform to the provisions of this section and Section 2606.

Exception: Skylights in which the light-transmitting plastic conforms to the required *roof assembly* classification~~roof covering class~~ in accordance with Section 1505.

Reason: This proposal corrects instances where results of ASTM E108 or UL 790 tests are associated with a *roof covering* or roof-covering assembly instead of a *roof assembly.* This continues work from the prior cycle in which clarifications were made to IBC Section 1505 on this matter (S1-21). ASTM E108 and UL 790 tests cannot be performed on a *roof covering,* but involve a *roof covering* (and sometimes other elements such as insulation or underlayment) installed onto a *roof deck.* These tests are always performed on a *roof assembly,* which by definition includes a *roof covering* and a *roof deck.*

Another proposal will be offered in Group B to address this issue in applicable Group B code sections. A complicating issue is that the current definition of *roof assembly* limits its applicability to IBC Chapter 15. However, there are already several instances where the defined term is evoked outside Chapter 15 (e.g., IBC 602.4.1.4, several times in IBC Chapter 7). As a result, a proposal to remove the Chapter 15 limitation is planned for Group B.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal makes only clarifying changes, so no impact on cost of construction is expected.

FS19-24

FS20-24

IBC: 706.1

Proponents: Ronald Clements, Chesterfield County, VA, Chesterfield County, VA (clementsro@chesterfield.gov)

2024 International Building Code

Revise as follows:

706.1 General. Each portion of a building separated by one or more *fire walls* that comply with the provisions of this section shall be considered a separate building. *Fire walls* shall be constructed in accordance with Sections 706.2 through 706.11. The extent and location of such *fire walls* shall provide a complete separation. Where a *fire wall* separates occupancies that are required to be separated by a *fire barrier* wall, the most restrictive requirements of each separation shall apply. *Equipment* and systems are permitted to serve multiple portions of a building separated by one or more *fire walls.*

Reason: G130-15 (provided below) removed the code text from 706.1 that states portions of buildings separated by fire walls shall be considered separate buildings. The result of G130-15 is that fire walls no longer create separate buildings per 706.1. Application of fire walls is now code provision specific. Section 503.1 was revised to address how fire walls impact application of allowable height and area provisions, but no such provision was added to other chapters or sections, such as chapter 9 as an example, to address how fire walls impact application of other code provisions applicable to buildings. The code change reason does not state intent to remove the ability to use fire walls to create separate buildings for the purpose of application of chapter 9 provisions, or separate control areas, or create separate buildings for a host of other code requirements that are building based. So, it appears an unintended consequence. The reason statement states the code change “will clarify application,” so it appears it was not the intent to make the significant technical change that resulted from G130.15.This code change returns the text from the 2015 edition "portions of buildings separated by fire walls shall be considered separate buildings", which makes it clear that fire walls create separate buildings for application all code provisions where separating a building into multiple buildings provides a code compliance solution. I am not the first to point out the unintended consequence of G130.15. F288-18 (provided below) was submitted to address the problem G130-15 caused regarding application of IBC section 414.2.3 and IFC section 5003.8.3.3 regarding separation of control areas. The F288-15 reason statement states: “This resulted in an unintended consequence in its application to control areas.” The Fire Code Committee agreed that G130-15 created “unintended consequences”, the report of the CAH states: F288-18 Committee Action: Approved as Submitted Committee Reason: This proposal fixed an unintended consequence that occurred clarifying the fire wall requirements for the 2018 code that appeared to not allow the use of fire walls for other than building height and area. This will allow the fire wall to create a separate building for the application of control areas. (Vote: 13-1).

Unfortunately, there are more unintended consequences than F288-18 could address. Just using the provisions of chapter 9 as another example, though IBC 901.7 provides that fire walls can be used to create fire areas for the application of chapter 9 fire protection thresholds, it does not establish use of fire walls to create separate buildings. This was not necessary based on the prior provision of 706.1, which already established use of fire walls to create buildings. As an example, under 2015 and prior, a 40,000 square foot group S-1 building could have been built with a fire wall dividing the building into two 20,000 sf buildings and then each of those buildings could be divided by fire barriers into 10,000 sf fire areas; or, you could build it with fire walls as four 10,000 foot buildings. In both cases no sprinkler is required. Based on G130.15, both scenarios now require the entire building, the 40,000 sf under roof, to be sprinklered. That is a huge change, and it was not mentioned or justified in the reason statement to G130-15. Note that multiple sections in chapter 9 both for sprinklers and fire alarm systems set thresholds and extent of installation based on buildings and building area, not just fire area.

I considered adding a statement to 901.7 similar to the F288-15 change, but that is putting another band-aid on the problem. The simplest and most efficient solution is to return the language of 706.1 back to the 2015 version that establishes portions of buildings separated by fire walls shall be considered separate buildings. To address the issue that G130-15 was attempting to correct, the sole issue according to the reasons statement and cost impact statement, I have proposed the last sentence to address the issue of permitting systems to serve building portions separated by fire walls.

G130-15 *The purpose of this proposal is to clarify the intent of these sections of the Code that the requirement for a fire wall in Sections 503.1 and 706.1 is predicated on the determination of the maximum allowable height and area calculations under Chapter 5. Using these sections of Code to control other building features or elements such as means of egress, building systems or building utilities is not* *intended or implied by these sections of the Code. However, by inclusion of the first sentence in Section 706.1 some code officials have incorrectly interpreted that language to mean that the portions of the various elements and systems on each side of a fire wall must be completely self-contained. There are no requirements in the I Codes that mandate that the placement of fire walls to create a separate building such that its building features need to be separated from other like building features in adjacent buildings. The scope of Section 706 is to provide the technical requirements for the construction of a fire wall. The added language in Section 503.1 along with the strikeout and added language in Section 706.1 <u>will clarify application</u> of these two sections.* Cost Impact: <u>Will not increase the cost of construction The cost of construction will be reduced by eliminating incorrect application of Section 706.1.</u>

F288-18 *IFC: 5003.8.3.3; IBC: [F]414.2.3 Proponent: Kevin Scott, representing KH Scott & Associates LLC (khscottassoc@gmail.com) 2018 International Fire Code Revise as follows: 5003.8.3.3 Number . The maximum number of control areas per floor within a building shall be in accordance with Table 5003.8.3.2. For the purposes of determining the number of control areas within a building, each portion of a building separated by one or more fire walls complying with Section 706 of the International Building Code shall be considered a separate building. 2018 International Building Code Revise as follows: [F] 414.2.3 Number . The maximum number of control areas within a building shall be in accordance with Table 414.2.2. For the purposes of determining the number of control areas within a building, each portion of a building separated by one or more fire walls complying with Section 706 shall be considered a separate building. Reason: The language regarding application of fire wall requirements changed in the 2018 IBC as a result of G130-15. Where previously, the code stated that fire walls created separate buildings, it now states that fire walls only create separate buildings when applying height, area and type of construction requirements. This resulted in an unintended consequence in its application to control areas. The number of control areas in a building has previously been counted separately on each side of a fire wall. Based on the 2018 IBC change, quantities in these control areas now must be aggregated which has the potential to place many facilities out of compliance. This proposal states the for control area purposed, fire walls will continue to be assumed to create separate building and will allow that application of the control area requirements to continue. The end result, is that a single-story building can have up to 4 control areas then be divided by a fire wall and up to another 4 control areas. This occurs often in strip malls. See the figure below. (Figure was not copied)*

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$1 and $2 per square foot just for sprinkler system savings. Multiple Web site sources that come up in a Google search state sprinkler installation cost for new commercial buildings range between $1 and $2 per square foot. Based on the example I provide in my reason statement for a 40,000 sf S1 this code change will save between $40,000 and $80,000 dollars for that one building. It is impossible to come up with every potential scenario of savings that this code change will provide. It is important to note that this code change is correcting an unintended consequence of G130-15 which had a cost impact that incorrectly stated: Cost Impact: Will not increase the cost of construction The cost of construction will be reduced by eliminating incorrect application of Section 706.1.

Estimated Immediate Cost Impact Justification (methodology and variables):

$1 and $2 per square foot just for sprinkler system savings. Multiple Web site sources that come up in a Google search state sprinkler installation cost for new commercial buildings range between $1 and $2 per square foot. Based on the example I provide in my reason statement for a 40,000 sf S1 this code change will save between $40,000 and $80,000 dollars for that one building. It is impossible to come up with every potential scenario of savings that this code change will provide. It is important to note that this code change is correcting an unintended consequence of G130-15 which had a cost impact that incorrectly stated: Cost Impact: Will not increase the cost of construction The cost of construction will be reduced by eliminating incorrect application of Section 706.1.

Estimated Life Cycle Cost Impact:

Multiple Web site sources that come up in a Google search state sprinkler annual inspection costs range form $1000 to $5000 depending on system size. Over a 50 year life cycle this is $50k to 250K reduction in cost if the code change is approved based solely on a sprinkler system example.

It is impossible to come up with every potential scenario of savings that this code change will provide. It is important to note that this code change is correcting an unintended consequence of G130-15 which had a cost impact that incorrectly stated: Cost Impact: Will not increase the cost of construction The cost of construction will be reduced by eliminating incorrect application of Section 706.1.

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It is impossible to come up with every potential scenario of savings that this code change will provide. It is important to note that this code change is correcting an unintended consequence of G130-15 which had a cost impact that incorrectly stated: Cost Impact: Will not increase the cost of construction The cost of construction will be reduced by eliminating incorrect application of Section 706.1.

FS20-24

FS21-24 Part I

IBC: 706.1, 707.1, 708.1, 709.1, 710.1, 711.1, TABLE 307.1.1, 402.4.2.2, 402.4.2.3, [BE] 402.8.7, 402.4.2.1, 404.6, 405.4.2, 405.4.3, 406.3.1, 406.6.4.1, 407.3, [BE] 407.4.4.2, [BE] 407.5, 408.7, 410.4.1, 410.4.2, 412.4.1, 412.3.4, 420.2, 420.3, 420.6, 422.2, 503.1, 508.4.4.1, 509.4.1, 510.7.1, 510.8, 706.1.1, 713.2, 713.5, 713.11, 713.13.3, 713.13.4, 901.7, 909.20.2, 909.20.6.1, 913.2.1, 1009.6.4, 1023.2, 1023.3.1, 1023.12.1, 1024.3, 1026.2, 1028.2, 1030.1.1.1, 3005.4, 3006.3, 3104.5.1; IFC: [BF] 909.20.2, [BF] 909.20.5.1, [BE] 1023.2, [BE] 1023.3.1, [BE] 1023.12.1, [BE] 1026.2, [BE] 1028.2, [BE] 1030.1.1.1

Proponents: Kevin Scott, KH Scott & Associates LLC, self (khscottassoc@gmail.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE FIRE SAFETY CODE COMMITTEE. PART II WILL BE HEARD BY THE FIRE CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Building Code

Revise as follows:

706.1 General.
Fire walls required by this code or the *International Fire Code* shall be constructed in accordance with Sections 706.2 through 706.11. The extent and location of such *fire walls* shall provide a complete separation. Where a *fire wall* separates occupancies that are required to be separated by a *fire barrier* wall, the most restrictive requirements of each separation shall apply.

707.1 General.
Fire barriers ~~installed as~~ required ~~elsewhere in~~by this code or the *International Fire Code* shall comply with this section.

708.1 General.
The following wall assemblies shall comply with this section:

1. Separation walls as required by Section 420.2 for Group I-1 and Group R occupancies.
2. Walls separating tenant spaces in *covered and open mall buildings* as required by Section 402.4.2.1.
3. *Corridor* walls as required by Section 1020.3.
4. Enclosed elevator lobby separation as required by Section 3006.3.
5. Egress balconies as required by Section 1021.2
6. Walls separating *ambulatory care facilities* from adjacent spaces, *corridors* or tenants as required by Section 422.2.
7. Walls separating *dwelling and sleeping units* in Groups R-1 and R-2 in accordance with Sections 907.2.8.1 and 907.2.9.1.
8. Vestibules in accordance with Section 1028.2.

Revise as follows:

709.1 General.
Vertical and horizontal *smoke barriers* required by this code or the *International Fire Code* shall comply with this section.

710.1 General.
Smoke partitions ~~installed as~~ required ~~elsewhere in the~~by this code or the *International Fire Code* shall comply with this section.

711.1 General.
Horizontal assemblies required by this code or the *International Fire Code* shall comply with Section 711.2. Nonfire-resistance-rated floor and *roof assemblies* shall comply with Section 711.3.

TABLE 307.1.1 HAZARDOUS MATERIALS EXEMPTIONS[a]

MATERIAL CLASSIFICATION	OCCUPANCY OR APPLICATION	EXEMPTION
Combustible fiber	Baled cotton	Densely packed baled cotton shall not be classified as combustible fiber, provided that the bales comply with the packing requirements of ISO 8115.
Corrosive	Building materials	The quantity of commonly used building materials that are classified as corrosive materials is not limited.
	Personal and household products	The quantity of personal and household products that are classified as corrosive materials is not limited in retail displays, provided that the products are in original packaging.
	Retail and wholesale sales occupancies	The quantity of medicines, foodstuffs or consumer products, and cosmetics containing not more than 50 percent by volume of water-miscible liquids, with the remainder of the solutions not being flammable, is not limited. To qualify for this allowance, such materials shall be packaged in individual containers not exceeding 1.3 gallons.
Explosives	Groups B, F, M and S	Storage of special industrial explosive devices is not limited.
	Groups M and R-3	Storage of black powder, smokeless propellant and small arms primers is not limited.
Flammable and combustible liquids and gases	Aerosols	Buildings and structures occupied for the storage of aerosol products, aerosol cooking spray products, or plastic aerosol 3 products shall be classified as Group S-1.
	Alcoholic beverages	The quantity of alcoholic beverages in liquor stores and distributors without bulk storage is not limited.
		The quantity of alcoholic beverages in distilling or brewing of beverages is not limited.
		The storage quantity of beer, distilled spirits and wines in barrels and casks is not limited.
		The quantity of alcoholic beverages in retail and wholesale sales occupancies is not limited. To qualify for this allowance, beverages shall be packaged in individual containers not exceeding 1.3 gallons.
	Cleaning establishments with combustible liquid solvents	The quantity of combustible liquid solvents used in closed systems and having a flash point at or above 140ºF is not limited. To qualify for this allowance, equipment shall be listed by an approved testing agency and the occupancy shall be separated from all other areas of the building by <u>not less than </u>1-hour fire barriers ~~constructed in accordance with Section 707~~ or ~~1-hour~~ horizontal assemblies ~~constructed in accordance with Section 711~~, or both
		The quantity of combustible liquid solvents having a flash point at or above 200ºF is not limited.
	Closed piping systems	The quantity of flammable and combustible liquids and gases utilized for the operation of machinery or equipment is not limited.
	Fuel	The quantity of liquid or gaseous fuel in fuel tanks on vehicles or motorized equipment is not limited.
		The quantity of gaseous fuels in piping systems and fixed appliances regulated by the International Fuel Gas Code is not limited.
		The quantity of liquid fuels in piping systems and fixed appliances regulated by the International Mechanical Code is not limited.
	Flammable finishing operations using flammable and combustible liquids	Buildings and structures occupied for the application of flammable finishes shall comply with Section 416.
	Fuel oil	The quantity of fuel oil storage complying with Section 605.4.2 of the *International Fire Code* is not limited. .
	Hand sanitizer	The quantity of alcohol-based hand rubs (ABHR) classified as Class I or II liquids in dispensers installed in accordance with Sections 5705.5 and 5705.5.1 of the *International Fire Code* is not limited. The location of the ABHR dispensers shall be provided in the construction documents.
	Retail and wholesale sales occupancies with flammable and combustible liquids	The quantity of medicines, foodstuffs or consumer products, and cosmetics containing not more than 50 percent by volume of water-miscible liquids, with the remainder of the solutions not being flammable, is not limited. To qualify for this allowance, such materials shall be packaged in individual containers not exceeding 1.3 gallons.
Highly toxic and toxic materials	Retail and wholesale sales occupancies	The quantity of medicines, foodstuffs or consumer products, and cosmetics containing not more than 50 percent by volume of water-miscible liquids, with the remainder of the solutions not being flammable, is not limited. To qualify for this allowance, such materials shall be packaged in individual containers not exceeding 1.3 gallons.
Any	Agricultural materials	The quantity of agricultural materials stored or utilized for agricultural purposes on the premises is not limited.
	Energy storage	The quantity of hazardous materials in stationary storage battery systems is not limited.
		The quantity of hazardous materials in stationary fuel cell power systems is not limited.
		The quantity of hazardous materials in capacitor energy storage systems is not limited.
	Refrigeration Systems	The quantity of refrigerants in refrigeration systems is not limited.

For SI: 1 gallon = 3.785L, °C = (°F - 32)/1.8.

a. Exempted materials and conditions listed in this table are required to comply with applicable provisions of the International Fire Code.

402.4.2.2 Anchor building separation.

An *anchor building* shall be separated from the *covered* or *open mall building* by *fire walls* ~~complying with Section 706~~.

Exceptions:

1. *Anchor buildings* of not more than three *stories above grade plane* that have an occupancy classification the same as that permitted for tenants of the *mall building* shall be separated by not less than 2-hour fire-resistance-rated *fire barriers* ~~complying with Section 707~~.
2. The *exterior walls* of *anchor buildings* separated from an *open mall building* by an *open mall* shall comply with Table 705.5.

402.4.2.3 Parking garages.

An attached garage for the storage of passenger vehicles having a capacity of not more than nine *persons* and *open parking garages* shall be considered as a separate *building* where it is separated from the *covered or open mall building* or *anchor building* by not less than 2-hour *fire barriers* ~~constructed in accordance with Section 707~~ or *horizontal assemblies* ~~constructed in accordance with Section 711~~, or both.

Parking garages, which are separated from *covered mall buildings*, *open mall buildings* or *anchor buildings*, shall comply with the provisions of Table 705.5.

Pedestrian walkways and tunnels that connect garages to mall *buildings* or *anchor buildings* shall be constructed in accordance with Section 3104.

[BE] 402.8.7 Service areas fronting on exit passageways.

Mechanical rooms, electrical rooms, building service areas and service elevators are permitted to open directly into *exit passageways*, provided that the *exit passageway* is separated from such rooms with not less than 1-hour *fire barriers* ~~constructed in accordance with Section 707~~ or *horizontal assemblies* ~~constructed in accordance with Section 711~~, or both. The *fire protection rating* of openings in the *fire barriers* shall be not less than 1 hour.

402.4.2.1 Tenant separations.

Each tenant space shall be separated from other tenant spaces by ~~a~~ *fire partitions* ~~*partition*~~ ~~complying with Section 708~~. A tenant separation wall is not required between any tenant space and the *mall*.

404.6 Enclosure of atriums.

Atrium spaces shall be separated from adjacent spaces by a 1-hour *fire barrier* ~~constructed in accordance with Section 707~~ or a *horizontal assembly* ~~constructed in accordance with Section 711~~, or both.

Exceptions:

1. A *fire barrier* is not required where a glass wall forming a *smoke partition* is provided. The glass wall shall comply with all of the following:
   1.1. *Automatic* sprinklers are provided along both sides of the separation wall and doors, or on the room side only if there is not a walkway on the *atrium* side. The sprinklers shall be located between 4 inches and 12 inches (102 mm and 305 mm) away from the glass and at intervals along the glass not greater than 6 feet (1829 mm). The sprinkler system shall be designed so that the entire surface of the glass is wet upon activation of the sprinkler system without obstruction.

   1.2. The glass wall shall be installed in a gasketed frame in a manner that the framing system deflects without breaking (loading) the glass before the sprinkler system operates.

   1.3. Where glass doors are provided in the glass wall, they shall be either *self-closing* or automatic-closing.
2. A *fire barrier* is not required where a glass-block wall assembly complying with Section 2110 and having a $^{3}/_{4}$-hour *fire protection rating* is provided.

3. A *fire barrier* is not required between the *atrium* and the adjoining spaces of up to three floors of the *atrium* provided that such spaces are accounted for in the design of the smoke control system.
4. In other than Group I-2 and Group I-1, Condition 2, a *fire barrier* is not required between the *atrium* and the adjoining spaces where the *atrium* is not required to be provided with a smoke control system.
5. In Group I-2 and Group I-1, Condition 2, a *fire barrier* is not required between the *atrium* and the adjoining spaces, other than care recipient sleeping or treatment rooms, for up to three *stories* of the *atrium* provided that such spaces are accounted for in the design of the smoke control system and do not provide access to care recipient sleeping or treatment rooms.
6. A *horizontal assembly* is not required between the *atrium* and openings for escalators complying with Section 712.1.3.
7. A *horizontal assembly* is not required between the *atrium* and openings for *exit access stairways* and *ramps* complying with Item 4 of Section 1019.3.

405.4.2 Smoke barrier penetration.
The compartments shall be separated from each other by ~~a~~ *smoke* *barriers* ~~*barrier*~~ ~~in accordance with Section 709~~. Penetrations between the two compartments shall be limited to plumbing and electrical piping and conduit that are firestopped in accordance with Section 714. Doorways shall be protected by *fire door assemblies* that comply with Section 716, automatic-closing by smoke detection in accordance with Section 716.2.6.6 and installed in accordance with NFPA 105 and Section 716.2.2.1. Where provided, each compartment shall have an air supply and an exhaust system independent of the other compartments.

405.4.3 Elevators.
Where elevators are provided, each compartment shall have *direct access* to an elevator. Where an elevator serves more than one compartment, an enclosed elevator lobby shall be provided and shall be separated from each compartment by a *smoke barrier* ~~in accordance with Section 709~~. Doorways in the *smoke barrier* shall be protected by *fire door assemblies* that comply with Section 716, shall comply with the smoke and draft control assembly requirements of Section 716.2.2.1 with the UL 1784 test conducted without an artificial bottom seal, and shall be automatic-closing by smoke detection in accordance with Section 716.2.6.6.

406.3.1 Classification.
Private garages and carports shall be classified as Group U occupancies. Each *private garage* shall be not greater than 1,000 square feet (93 m^2) in area. Multiple *private garages* are permitted in a *building* where each *private garage* is separated from the other *private garages* by not less than 1-hour *fire barriers* ~~in accordance with Section 707,~~ or ~~1-hour~~ *horizontal assemblies* ~~in accordance with Section 711~~, or both.

406.6.4.1 Separation.
Mechanical-access enclosed parking garages shall be separated from other occupancies and accessory uses by not less than 2-hour *fire barriers* ~~constructed in accordance with Section 707~~ or ~~by not less than 2-hour~~ *horizontal assemblies* ~~constructed in accordance with Section 711~~, or both.

407.3 Corridor wall construction.
Corridor walls shall be constructed as *smoke partitions* ~~in accordance with Section 710~~.

[BE] 407.4.4.2 Separation.
Care suites shall be separated from other portions of the *building*, including other *care suites*, by ~~a~~ *smoke* *partitions* ~~*partition*~~ ~~complying with Section 710~~.

[BE] 407.5 Smoke barriers.
Smoke barriers shall be provided to subdivide every *story* used by *persons* receiving care, treatment or sleeping into not fewer than two *smoke compartments. Smoke barriers* shall be provided to subdivide other *stories* with an *occupant load* of 50 or more *persons*, into not fewer than two *smoke compartments*. ~~The *smoke barrier* shall be in accordance with Section 709.~~

408.7 Security glazing.
In occupancies in Group I-3, windows and doors in 1-hour *fire barriers* ~~constructed in accordance with Section 707~~, *fire partitions*

~~constructed in accordance with Section 708~~ and *smoke barriers* ~~constructed in accordance with Section 709~~ shall be permitted to have security glazing installed provided that the following conditions are met.

1. Individual panels of glazing shall not exceed 1,296 square inches (0.84 m^2).
2. The glazing shall be protected on both sides by an *automatic sprinkler system*. The sprinkler system shall be designed to, when actuated, wet completely the entire surface of any glazing affected by fire.
3. The glazing shall be in a gasketed frame and installed in such a manner that the framing system will deflect without breaking (loading) the glass before the sprinkler system operates.
4. Obstructions, such as curtain rods, drapery traverse rods, curtains, drapes or similar materials shall not be installed between the automatic sprinklers and the glazing.

410.4.1 Separation from stage.

The *stage* shall be separated from dressing rooms, scene docks, property rooms, workshops, storerooms and compartments contiguous to the *stage* and other parts of the *building* by *fire barriers* ~~constructed in accordance with Section 707~~ or *horizontal assemblies* ~~constructed in accordance with Section 711~~, or both. The *fire-resistance rating* shall be not less than 2 hours for stage heights greater than 50 feet (15 240 mm) and not less than 1 hour for *stage* heights of 50 feet (15 240 mm) or less.

410.4.2 Separation from each other.

Dressing rooms, scene docks, property rooms, workshops, storerooms and compartments contiguous to the *stage* shall be separated from each other by not less than 1-hour *fire barriers* ~~constructed in accordance with Section 707~~ or *horizontal assemblies* ~~constructed in accordance with Section 711~~, or both.

412.4.1 Fire separation.

A hangar shall not be attached to a *dwelling* unless separated by ~~a~~ not less than 1-hour *fire* *barriers* ~~*barrier* having a *fire-resistance rating* of not less than 1 hour~~. Such separation shall be continuous from the foundation to the underside of the roof and unpierced except for doors leading to the *dwelling unit*. Doors into the *dwelling unit* shall be equipped with *self-closing* devices and conform to the requirements of Section 716 with a noncombustible raised sill not less than 4 inches (102 mm) in height. Openings from a hangar directly into a room used for sleeping purposes shall not be permitted.

412.3.4 Heating equipment.

Heating equipment shall be placed in another room separated by not less than 2-hour *fire barriers* ~~constructed in accordance with Section 707~~ or *horizontal assemblies* ~~constructed in accordance with Section 711~~, or both. Entrance shall be from the outside or by means of a vestibule providing a two-doorway separation.

Exceptions:

1. Unit heaters and vented infrared radiant heating equipment suspended not less than 10 feet (3048 mm) above the upper surface of wings or engine enclosures of the highest aircraft that are permitted to be housed in the hangar need not be located in a separate room provided that they are mounted not less than 8 feet (2438 mm) above the floor in shops, offices and other sections of the hangar communicating with storage or service areas.
2. Entrance to the separated room shall be permitted by a single interior door provided that the sources of ignition in the appliances are not less than 18 inches (457 mm) above the floor.

420.2 Separation walls.

Walls separating *dwelling units* in the same building, walls separating *sleeping units* in the same *building* , walls separating *dwelling units* from *sleeping units* in the same *building* and walls separating *dwelling* or *sleeping units* from other occupancies contiguous to them in the same building shall be constructed as *fire partitions* ~~in accordance with Section 708~~.

420.3 Horizontal separation.

Floor assemblies separating *dwelling units* in the same *buildings*, floor assemblies separating *sleeping units* in the same *building* , floor assemblies separating *dwelling units* from *sleeping units* in the same *building* and floor assemblies separating dwelling or *sleeping units* from other occupancies contiguous to them in the same *building* shall be constructed as *horizontal assemblies* ~~in accordance with~~

~~Section 711~~.

420.6 Smoke barriers in Group I-1, Condition 2.

Smoke barriers shall be provided in Group I-1, Condition 2 to subdivide every *story* used by *persons* receiving care, treatment or sleeping and to provide other *stories* with an *occupant load* of 50 or more *persons*, into not fewer than two *smoke compartments*. Such *stories* shall be divided into *smoke compartments* with an area of not more than 22,500 square feet (2092 m^2) and the distance of travel from any point in a *smoke compartment* to a *smoke barrier* door shall not exceed 200 feet (60 960 mm). ~~The *smoke barrier* shall be in accordance with Section 709.~~

422.2 Separation.

Ambulatory care facilities where the potential for four or more care recipients are to be *incapable of self-preservation* at any time shall be separated from adjacent spaces, *corridors* or tenants with a *fire partition* ~~installed in accordance with Section 708~~.

503.1 General.

Unless otherwise specifically modified in Chapter 4 and this chapter, *building height*, number of *stories* and *building area* shall not exceed the limits specified in Sections 504 and 506 based on the type of construction as determined by Section 602 and the occupancies as determined by Section 302 except as modified hereafter. *Building height*, number of *stories* and *building area* provisions shall be applied independently. For the purposes of determining area limitations, height limitations and type of construction, each portion of a building separated by one or more *fire walls* ~~complying with Section 706~~ shall be considered to be a separate building.

508.4.4.1 Construction.

Required separations shall be *fire barriers* ~~constructed in accordance with Section 707~~ or *horizontal assemblies* ~~constructed in accordance with Section 711~~, or both, so as to completely separate adjacent occupancies. *Mass timber* elements serving as *fire barriers* or *horizontal assemblies* to separate occupancies in Type IV-B or IV-C construction shall be separated from the interior of the *building* with an *approved* thermal barrier consisting of *gypsum board* that is not less than $^1/_2$ inch (12.7 mm) in thickness or a material that is tested in accordance with and meets the acceptance criteria of both the Temperature Transmission Fire Test and the Integrity Fire Test of NFPA 275.

Exception: A thermal barrier shall not be required on the top of horizontal assemblies serving as occupancy separations.

509.4.1 Separation.

Where Table 509.1 specifies a fire-resistance-rated separation, the incidental uses shall be separated from the remainder of the *building* by ~~a~~ *fire* <u>*barriers*</u> ~~*barrier*~~ ~~constructed in accordance with Section 707~~ or ~~a~~ *horizontal* <u>*assemblies*</u> ~~*assembly*~~ ~~constructed in accordance with Section 711~~, or both. Construction supporting 1-hour *fire barriers* or *horizontal assemblies* used for incidental use separations in *buildings* of Type IIB, IIIB and VB construction is not required to be fire-resistance rated unless required by other sections of this code.

510.7.1 Fire separation.

Fire barriers ~~constructed in accordance with Section 707~~ or *horizontal assemblies* ~~constructed in accordance with Section 711~~ between the parking occupancy and the upper occupancy shall correspond to the required *fire-resistance rating* prescribed in Table 508.4 for the uses involved. The type of construction shall apply to each occupancy individually, except that structural members, including main bracing within the open parking *structure*, which is necessary to support the upper occupancy, shall be protected with the more restrictive fire-resistance-rated assemblies of the groups involved as shown in Table 601. *Means of egress* for the upper occupancy shall conform to Chapter 10 and shall be separated from the parking occupancy by <u>not less than 2-hour</u> *fire barriers* ~~having not less than a 2-hour *fire-resistance rating* as required by Section 707 with *self-closing* doors complying with Section 716~~ or *horizontal assemblies* ~~having not less than a 2-hour *fire-resistance rating* as required by Section 711~~, <u>or both</u> with *self-closing* doors complying with Section 716. *Means of egress* from the *open parking garage* shall comply with Section 406.5.

510.8 Group B or M buildings with Group S-2 open parking garage above.

Group B or M occupancies located below a Group S-2 *open parking garage* of a lesser type of construction shall be considered as a separate and distinct *building* from the Group S-2 *open parking garage* for the purpose of determining the type of construction where the following conditions are met:

1. The *buildings* are separated with a *horizontal assembly* having a *fire-resistance rating* of not less than 2 hours.

2. The occupancies in the *building* below the *horizontal assembly* are limited to Groups B and M.
3. The occupancy above the *horizontal assembly* is limited to a Group S-2 *open parking garage*.
4. The *building* below the *horizontal assembly* is of Type IA construction.

   Exception: The *building* below the *horizontal assembly* shall be permitted to be of Type IB or II construction, but not less than the type of construction required for the Group S-2 *open parking garage* above, where the *building* below is not greater than *one story* in height above *grade plane.*
5. The height and area of the *building* below the *horizontal assembly* does not exceed the limits set forth in Section 503.
6. The height and area of the Group S-2 *open parking garage* does not exceed the limits set forth in Section 406.5. The height, in both feet and *stories*, of the Group S-2 *open parking garage* shall be measured from *grade plane* and shall include the *building* below the *horizontal assembly*.
7. *Exits* serving the Group S-2 *open parking garage* ~~shall~~ discharge at grade with direct and unobstructed access to a street or *public way* and are separated from the *building* below the *horizontal assembly* by not less than 2-hour *fire barriers* ~~constructed in accordance with Section 707~~ or ~~2-hour~~ *horizontal assemblies* ~~constructed in accordance with Section 711~~, or both.

706.1.1 Party walls.

Any wall located on a *lot line* between adjacent *buildings*, which is used or adapted for *joint* service between the two *buildings*, shall be constructed as a *fire wall* ~~in accordance with Section 706~~. Party walls shall be constructed without openings and shall create separate *buildings*.

Exceptions:

1. Openings in a party wall separating an *anchor building* and a *mall* shall be in accordance with Section 402.4.2.2.1.
2. Party walls and *fire walls* are not required on *lot lines* dividing a *building* for ownership purposes where the aggregate height and area of the portions of the *building* located on both sides of the *lot line* do not exceed the maximum height and area requirements of this code. For the *building official's* review and approval, the official shall be provided with copies of dedicated access easements and contractual agreements that permit the *owners* of portions of the building located on either side of the *lot line* access to the other side for purposes of maintaining fire and *life safety systems* necessary for the operation of the building.

713.2 Construction.

Shaft enclosures shall be constructed as *fire barriers* ~~in accordance with Section 707~~ or *horizontal assemblies* ~~in accordance with Section 711~~, or both.

713.5 Continuity.

Shaft enclosures shall be constructed as *fire barriers* ~~in accordance with Section 707~~ or *horizontal assemblies* ~~constructed in accordance with Section 711~~, or both, and shall have continuity in accordance with Section 707.5 for *fire barriers* or Section 711.2.2 for *horizontal assemblies*, as applicable.

713.11 Enclosure at the bottom.

Shafts that do not extend to the bottom of the *building* or *structure* shall comply with one of the following:

1. Be enclosed at the lowest level with construction of the same *fire-resistance rating* as the *lowest floor* through which the *shaft* passes, but not less than the rating required for the *shaft enclosure.*
2. Terminate in a room having a use related to the purpose of the *shaft*. The room shall be separated from the remainder of the *building* by *fire barriers* ~~constructed in accordance with Section 707~~ or *horizontal assemblies* ~~constructed in accordance with Section 711~~, or both. The *fire-resistance rating* and opening protectives shall be not less than the protection required for the *shaft enclosure*.
3. Be protected by *approved fire dampers* installed in accordance with their listing at the *lowest floor* level within the *shaft enclosure*.

Exceptions:

1. The fire-resistance-rated room separation is not required, provided that the only openings in or penetrations of the *shaft enclosure* to the interior of the *building* occur at the bottom. The bottom of the *shaft* shall be closed off around the penetrating items with materials permitted by Section 718.3.1 for *draftstops* , or the room shall be provided with an *approved automatic sprinkler system*.
2. A *shaft enclosure* containing a waste or linen chute shall not be used for any other purpose and shall discharge in a room protected in accordance with Section 713.13.4.
3. The fire-resistance-rated room separation and the protection at the bottom of the *shaft* are not required provided that there are no combustibles in the *shaft* and there are no openings or other penetrations through the *shaft enclosure* to the interior of the *building*.

713.13.3 Chute access rooms.

Access openings for waste, recycling or linen chutes shall be located in rooms or compartments enclosed by not less than 1-hour *fire barriers* ~~constructed in accordance with Section 707~~ or *horizontal assemblies* ~~constructed in accordance with Section 711~~, or both. Openings into the access rooms shall be protected by opening protectives having a *fire protection rating* of not less than $^3/_4$ hour. Doors shall be self- or automatic-closing upon the detection of smoke in accordance with Section 716.2.6.6. The room or compartment shall be configured to allow the access door to the room or compartment to close and latch with the access panel to the chute in any position.

713.13.4 Chute discharge room.

Waste, recycling or linen chutes shall discharge into an enclosed room separated by *fire barriers* with a *fire-resistance rating* not less than the required fire rating of the *shaft enclosure* ~~and constructed in accordance with Section 707~~ or *horizontal assemblies* ~~constructed in accordance with Section 711~~, or both. Openings into the discharge room from the remainder of the *building* shall be protected by opening protectives having a *fire protection rating* based on the fire rating of the *shaft enclosure* in accordance with Tables 716.1(2) and 716.1(3) . Doors shall be self- or automatic-closing upon the detection of smoke in accordance with Section 716.2.6.6. Waste chutes shall not terminate in an incinerator room. Waste and linen rooms that are not provided with chutes need only comply with Table 509.1.

901.7 Fire areas.

Where *buildings*, or portions thereof, are divided into *fire areas* so as not to exceed the limits established for requiring a *fire protection system* in accordance with this chapter, such *fire areas* shall be separated by *fire walls* ~~constructed in accordance with Section 706~~, *fire barriers* ~~constructed in accordance with Section 707~~, or *horizontal assemblies* ~~constructed in accordance with Section 711~~, or a combination thereof having a *fire-resistance rating* of not less than that determined in accordance with Section 707.3.10.

909.20.2 Construction.

The *smokeproof enclosure* shall be separated from the remainder of the *building* by not less than 2-hour *fire barriers* ~~constructed in accordance with Section 707~~ or *horizontal assemblies* ~~constructed in accordance with Section 711~~, or both. Openings are not permitted other than the required *means of egress* doors. The vestibule shall be separated from the *stairway* or *ramp* by not less than 2-hour *fire barriers* ~~constructed in accordance with Section 707~~ or *horizontal assemblies* ~~constructed in accordance with Section 711~~, or both. The open exterior balcony shall be constructed in accordance with the *fire-resistance rating* requirements for floor assemblies.

909.20.6.1 Ventilation systems.

Smokeproof enclosure ventilation systems shall be independent of other *building* ventilation systems. The equipment, control wiring, power wiring and ductwork shall comply with one of the following:

1. Equipment, control wiring, power wiring and ductwork shall be located exterior to the *building* and directly connected to the *smokeproof enclosure* or connected to the *smokeproof enclosure* by ductwork enclosed by not less than 2-hour *fire barriers* ~~constructed in accordance with Section 707~~ or *horizontal assemblies* ~~constructed in accordance with Section 711~~, or both.
2. Equipment, control wiring, power wiring and ductwork shall be located within the *smokeproof enclosure* with intake or exhaust directly from and to the outside or through ductwork enclosed by not less than 2-hour *fire barriers* ~~constructed in accordance with Section 707~~ or *horizontal assemblies* ~~constructed in accordance with Section 711~~, or both.

3. Equipment, control wiring, power wiring and ductwork shall be located within the *building* if separated from the remainder of the *building*, including other mechanical equipment, by not less than 2-hour *fire barriers* ~~constructed in accordance with Section 707~~ or *horizontal assemblies* ~~constructed in accordance with Section 711~~, or both.

Exception:

1. Control wiring and power wiring located outside of a 2-hour *fire barrier* construction shall be protected using any one of the following methods:
   1.1. Cables used for survivability of required critical circuits shall be *listed* in accordance with UL 2196 and shall have a *fire-resistance rating* of not less than 2 hours.

   1.2. Where encased with not less than 2 inches (51 mm) of concrete.

   1.3. *Electrical circuit protective systems* shall have a *fire-resistance rating* of not less than 2 hours. *Electrical circuit protective systems* shall be installed in accordance with their listing requirements.

913.2.1 Protection of fire pump rooms.

Fire pumps shall be located in rooms that are separated from all other areas of the *building* by 2-hour *fire barriers* ~~constructed in accordance with Section 707~~ or ~~2-hour~~ *horizontal assemblies* ~~constructed in accordance with Section 711~~, or both.

Exceptions:

1. In other than *high-rise buildings*, separation by not less than 1-hour *fire barriers* ~~constructed in accordance with Section 707~~ or ~~1-hour~~ *horizontal assemblies* ~~constructed in accordance with Section 711~~, or both, shall be permitted in *buildings* equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2.

2. Separation is not required for fire pumps physically separated in accordance with NFPA 20.

1009.6.4 Separation.

Each *area of refuge* shall be separated from the remainder of the *story* by a *smoke barrier* ~~complying with Section 709~~ or a *horizontal exit* complying with Section 1026. Each *area of refuge* shall be designed to minimize the intrusion of smoke.

Exceptions:

1. *Areas of refuge* located within an enclosure for *interior exit stairways* complying with Section 1023.

2. *Areas of refuge* in outdoor *facilities* where *exit access* is essentially open to the outside.

1023.2 Construction.

Enclosures for interior exit *stairways* and *ramps* shall be constructed as *fire barriers* ~~in accordance with Section 707~~ or *horizontal assemblies* ~~constructed in accordance with Section 711~~, or both. *Interior exit stairway* and *ramp* enclosures shall have a *fire-resistance rating* of not less than 2 hours where connecting four stories or more and not less than 1 hour where connecting less than four stories. The number of *stories* connected by the interior exit *stairways* or *ramps* shall include any *basements*, but not any *mezzanines*. Enclosures for interior *exit stairways* and *ramps* shall have a *fire-resistance rating* not less than the floor assembly penetrated, but need not exceed 2 hours.

Exceptions:

1. *Interior exit stairways* and *ramps* in Group I-3 occupancies in accordance with the provisions of Section 408.3.8.

2. *Interior exit stairways* within an *atrium* enclosed in accordance with Section 404.6.

3. *Interior exit stairways* in accordance with Section 510.2.

1023.3.1 Extension.

Where *interior exit stairways* and *ramps* are extended to an *exit discharge* or a *public way* by an *exit passageway*, the *interior exit stairway* and *ramp* shall be separated from the *exit passageway* by ~~a~~ *fire* barriers ~~*barrier*~~ ~~constructed in accordance with Section 707~~ or ~~a~~ *horizontal* assemblies ~~*assembly*~~ ~~constructed in accordance with Section 711~~, or both. The *fire-resistance rating* shall be not less than that required for the *interior exit stairway* and *ramp*. A *fire door assembly* complying with Section 716 shall be installed in the *fire barrier* to provide a *means of egress* from the *interior exit stairway* and *ramp* to the *exit passageway*. Openings in the *fire barrier* other than the *fire* *door assembly* are prohibited. Penetrations of the *fire barrier* are prohibited.

Exceptions:

1. Penetrations of the *fire barrier* in accordance with Section 1023.5 shall be permitted.
2. Separation between an *interior exit stairway* or *ramp* and the *exit passageway* extension shall not be required where there are no openings into the *exit passageway* extension.
3. Separation between an *interior exit stairway* or *ramp* and the *exit passageway* extension shall not be required where the *interior exit stairway* and the *exit passageway* extension are pressurized in accordance with Section 909.20.4.

1023.12.1 Termination and extension.

A *smokeproof enclosure* shall terminate at an *exit discharge* or a *public way*. The *smokeproof enclosure* shall be permitted to be extended by an *exit passageway* in accordance with Section 1023.3. The *exit passageway* shall be without openings other than the *fire door assembly* required by Section 1023.3.1 and those necessary for egress from the *exit passageway*. The *exit passageway* shall be separated from the remainder of the *building* by not less than 2-hour *fire barriers* ~~constructed in accordance with Section 707~~ or *horizontal assemblies* ~~constructed in accordance with Section 711~~, or both.

Exceptions:

1. Openings in the *exit passageway* serving a *smokeproof enclosure* are permitted where the *exit passageway* is protected and pressurized in the same manner as the *smokeproof enclosure*, and openings are protected as required for access from other floors.
2. The *fire barrier* separating the *smokeproof enclosure* from the *exit passageway* is not required, provided that the *exit passageway* is protected and pressurized in the same manner as the *smokeproof enclosure*.
3. A *smokeproof enclosure* shall be permitted to egress through areas on the *level of exit discharge* or vestibules as permitted by Section 1028.

1024.3 Construction.

Exit passageway enclosures shall have walls, floors and ceilings of not less than a 1-hour *fire-resistance rating*, and not less than that required for any connecting *interior exit stairway* or *ramp*. Exit passageways shall be constructed as *fire barriers* ~~in accordance with Section 707~~ or *horizontal assemblies* ~~constructed in accordance with Section 711~~, or both.

1026.2 Separation. The separation between buildings or refuge areas connected by a *horizontal exit* shall be provided by ~~a *fire wall*, complying with Section 706; or by a *fire barrier* complying with Section 707 or a *horizontal assembly* complying with Section 711, or both~~ not less than 2-hour fire walls, fire barriers or horizontal assemblies, or a combination thereof. ~~The minimum *fire-resistance rating* of the separation shall be 2 hours.~~ Opening protectives in horizontal *exits* shall also comply with Section 716. Duct and air transfer openings in a *fire wall* or *fire barrier* that serves as a *horizontal exit* shall also comply with Section 717. The *horizontal exit* separation shall extend vertically through all levels of the building unless floor assemblies have a *fire-resistance rating* of not less than 2 hours and do not have unprotected openings.

Exception: A *fire-resistance rating* is not required at horizontal *exits* between a *building* area and an above-grade *pedestrian walkway* constructed in accordance with Section 3104, provided that the distance between connected buildings is more than 20 feet (6096 mm).

Horizontal exits constructed as *fire barriers* shall be continuous from *exterior wall* to *exterior wall* so as to divide completely the floor served by the *horizontal exit*.

1028.2 Exit discharge.

Exits shall discharge directly to the exterior of the *building*. The *exit discharge* shall be at grade or shall provide a direct path of egress travel to grade. The *exit discharge* shall not reenter a *building*. The combined use of Exceptions 1 and 2 shall not exceed 50 percent of the number and minimum width or required capacity of the required *exits*.

Exceptions:

1. Not more than 50 percent of the number and minimum width or required capacity of *interior exit stairways* and *ramps* is permitted to egress through areas, including *atriums*, on the level of discharge provided that all of the following conditions are met:
   1.1. Discharge of *interior exit stairways* and *ramps* shall be provided with a free and unobstructed path of travel to an exterior *exit* door and such *exit* is readily visible and identifiable from the point of termination of the enclosure.
   1.2. The entire area of the *level of exit discharge* is separated from areas below by construction conforming to the *fire-resistance rating* for the enclosure.
   1.3. The egress path from the *interior exit stairway* and *ramp* on the *level of exit discharge* is protected throughout by an *approved automatic sprinkler system*. Portions of the *level of exit discharge* with access to the egress path shall be either equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, or separated from the egress path in accordance with the requirements for the enclosure of *interior exit stairways* or *ramps*.
   1.4. Where a required *interior exit stairway* or *ramp* and an *exit access stairway* or *ramp* serve the same floor level and terminate at the same *level of exit discharge*, the termination of the *exit access stairway* or *ramp* and the *exit discharge* door of the *interior exit stairway* or *ramp* shall be separated by a distance of not less than 30 feet (9144 mm) or not less than one-fourth the length of the maximum overall diagonal dimension of the *building*, whichever is less. The distance shall be measured in a straight line between the *exit discharge* door from the *interior exit stairway* or *ramp* and the last tread of the *exit access stairway* or termination of slope of the *exit access ramp*.
2. Not more than 50 percent of the number and minimum width or required capacity of the *interior exit stairways* and *ramps* is permitted to egress through a vestibule provided that all of the following conditions are met:
   2.1. The entire area of the vestibule is separated from areas below by construction conforming to the *fire-resistance rating* of the *interior exit stairway* or *ramp enclosure*.
   2.2. The depth from the exterior of the *building* is not greater than 10 feet (3048 mm) and the length is not greater than 30 feet (9144 mm).
   2.3. The area is separated from the remainder of the *level of exit discharge* by a *fire partition* ~~constructed in accordance with Section 708~~.

      Exception: The maximum transmitted temperature rise is not required.
   2.4. The area is used only for *means of egress* and *exits* directly to the outside.
3. *Horizontal exits* complying with Section 1026 shall not be required to discharge directly to the exterior of the *building*.

1030.1.1.1 Spaces under grandstands and bleachers.
Spaces under *grandstands* or *bleachers* shall be separated by <u>not less than 1-hour</u> *fire barriers* ~~complying with Section 707 and~~ <u>or</u> *horizontal assemblies* ~~complying with Section 711 with not less than 1-hour *fire-resistance-rated* construction~~<u>, or both</u>.

Exceptions:
1. Ticket booths less than 100 square feet (9.29 m^2) in area.
2. Toilet rooms.
3. Other accessory use areas 1,000 square feet (92.9 m^2) or less in area and equipped with an *automatic sprinkler system* in accordance with Section 903.3.1.1.

3005.4 Machine rooms, control rooms, machinery spaces, and control spaces.
The following rooms and spaces shall be enclosed with *fire barriers* ~~constructed in accordance with Section 707~~ or *horizontal assemblies* ~~constructed in accordance with Section 711~~, or both:
1. Machine rooms.
2. Control rooms.
3. Control spaces.

4. Machinery spaces outside of the hoistway enclosure.

The *fire-resistance rating* shall be not less than the required rating of the hoistway enclosure served by the machinery. Openings in the *fire barriers* shall be protected with assemblies having a *fire protection rating* not less than that required for the hoistway enclosure doors.

Exceptions:

1. For other than fire service access elevators and occupant evacuation elevators, where machine rooms, machinery spaces, control rooms and control spaces do not abut and do not have openings to the hoistway enclosure they serve, the *fire barriers* ~~constructed in accordance with Section 707~~ or *horizontal assemblies* ~~constructed in accordance with Section 711~~, or both, shall be permitted to be reduced to a 1-hour *fire-resistance rating*.
2. For other than fire service access elevators and occupant evacuation elevators, in *buildings* four *stories* or less above *grade plane* where machine room, machinery spaces, control rooms and control spaces do not abut and do not have openings to the hoistway enclosure they serve, the machine room, machinery spaces, control rooms and control spaces are not required to be fire-resistance rated.

3006.3 Elevator hoistway door protection.

Where Section 3006.2 requires protection of the elevator hoistway doors, the protection shall be provided by one of the following:

1. An enclosed elevator lobby shall be provided at each floor to separate the elevator hoistway doors from each floor with *fire partitions* ~~in accordance with Section 708~~. In addition, doors protecting openings in the fire partitions shall comply with Section 716.2.2.1. Penetrations of the fire partitions by ducts and air transfer openings shall be protected as required for *corridors* in accordance with Section 717.5.4.1.
2. An enclosed elevator lobby shall be provided at each floor to separate the elevator hoistway doors from each floor by *smoke partitions* ~~in accordance with Section 710~~. In addition, doors protecting openings in the *smoke partitions* shall comply with Sections 710.5.2.2, 710.5.2.3 and 716.2.6.1. Penetrations of the *smoke partitions* by ducts and air transfer openings shall be protected as required for *corridors* in accordance with Section 717.5.4.1.
3. Additional doors or other devices shall be provided at each elevator hoistway door in accordance with Section 3002.6. Such doors or other devices shall comply with the smoke and draft control door assembly requirements in Section 716.2.2.1.1 when tested in accordance with UL 1784 without an artificial bottom seal.
4. The elevator hoistway shall be pressurized in accordance with Section 909.21.
5. A *smoke-protective curtain assembly for hoistways* shall be provided at each elevator hoistway door opening in accordance with Section 3002.6. Such curtain assemblies shall comply with the smoke and draft control requirements in Section 716.2.2.1.1 when tested in accordance with UL 1784 without an artificial bottom seal. Such curtain assemblies shall be equipped with a control unit *listed* to UL 864. Such curtain assemblies shall comply with Section 2.11.6.3 of ASME A17.1/CSA B44. Installation and maintenance shall be in accordance with NFPA 105.

3104.5.1 Fire barriers.

Pedestrian walkways shall be separated from the interior of the *building* by not less than 2-hour *fire barriers* constructed in accordance with ~~Section~~ Sections 707 and ~~Sections~~ 3104.5.1.1 through 3104.5.1.3.

2024 International Fire Code

Revise as follows:

[BF] 909.20.2 Construction.

The *smokeproof enclosure* shall be separated from the remainder of the building by not less than 2-hour *fire barriers* ~~constructed in accordance with Section 707 of the *International Building Code*~~ or *horizontal assemblies* ~~constructed in accordance with Section 711 of the *International Building Code*~~, or both. Openings are not permitted other than the required *means of egress* doors. The vestibule shall be separated from the *stairway* or *ramp* by not less than 2-hour *fire barriers* ~~constructed in accordance with Section 707 of the *International Building Code*~~ or *horizontal assemblies* ~~constructed in accordance with Section 711 of the *International Building Code*,~~ or both. The open exterior balcony shall be constructed in accordance with the *fire-resistance-rating* requirements for floor assemblies.

[BF] 909.20.5.1 Ventilation systems.

Smokeproof enclosure ventilation systems shall be independent of other building ventilation systems. The equipment, control wiring, power wiring and ductwork shall comply with one of the following:

1. Equipment, control wiring, power wiring and ductwork shall be located exterior to the building and directly connected to the *smokeproof enclosure* or connected to the *smokeproof enclosure* by ductwork enclosed by not less than 2-hour *fire barriers* ~~constructed in accordance with Section 707 of the *International Building Code*~~ or *horizontal assemblies* ~~constructed in accordance with Section 711 of the *International Building Code*,~~ or both.
2. Equipment, control wiring, power wiring and ductwork shall be located within the *smokeproof enclosure* with intake or exhaust directly from and to the outside or through ductwork enclosed by not less than 2-hour *fire barriers* ~~constructed in accordance with Section 707 of the *International Building Code*~~ or *horizontal assemblies* ~~constructed in accordance with Section 711 of the *International Building Code*,~~ or both.
3. Equipment, control wiring, power wiring and ductwork shall be located within the building if separated from the remainder of the building, including other mechanical equipment, by not less than 2-hour *fire barriers* ~~constructed in accordance with Section 707 of the *International Building Code*~~ or *horizontal assemblies* ~~constructed in accordance with Section 711 of the *International Building Code*,~~ or both.

Exception: Control wiring and power wiring located outside of a 2-hour *fire barrier* construction shall be protected using any one of the following methods:

1. Cables used for survivability of required *critical circuits* shall be *listed* in accordance with UL 2196 and shall have a *fire-resistance rating* of not less than 2 hours.
2. Where encased with not less than 2 inches (51 mm) of concrete.
3. Electrical circuit protective systems shall have a *fire-resistance rating* of not less than 2 hours. Electrical circuit protective systems shall be installed in accordance with their listing requirements.

[BE] 1023.2 Construction.

Enclosures for *interior exit stairways* and *ramps* shall be constructed as *fire barriers* ~~in accordance with Section 707 of the International Building Code~~ or *horizontal assemblies* ~~constructed in accordance with Section 711 of the International Building Code,~~ or both. *Interior exit stairway* and *ramp* enclosures shall have a *fire-resistance rating* of not less than 2 hours where connecting four stories or more and not less than 1 hour where connecting less than four stories. The number of stories connected by the *interior exit stairways* or *ramps* shall include any *basements*, but not any *mezzanines*. Enclosure for *interior exit stairways* and *ramps* shall have a *fire-resistance rating* not less than the floor assembly penetrated, but need not exceed 2 hours.

Exceptions:

1. *Interior exit stairways* and *ramps* in Group I-3 occupancies in accordance with the provisions of Section 408.3.8 of the International Building Code.
2. *Interior exit stairways* within an atrium enclosed in accordance with Section 404.6 of the International Building Code.
3. *Interior exit stairways* in accordance with Section 510.2 of the *International Building Code*.

[BE] 1023.3.1 Extension. Where *interior exit stairways* and *ramps* are extended to an *exit discharge* or a *public way* by an *exit passageway*, the *interior exit stairway* and *ramp* shall be separated from the *exit passageway* by ~~a~~ *fire barriers* ~~constructed in accordance with Section 707 of the International Building Code~~ or ~~a~~ *horizontal* assemblies ~~*assembly* constructed in accordance with Section 711 of the International Building Code,~~ or both. The *fire-resistance rating* shall be not less than that required for the *interior exit stairway* and *ramp*. A *fire door* assembly complying with Section 716 of the International Building Code shall be installed in the *fire barrier* to provide a *means of egress* from the *interior exit stairway* and *ramp* to the *exit passageway*. Openings in the *fire barrier* other than the *fire door* assembly are prohibited. Penetrations of the *fire barrier* are prohibited.

Exceptions:

1. Penetrations of the *fire barrier* in accordance with Section 1023.5 shall be permitted.
2. Separation between an *interior exit stairway* or *ramp* and the *exit passageway* extension shall not be required where there are no openings into the *exit passageway* extension.

3. Separation between an *interior exit stairway* or *ramp* and the *exit passageway* extension shall not be required where the *interior exit stairway* and the *exit passageway* extension are pressurized in accordance with Section 909.20.4 of the International Building Code.

[BE] 1023.12.1 Termination and extension. A *smokeproof enclosure* shall terminate at an *exit discharge* or a *public way*. The *smokeproof enclosure* shall be permitted to be extended by an *exit passageway* in accordance with Section 1023.3. The *exit passageway* shall be without openings other than the *fire door assembly* required by Section 1023.3.1 and those necessary for egress from the *exit passageway*. The *exit passageway* shall be separated from the remainder of the building by not less than 2-hour *fire barriers* ~~constructed in accordance with Section 707 of the International Building Code~~ or *horizontal assemblies* ~~constructed in accordance with Section 711 of the International Building Code,~~ or both.

Exceptions:

1. Openings in the *exit passageway* serving a *smokeproof enclosure* are permitted where the *exit passageway* is protected and pressurized in the same manner as the *smokeproof enclosure*, and openings are protected as required for access from other floors.
2. The *fire barrier* separating the *smokeproof enclosure* from the *exit passageway* is not required, provided that the *exit passageway* is protected and pressurized in the same manner as the *smokeproof enclosure*.
3. A *smokeproof enclosure* shall be permitted to egress through areas on the *level of exit discharge* or vestibules as permitted by Section 1028.

[BE] 1026.2 Separation. The separation between buildings or refuge areas connected by a *horizontal exit* shall be provided by ~~a *fire wall* complying with Section 706 of the International Building Code; or by a *fire barrier* complying with Section 707 of the International Building Code or a *horizontal assembly* complying with Section 711 of the International Building Code, or both.~~ not less than 2-hour fire walls, fire barriers or horizontal assemblies, or a combination thereof. ~~The minimum *fire-resistance rating* of the separation shall be 2 hours.~~ Opening protectives in *horizontal exits* shall also comply with Section 716 of the International Building Code. Duct and air transfer openings in a *fire wall* or *fire barrier* that serves as a *horizontal exit* shall also comply with Section 717 of the International Building Code. The *horizontal exit* separation shall extend vertically through all levels of the building unless floor assemblies have a *fire-resistance rating* of not less than 2 hours and do not have unprotected openings.

Exception: A *fire-resistance rating* is not required at *horizontal exits* between a building area and an above-grade pedestrian walkway constructed in accordance with Section 3104 of the International Building Code, provided that the distance between connected buildings is more than 20 feet (6096 mm).

Horizontal exits constructed as *fire barriers* shall be continuous from *exterior wall* to *exterior wall* so as to divide completely the floor served by the *horizontal exit*.

[BE] 1028.2 Exit discharge.

Exits shall discharge directly to the exterior of the building. The *exit discharge* shall be at grade or shall provide a direct path of egress travel to grade. The *exit discharge* shall not reenter a building. The combined use of Exceptions 1 and 2 shall not exceed 50 percent of the number and minimum width or required capacity of the required *exits*.

Exceptions:

1. Not more than 50 percent of the number and minimum width or required capacity of *interior exit stairways* and *ramps* is permitted to egress through areas, including atriums, on the *level of discharge* provided that all of the following conditions are met:
   1.1. Discharge of *interior exit stairways* and *ramps* shall be provided with a free and unobstructed path of travel to an exterior exit door and such *exit* is readily visible and identifiable from the point of termination of the enclosure.
   1.2. The entire area of the *level of exit discharge* is separated from areas below by construction conforming to the *fire-resistance rating* for the enclosure.
   1.3. The egress path from the *interior exit stairway* and *ramp* on the *level of exit discharge* is protected throughout by an *approved automatic sprinkler system*. Portions of the *level of exit discharge* with access to the egress path shall either be equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, or separated from the egress path in accordance with the requirements for the enclosure of *interior exit stairways* or *ramps*.
   1.4. Where a required *interior exit stairway* or *ramp* and an *exit access stairway* or *ramp* serve the same floor level and terminate at the same *level of exit discharge*, the termination of the *exit access stairway* or *ramp* and the exit discharge door of the *interior exit stairway* or *ramp* shall be separated by a distance of not less than 30 feet (9144 mm) or not less than one-fourth the length of the maximum overall diagonal dimension of the building, whichever is less. The distance shall be measured in a straight line between the exit discharge door from the *interior exit stairway* or *ramp* and the last tread of the *exit access stairway* or termination of slope of the *exit access ramp*.

2. Not more than 50 percent of the number and minimum width or required capacity of the *interior exit stairways* and *ramps* is permitted to egress through a vestibule provided that all of the following conditions are met:
   2.1. The entire area of the vestibule is separated from areas below by construction conforming to the *fire-resistance rating* of the *interior exit stairway* or *ramp* enclosure.
   2.2. The depth from the exterior of the building is not greater than 10 feet (3048 mm) and the length is not greater than 30 feet (9144 mm).
   2.3. The area is separated from the remainder of the *level of exit discharge* by a *fire partition* ~~constructed in accordance with Section 708 of the International Building Code~~.

      Exception: The maximum transmitted temperature rise is not required.

   2.4. The area is used only for *means of egress* and *exits* directly to the outside.
3. *Horizontal exits* complying with Section 1026 shall not be required to discharge directly to the exterior of the building.

[BE] 1030.1.1.1 Spaces under grandstands and bleachers. Spaces under *grandstands* or *bleachers* shall be separated by <u>not less than 1-hour</u> *fire barriers* ~~complying with Section 707 of the International Building Code~~ and *horizontal assemblies* ~~complying with Section 711 of the International Building Code with not less than 1-hour *fire-resistance-rated* construction .~~<u>, or both .</u>

Exceptions:

1. Ticket booths less than 100 square feet (9 m^2) in area.
2. Toilet rooms.
3. Other accessory use areas 1,000 square feet (93 m^2) or less in area and equipped with an *automatic sprinkler system* in accordance with Section 903.3.1.1.

Reason: This proposal is designed to provide consistency with references to fire-resistance-rated construction requirements. The 2024 IBC makes multiple requirements for fire walls, fire barriers, fire partitions, smoke barriers, and smoke partitions. The format of the requirements is not consistent, but more importantly, there is really no need to reference the section regulating these components every time a requirement is made. These terms are all defined terms and each component has a specific section that it must comply with. Where Section 426.1.7 requires a tire buffing room to be separated from the remainder of the building by 1-hour fire barriers, it is understood that the fire barrier must comply with the code. If the fire barrier does not comply with the code, it is not a fire barrier.

For example, the IBC does not state provide “exit doors in accordance with Section 1010” every time an exit door is required. Such language is not necessary and the code does not need to state it, because if the door does not comply then it is not considered an exit door.

Currently, the IBC does not reference the specific sections in the following locations:
404.6, 407.5.4, 408.6.1, 412.4.1, 415.9.1.2, 415.11.1.6, 415.11.7.4, 420.6, 426.1.7, 507.9, 510.2, 510.5, 510.6, 707.3.10, 714.4, 714.5.4, 717.5.1.1, 909.6, 909.6.2, 909.18.6, 910.3.2, 911.1.6, 1026.2, 3007.6.2, 3008.6.2
None of these sections refer back to Chapter 7, but they all seem to work effectively without that reference.

This proposal intends to eliminate the multiple phrases “constructed in accordance with Section 70X” because they are not needed, and are basically redundant. The code proves that they are not needed by the number of references where the section for construction is not included.

Even where a section in Chapter 7 is referenced, a number of references are worded differently. Some of those sections include:

- **402.4.2.2** Anchor building separation. …fire walls complying with Section 706.
- **420.2** Separation walls. …fire partitions in accordance with Section 708
- **422.2** Separation walls. …fire partitions installed in accordance with Section 708
- **716.3.2.1.1** Where 3/4-hour-fire-protection window assemblies permitted. …fire partitions designed in accordance with Section 708
- **1026.2** Separation. …fire wall complying with Section 706; or by a fire barrier complying with Section 707 or a horizontal assembly complying with Section 711, or both.

This code change is editorial and makes no change in code application. This proposal simplifies the code language and provides consistency in the requirements for fire walls, fire barriers, smoke barriers, etc.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is long, but it is entirely editorial. There is no change in code application or code requirements.

FS21-24 Part I

FS21-24 Part II

IFC: SECTION 702, 702.1, 702.1 (New), 508.1.2, 605.4.2.6, 901.4.4, 903.2, 909.11.1, 910.4.5, 914.3.1, 914.4.1, 914.8.3.2, 1207.7.4, 2311.8.3, 2404.4, 2703.14.2, 3206.3.2, 3207.2, 3208.2, 3704.3, 3704.4, 3704.5, 3804.1.1.1, TABLE 5003.1.1(5), 5003.8.3.1, 5003.8.3.3, 5306.2.1, 5306.2.2, 5906.4.2, 6306.4, 6404.1.4; IBC: [F] 403.3, [F] 403.4.8.1, [F] 404.3, [F] 412.3.6.2, [F] 414.2.1, [F] 414.2.3, [F] 415.10.2, [F] 415.10.4, [F] 415.11.1.2, [F] 415.11.1.6, [F] 415.11.6.1, [F] 415.11.6.2, [F] 416.2, [F] 418.4, [F] 418.5, [F] 418.6, [F] 426.1.2, [F] 427.2.1, [F] 427.2.2, [F] 428.3.1, [F] 903.2, [F] 909.11.1, [F] 910.4.5, [F] 911.1.2

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THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE FIRE SAFETY CODE COMMITTEE. PART II WILL BE HEARD BY THE FIRE CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Fire Code

Revise as follows:

SECTION 702
~~DEFINITIONS~~ RATED CONSTRUCTION

Delete without substitution:

~~**702.1 Definitions.**~~
~~The following terms are defined in Chapter 2:~~
~~**DRAFTSTOP.**~~

~~**FIREBLOCKING.**~~

~~**MEMBRANE-PENETRATION FIRESTOP SYSTEM.**~~

~~**OPENING PROTECTIVE.**~~

~~**SMOKE BARRIER.**~~

~~**SMOKE PARTITION.**~~

~~**THROUGH-PENETRATION FIRESTOP SYSTEM.**~~

Add new text as follows:

702.1 Construction requirements. Fire-resistance-rated construction and smoke-limiting construction required by this code shall comply with the following:

1. Fire walls shall be constructed in accordance with Section 706 of the *International Building Code*.
2. Fire barriers shall be constructed in accordance with Section 707 of the *International Building Code*.
3. Fire partitions shall be constructed in accordance with Section 708 of the *International Building Code*.
4. Smoke barriers shall be constructed in accordance with Section 709 of the *International Building Code*.
5. Smoke partitions shall be constructed in accordance with Section 710 of the *International Building Code*.
6. Horizontal assemblies shall be constructed in accordance with Section 711 of the *International Building Code*.

Revise as follows:

508.1.2 Separation.

The *fire command center* shall be separated from the remainder of the building by not less than a 1-hour ~~*fire barrier* constructed in accordance with Section 707 of the International Building Code or *horizontal assembly* constructed in accordance with Section 711 of the International Building Code~~fire barriers or horizontal assemblies, or both.

605.4.2.6 Separation.

Rooms containing fuel oil tanks for internal combustion engines shall be separated from the remainder of the building by not less than 1-hour *fire barriers, horizontal assemblies*, or both, ~~with a minimum 1-hour *fire-resistance rating*~~ with 1-hour fire-protection-rated *opening protectives* ~~constructed in accordance with the *International Building Code*~~.

> **Exception:** Rooms containing protected above-ground tanks complying with Section 5704.2.9.7 shall not be required to be separated from surrounding areas.

901.4.4 Fire areas.

Where buildings, or portions thereof, are divided into *fire areas* so as not to exceed the limits established for requiring a *fire protection system* in accordance with this chapter, such *fire areas* shall be separated by *fire barriers* ~~constructed in accordance with Section 707 of the International Building Code~~ or *horizontal assemblies* ~~constructed in accordance with Section 711 of the International Building Code~~, or both, having a *fire-resistance rating* of not less than that determined in accordance with Section 707.3.10 of the International Building Code.

903.2 Where required.

Approved automatic sprinkler systems in new buildings and structures shall be provided in the locations described in Sections 903.2.1 through 903.2.12.

> **Exception:** Spaces or areas in telecommunications buildings used exclusively for telecommunications equipment, associated electrical power distribution equipment, batteries not required to have an *automatic sprinkler system* by Section 1207 for energy storage systems and standby engines, provided that those spaces or areas are equipped throughout with an *automatic smoke detection system* in accordance with Section 907.2 and are separated from the remainder of the building by not less than 1-hour *fire barriers* ~~constructed in accordance with Section 707 of the International Building Code~~ or not less than 2-hour *horizontal assemblies* ~~constructed in accordance with Section 711 of the International Building Code~~, or both.

909.11.1 Equipment room.

The standby power source and its transfer switches shall be in a room separate from the normal power transformers and switch gears and ventilated directly to and from the exterior. The room shall be enclosed with not less than 1-hour *fire barriers* ~~constructed in accordance with Section 707 of the International Building Code~~ or *horizontal assemblies* ~~constructed in accordance with Section 711 of the International Building Code~~, or both.

910.4.5 Manual control location.

Manual controls shall be located where they are able to be accessed by the fire service from an exterior door of the building and separated from the remainder of the building by not less than 1-hour *fire barriers* ~~constructed in accordance with Section 707 of the International Building Code~~ or *horizontal assemblies* ~~constructed in accordance with Section 711 of the International Building Code~~, or both.

914.3.1 Automatic sprinkler system.

Buildings and structures shall be equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 and a secondary water supply where required by Section 914.3.2.

> **Exception:** An *automatic sprinkler system* shall not be required in spaces or areas of telecommunications equipment buildings used exclusively for telecommunications equipment, associated electrical power distribution equipment, batteries and standby engines, provided that those spaces or areas are equipped throughout with an automatic fire detection system in accordance with Section 907.2 and are separated from the remainder of the building by not less than 1-hour *fire barriers* ~~constructed in accordance with Section 707 of the *International Building Code*~~ or not less than 2-hour *horizontal assemblies* ~~constructed in accordance with Section 711 of the *International Building Code*~~, or both.

914.4.1 Automatic sprinkler system.

An *approved automatic sprinkler system* shall be installed throughout the entire building.

Exceptions:

1. That area of a building adjacent to or above the atrium need not be sprinklered, provided that portion of the building is separated from the atrium portion by not less than a 2-hour *fire barrier* ~~constructed in accordance with Section 707 of the International Building Code~~ or *horizontal assemblies* ~~constructed in accordance with Section 711 of the International Building Code~~, or both.
2. Where the ceiling of the atrium is more than 55 feet (16 764 mm) above the floor, sprinkler protection at the ceiling of the atrium is not required.

914.8.3.2 Separation of maximum single fire areas.

Maximum single *fire areas* established in accordance with hangar classification and construction type in Table 914.8.3 shall be separated by not less than 2-hour *fire walls* ~~constructed in accordance with Section 706 of the International Building Code~~. In determining the maximum single *fire area* as set forth in Table 914.8.3, ancillary uses that are separated from aircraft servicing areas by not less than a 1-hour *fire barrier* ~~constructed in accordance with Section 707 of the International Building Code~~ shall not be included in the area.

1207.7.4 Fire-resistance-rated separations.

Rooms and areas containing ESS shall include *fire-resistance-rated* separations as follows:

1. In dedicated-use buildings, rooms and areas containing ESS shall be separated from areas in which administrative and support personnel are located.
2. In nondedicated-use buildings, rooms and areas containing ESS shall be separated from other areas in the building.

Separation shall be provided by 2-hour *fire barriers* ~~constructed in accordance with Section 707 of the *International Building Code* and 2-hour~~ or *horizontal assemblies* ~~constructed in accordance with Section 711 of the *International Building Code*~~, ~~as appropriate~~or both.
(Material based on NFPA 855 2023 Ed.)

2311.8.3 Motor vehicle repair rooms.

Motor vehicle repair rooms shall be enclosed ~~with~~ by not less than 1-hour *fire barriers* ~~constructed in accordance with Section 707 of the International Building Code,~~ or *horizontal assemblies* ~~constructed in accordance with Section 711 of the International Building Code~~, or both, with 1-hour-rated opening protectives.

2404.4 Location of spray-finishing operations.

Spray-finishing operations conducted in buildings used for Group A, E, I or R occupancies shall be located in a spray room protected with an *approved automatic sprinkler system* installed in accordance with Section 903.3.1.1 and separated ~~vertically and horizontally~~ from the remainder of the building by not less than 1-hour fire barriers ~~*fire barrier* walls and~~ or *horizontal assemblies* ~~with not less than a 1-hour *fire-resistance rating* in accordance with the *International Building Code*~~*, or both*. In other occupancies, spray-finishing operations shall be conducted in a spray room, spray booth or limited spraying space *approved* for such use.

Exceptions:

1. Automobile undercoating spray operations and spray-on automotive lining operations conducted in areas with *approved* natural or mechanical ventilation shall be exempt from the provisions of Section 2404 when *approved* and where utilizing Class IIIA or IIIB *combustible liquids*.
2. In buildings other than Group A, E, I or R occupancies, *approved* limited spraying space in accordance with Section 2404.11.
3. Resin application areas used for manufacturing of reinforced plastics complying with Section 2409 shall not be required to be located in a spray room, spray booth or spraying space.

2703.14.2 Penetrations.

Exhaust ducts penetrating *fire barriers* ~~constructed in accordance with Section 707 of the International Building Code~~ or *horizontal assemblies* ~~constructed in accordance with Section 711 of the International Building Code~~ shall be contained in a shaft of equivalent *fire-resistance-rated* construction. Exhaust ducts shall not penetrate *fire walls*. *Fire dampers* shall not be installed in exhaust ducts.

3206.3.2 Multiple high-piled storage areas.

Where a building contains multiple *high-piled storage areas*, the aggregate of all *high-piled storage areas* shall be used for the application of Table 3206.2 unless the *high-piled storage areas* are separated in accordance with one of the following:

1. *High-piled storage areas* separated by not less than 1-hour *fire barriers* ~~with a minimum *fire-resistance rating* of 1 hour constructed in accordance with Section 707 of the International Building Code~~.
2. In buildings equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1, *high-piled storage areas* separated by 100 feet (30 480 mm) or more. The area providing the separation shall not contain *high-piled combustible storage*.

3207.2 Fire protection.

Where automatic sprinklers are required by Table 3206.2, an *approved automatic sprinkler system* shall be installed throughout the building or to not less than 1-hour *fire barriers* ~~constructed in accordance with Section 707 of the International Building Code~~with 1-hour-rated opening protectives. ~~Openings in such *fire barriers* shall be protected by opening protectives having a 1-hour *fire protection rating*.~~ The design and installation of the *automatic sprinkler system* and other applicable fire protection shall be in accordance with the *International Building Code* and NFPA 13.

3208.2 Fire protection.

Where automatic sprinklers are required by Table 3206.2, an *approved automatic sprinkler system* shall be installed throughout the building or to not less than 1-hour *fire barriers* ~~constructed in accordance with Section 707 of the International Building Code~~with 1-hour-rated opening protectives. ~~Openings in such *fire barriers* shall be protected by opening protectives having a 1-hour *fire protection rating*.~~ The design and installation of the *automatic sprinkler system* and other applicable fire protection shall be in accordance with Section 903.3.1.1 and the *International Building Code*.

3704.3 Storage of more than 100 cubic feet to 500 cubic feet.

Loose *combustible fibers* in quantities exceeding 100 cubic feet (3 m^3) but not exceeding 500 cubic feet (14 m^3) shall be stored in rooms enclosed ~~with~~ by not less than 1-hour *fire barriers* ~~constructed in accordance with Section 707 of the International Building Code~~ or *horizontal assemblies* ~~constructed in accordance with Section 711 of the International Building Code~~, or both~~, with openings protected by an *approved* opening protective assembly having a *fire protection rating* of 3/4 hour in accordance with the *International Building Code*~~.

3704.4 Storage of more than 500 cubic feet to 1,000 cubic feet.

Loose *combustible fibers* in quantities exceeding 500 cubic feet (14 m^3) but not exceeding 1,000 cubic feet (28 m^3) shall be stored in rooms enclosed ~~with~~ by not less than 2-hour *fire barriers* ~~constructed in accordance with Section 707 of the International Building Code~~ or *horizontal assemblies* ~~constructed in accordance with Section 711 of the International Building Code~~, or both~~, openings protected by an *approved* opening protective assembly having a *fire protection rating* of 1 1/2 hours in accordance with the *International Building Code*~~.

3704.5 Storage of more than 1,000 cubic feet.

Loose *combustible fibers* in quantities exceeding 1,000 cubic feet (28 m^3) shall be stored in rooms enclosed ~~with~~by not less than 2-hour *fire barriers* ~~constructed in accordance with Section 707 of the International Building Code~~ or *horizontal assemblies* ~~constructed in accordance with Section 711 of the International Building Code~~, or both~~, with openings protected by an *approved* opening protective assembly having a *fire protection rating* of 1 1/2 hours in accordance with the *International Building Code*~~. The storage room shall be protected by an *automatic sprinkler system* installed in accordance with Section 903.3.1.1.

3804.1.1.1 Separation from other nonlaboratory areas. *Laboratory suites* shall be separated from other portions of the building in accordance with the most restrictive of the following:

1. *Fire barriers* and *horizontal assemblies* as required in Table 3804.1.1. ~~*Fire barriers* shall be constructed in accordance with Section 707 of the International Building Code and *horizontal assemblies* shall be constructed in accordance with Section 711 of the International Building Code.~~

   Exception: Where an individual *laboratory suite* occupies more than one story, the *fire-resistance rating* of intermediate floors contained within the *laboratory suite* shall comply with the requirements of the *International Building Code*.

2. Separations as required in Section 508 of the International Building Code.

TABLE 5003.1.1(5) HAZARDOUS MATERIALS EXEMPTIONS[a]

MATERIAL CLASSIFICATION	OCCUPANCY OR APPLICATION	EXEMPTION
Combustible fiber	Baled cotton	Densely packed baled cotton shall not be classified as combustible fiber, provided that the bales comply with the packing requirements of ISO 8115.
Corrosive	Building materials	The quantity of commonly used building materials that are classified as corrosive materials is not limited.
	Personal and household products	The quantity of personal and household products that are classified as corrosive materials is not limited in retail displays, provided that the products are in original packaging.
	Retail and wholesale sales occupancies	The quantity of medicines, foodstuffs or consumer products, and cosmetics containing not more than 50 percent by volume of water-miscible liquids, with the remainder of the solutions not being flammable, is not limited. To qualify for this allowance, such materials shall be packaged in individual containers not exceeding 1.3 gallons.
Explosives	Groups B, F, M and S	Storage of special industrial explosive devices is not limited.
	Groups M and R-3	Storage of black powder, smokeless propellant, and small arms primers is not limited.
Flammable and combustible liquids and gases	Aerosols	Buildings and structures occupied for the storage of aerosol products, aerosol cooking spray products, or plastic aerosol 3 products shall be classified as Group S-1.
	Alcoholic beverages	The quantity of alcoholic beverages in liquor stores and distributors without bulk storage is not limited.
		The quantity of alcoholic beverages in distilling or brewing of beverages is not limited.
		The storage quantity of beer, distilled spirits and wines in barrels and casks is not limited.
		The quantity of alcoholic beverages in retail and wholesale sales occupancies is not limited. To qualify for this allowance, beverages shall be packaged in individual containers not exceeding 1.3 gallons.
	Cleaning establishments with combustible liquid solvents	The quantity of combustible liquid solvents used in closed systems and having a flash point at or above 140°F is not limited. To qualify for this allowance, equipment shall be listed by an approved testing agency and the occupancy shall be separated from all other areas of the building by 1-hour fire barriers or ~~1-hour~~ horizontal assemblies, or both~~, constructed in accordance with the *International Building Code*~~.
		The quantity of combustible liquid solvents having a flash point at or above 200°F is not limited.
	Closed piping systems	The quantity of flammable and combustible liquids and gases utilized for the operation of machinery or equipment is not limited.
	Flammable finishing operations using flammable and combustible liquids	Buildings and structures occupied for the application of flammable finishes shall comply with Section 416.
	Fuel	The quantity of liquid or gaseous fuel in fuel tanks on vehicles or motorized equipment is not limited.
		The quantity of gaseous fuels in piping systems and fixed appliances regulated by the *International Fuel Gas Code* is not limited.
		The quantity of liquid fuels in piping systems and fixed appliances regulated by the *International Mechanical Code* is not limited.
	Fuel oil	The quantity of fuel oil storage complying with Section 605.4.2 is not limited.
	Hand sanitizer	The quantity of alcohol-based hand rubs (ABHR) classified as Class I or II liquids in dispensers installed in accordance with Sections 5705.5 and 5705.5.1 is not limited. The location of the ABHR shall be provided in the construction documents.
	Retail and wholesale sales occupancies with flammable and combustible liquids	The quantity of medicines, foodstuffs or consumer products, and cosmetics containing not more than 50 percent by volume of water-miscible liquids, with the remainder of the solutions not being flammable, is not limited. To qualify for this allowance, such materials shall be packaged in individual containers not exceeding 1.3 gallons.
Highly toxic and toxic materials	Retail and wholesale sales occupancies	The quantity of medicines, foodstuffs or consumer products, and cosmetics containing not more than 50 percent by volume of water-miscible liquids, with the remainder of the solutions not being flammable, is not limited. To qualify for this allowance, such materials shall be packaged in individual containers not exceeding 1.3 gallons.
Any	Agricultural materials	The quantity of agricultural materials stored or utilized for agricultural purposes on the premises is not limited.
	Energy storage	The quantity of hazardous materials in stationary storage battery systems is not limited.
		The quantity of hazardous materials in stationary fuel cell power systems is not limited.
		The quantity of hazardous materials in capacitor energy storage systems is not limited.

	Refrigeration systems	The quantity of refrigerants in refrigeration systems is not limited.

For SI: 1 gallon = 3.785 L, °C = (°F – 32)/1.8.

a. Exempted materials and conditions listed in this table are required to comply with provisions of this code that are not based on exceeding maximum allowable quantities in Section 5003.

5003.8.3.1 Construction requirements.

Control areas shall be separated from each other by *fire barriers* ~~constructed in accordance with Section 707 of the International Building Code~~ or *horizontal assemblies* ~~constructed in accordance with Section 711 of the International Building Code~~, or both.

5003.8.3.3 Number.

The maximum number of *control areas* per floor within a building shall be in accordance with Table 5003.8.3.2. For the purposes of determining the number of *control areas* within a building, each portion of a building separated by one or more *fire walls* ~~complying with Section 706 of the *International Building Code*~~ shall be considered a separate building.

5306.2.1 One-hour exterior rooms.

A 1-hour exterior room shall be a room or enclosure separated from the remainder of the building by <u>not less than 1-hour</u> *fire barriers* ~~constructed in accordance with Section 707 of the International Building Code~~ or *horizontal assemblies* ~~constructed in accordance with Section 711 of the International Building Code~~, or both~~, with a *fire-resistance rating* of not less than 1 hour~~. Openings between the room or enclosure and interior spaces shall be self-closing smoke- and draft-control assemblies having a *fire protection rating* of not less than 1 hour. Rooms shall have not less than one *exterior wall* that is provided with not less than two vents. Each vent shall have a minimum free opening area of 36 square inches (232 cm^2) for each 1,000 cubic feet (28 m^3) at *normal temperature and pressure* (NTP) of gas stored in the room and shall be not less than 72 square inches (465 cm^2) in aggregate free opening area. One vent shall be within 6 inches (152 mm) of the floor and one shall be within 6 inches (152 mm) of the ceiling. Rooms shall be provided with not less than one automatic sprinkler to provide container cooling in case of fire.

5306.2.2 One-hour interior room.

Where an exterior wall cannot be provided for the room, a 1-hour interior room shall be provided and shall be a room or enclosure separated from the remainder of the building by <u>not less than 1-hour</u> *fire barriers* ~~constructed in accordance with Section 707 of the International Building Code~~ or *horizontal assemblies* ~~constructed in accordance with Section 711 of the International Building Code~~, or both~~, with a *fire-resistance rating* of not less than 1 hour~~. Openings between the room or enclosure and interior spaces shall be provided with self-closing, smoke- and draft-control assemblies having a *fire protection rating* of not less than 1 hour. An *automatic sprinkler system* shall be installed within the room. The room shall be exhausted through a duct to the exterior. Supply and exhaust ducts shall be enclosed in a 1-hour-rated shaft enclosure from the room to the exterior. *Approved* mechanical ventilation shall comply with the *International Mechanical Code* and be provided at a minimum rate of 1 cfm per square foot [0.00508 $m^3/(s \times m^2)$] of the area of the room.

5906.4.2 Storage of 50 to 1,000 cubic feet.

Storage of fine magnesium scrap in quantities greater than 50 cubic feet (1.4 m^3) [six 55-gallon (208 L) steel drums] shall be separated from other occupancies by an open space of not less than 50 feet (15 240 mm) or by ~~a~~ *fire* ~~*barrier*~~ <u>*barriers*</u>~~constructed in accordance with Section 707 of the International Building Code~~.

6306.4 Maximum aggregate quantity.

The maximum aggregate quantity of liquid oxygen allowed in storage and in use in each *dwelling unit* shall be 31.6 gallons (120 L).

Exceptions:

1. The maximum aggregate quantity of liquid oxygen allowed in Group I-4 occupancies shall be limited by the maximum allowable quantity set forth in Table 5003.1.1(1).

2. Where individual sleeping rooms are separated from the remainder of the *dwelling unit* by not less than 1-hour *fire barriers* ~~constructed in accordance with Section 707 of the International Building Code,~~ ~~and~~or *horizontal assemblies* ~~constructed in accordance with Section 711 of the International Building Code~~, or both, ~~having a minimum *fire-resistance rating* of 1 hour,~~ the maximum aggregate quantity per *dwelling unit* shall be increased to allow not more than 31.6 gallons (120 L) of liquid oxygen per sleeping room.

6404.1.4 Separation from incompatible materials.
In addition to the requirements of Section 5003.9.8, indoor storage of *pyrophoric* materials shall be isolated from incompatible hazardous materials by 1-hour *fire barriers* ~~with openings protected in accordance with the *International Building Code*~~.

Exception: Storage in *approved* hazardous materials storage cabinets constructed in accordance with Section 5003.8.7.

2024 International Building Code

Revise as follows:

[F] 403.3 Automatic sprinkler system.
Buildings and *structures* shall be equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 and a secondary water supply where required by Section 403.3.3.

Exception: An *automatic sprinkler system* shall not be required in spaces or areas of telecommunications equipment *buildings* used exclusively for telecommunications equipment, associated electrical power distribution equipment, batteries and standby engines, provided that those spaces or areas are equipped throughout with an *automatic* fire detection system in accordance with Section 907.2 and are separated from the remainder of the *building* by not less than 1-hour *fire barriers* ~~constructed in accordance with Section 707~~ or not less than 2-hour *horizontal assemblies* ~~constructed in accordance with Section 711,~~ or both.

[F] 403.4.8.1 Equipment room.
If the *standby or emergency power system* includes a generator set inside a *building*, the system shall be located in a separate room enclosed with 2-hour *fire barriers* ~~constructed in accordance with Section 707~~ or *horizontal assemblies* ~~constructed in accordance with Section 711~~, or both. System supervision with manual start and transfer features shall be provided at the *fire command center*.

Exception: In Group I-2, Condition 2, manual start and transfer features for the critical branch of the emergency power are not required to be provided at the *fire command center*.

[F] 404.3 Automatic sprinkler protection.
An *approved automatic sprinkler system* shall be installed throughout the entire *building*.

Exceptions:

1. That area of a *building* adjacent to or above the *atrium* need not be sprinklered provided that portion of the *building* is separated from the *atrium* portion by not less than 2-hour *fire barriers* ~~constructed in accordance with Section 707~~ or *horizontal assemblies* ~~constructed in accordance with Section 711,~~ or both.
2. Where the ceiling of the *atrium* is more than 55 feet (16 764 mm) above the floor, sprinkler protection at the ceiling of the *atrium* is not required.

[F] 412.3.6.2 Separation of maximum single fire areas.
Maximum single *fire areas* established in accordance with hangar classification and construction type in Table 412.3.6 shall be separated by not less than 2-hour *fire walls* ~~constructed in accordance with Section 706~~. In determining the maximum single *fire area* as set forth in Table 412.3.6, ancillary uses that are separated from aircraft servicing areas by ~~a *fire barrier* of~~ not less than 1 hour *fire barriers*~~, constructed in accordance with Section 707,~~ shall not be included in the area.

[F] 414.2.1 Construction requirements.
Control areas shall be separated from each other by *fire barriers* ~~constructed in accordance with Section 707~~ or *horizontal assemblies* ~~constructed in accordance with Section 711,~~ or both.

[F] 414.2.3 Number.
The maximum number of *control areas* within a *building* shall be in accordance with Table 414.2.2. For the purposes of determining the number of *control areas* within a *building*, each portion of a *building* separated by one or more *fire walls* ~~complying with Section 706~~ shall be considered a separate *building*.

[F] 415.10.2 Gas rooms.
Where *gas rooms* are provided, such rooms shall be separated from other areas by not less than 1-hour *fire barriers* ~~constructed in accordance with Section 707~~ or *horizontal assemblies* ~~constructed in accordance with Section 711,~~ or both.

[F] 415.10.4 Separation of highly toxic solids and liquids.
Highly toxic solids and liquids not stored in *approved hazardous materials storage* cabinets shall be isolated from other *hazardous materials storage* by not less than 1-hour *fire barriers* ~~constructed in accordance with Section 707~~ or *horizontal assemblies* ~~constructed in accordance with Section 711,~~ or both.

[F] 415.11.1.2 Separation.
Fabrication areas, whose sizes are limited by the quantity of *hazardous materials* allowed by Table 415.11.1.1, shall be separated from each other, from *corridors* and from other parts of the *building* by not less than 1-hour *fire barriers* ~~constructed in accordance with Section 707~~ or *horizontal assemblies* ~~constructed in accordance with Section 711,~~ or both.

Exceptions:

1. Doors within such *fire barrier* walls, including doors to *corridors*, shall be only *self-closing fire door assemblies* having a *fire protection rating* of not less than $^3/_4$ hour.
2. Windows between *fabrication areas* and *corridors* are permitted to be fixed glazing *listed* and *labeled* for a *fire protection rating* of not less than $^3/_4$ hour in accordance with Section 716.

[F] 415.11.1.6 Ventilation.
Mechanical exhaust *ventilation* at the rate of not less than 1 cubic foot per minute per square foot [0.0051 $m^3/(s \times m^2)$] of floor area shall be provided throughout the portions of the *fabrication area* where *HPM* are used or stored. The exhaust air duct system of one *fabrication area* shall not connect to another duct system outside that *fabrication area* within the *building*.
A *ventilation* system shall be provided to capture and exhaust gases, fumes and vapors at *workstations*.

Two or more operations at a *workstation* shall not be connected to the same exhaust system where either one or the combination of the substances removed could constitute a fire, *explosion* or hazardous chemical reaction within the exhaust duct system.

Exhaust ducts penetrating *fire barriers* ~~constructed in accordance with Section 707~~ or *horizontal assemblies* ~~constructed in accordance with Section 711~~ shall be contained in a *shaft* of equivalent fire-resistance-rated construction. Exhaust ducts shall not penetrate *fire walls*.

Fire dampers shall not be installed in exhaust ducts.

[F] 415.11.6.1 HPM rooms and gas rooms.
HPM rooms and *gas rooms* shall be separated from other areas by *fire barriers* ~~constructed in accordance with Section 707~~ or *horizontal assemblies* ~~constructed in accordance with Section 711,~~ or both. The *fire-resistance rating* shall be not less than 2 hours where the area is 300 square feet (27.9 m^2) or more and not less than 1 hour where the area is less than 300 square feet (27.9 m^2).

[F] 415.11.6.2 Liquid storage rooms.
Liquid storage rooms shall be constructed in accordance with the following requirements:

1. Rooms greater than 500 square feet (46.5 m^2) in area, shall have not fewer than one exterior door *approved* for fire department access.
2. Rooms shall be separated from other areas by *fire barriers* ~~constructed in accordance with Section 707~~ or *horizontal assemblies* ~~constructed in accordance with Section 711,~~ or both. The *fire-resistance rating* shall be not less than 1 hour for rooms up to 150 square feet (13.9 m^2) in area and not less than 2 hours where the room is more than 150 square feet (13.9 m^2) in area.
3. Shelving, racks and wainscotting in such areas shall be of noncombustible construction or wood of not less than 1-inch (25 mm) nominal thickness or *fire-retardant-treated wood* complying with Section 2303.2.

4. Rooms used for the storage of Class I *flammable liquids* shall not be located in a *basement*.

[F] 416.2 Spray rooms.

Spray rooms shall be enclosed with not less than 1-hour *fire barriers* ~~constructed in accordance with Section 707~~ or *horizontal assemblies* ~~constructed in accordance with Section 711,~~ or both. Floors shall be waterproofed and drained in an *approved* manner.

[F] 418.4 Tank storage.

Storage areas for *flammable and combustible liquid* tanks inside of *structures* shall be located at or above grade and shall be separated from the processing area by not less than 2-hour *fire barriers* ~~constructed in accordance with Section 707~~ or *horizontal assemblies* ~~constructed in accordance with Section 711,~~ or both.

[F] 418.5 Nitrocellulose storage.

Nitrocellulose storage shall be located on a detached pad or in a separate *structure* or a room enclosed with not less than 2-hour *fire barriers* ~~constructed in accordance with Section 707~~ or *horizontal assemblies* ~~constructed in accordance with Section 711,~~ or both.

[F] 418.6 Finished products.

Storage rooms for finished products that are *flammable or combustible liquids* shall be separated from the processing area by not less than 2-hour *fire barriers* ~~constructed in accordance with Section 707~~ or *horizontal assemblies* ~~constructed in accordance with Section 711,~~ or both.

[F] 426.1.2 Grinding rooms.

Every room or space occupied for grinding or other operations that produce *combustible dusts* in such a manner that the room or space is classified as a Group H-2 occupancy shall be enclosed with *fire barriers* ~~constructed in accordance with Section 707~~ or *horizontal assemblies* ~~constructed in accordance with Section 711,~~ or both. The *fire-resistance rating* of the enclosure shall be not less than 2 hours where the area is not more than 3,000 square feet (279 m^2), and not less than 4 hours where the area is greater than 3,000 square feet (279 m^2).

[F] 427.2.1 One-hour exterior room.

A 1-hour exterior room shall be a room or enclosure separated from the remainder of the *building* by not less than 1-hour *fire barriers* ~~constructed in accordance with Section 707~~ or *horizontal assemblies* ~~constructed in accordance with Section 711,~~ or both~~, with a *fire-resistance rating* of not less than 1 hour~~. Openings between the room or enclosure and interior spaces shall be provided with *self-closing* smoke- and draft-control assemblies having a *fire protection rating* of not less than 1 hour. Rooms shall have not less than one *exterior wall* that is provided with not less than two vents. Each vent shall have a minimum free air opening of not less than 36 square inches (232 cm^2) for each 1,000 cubic feet (28 m^3) at normal temperature and pressure (*NTP*) of gas stored in the room and shall be not less than 72 square inches (465 cm^2) in aggregate free opening area. One vent shall be within 6 inches (152 mm) of the floor and one shall be within 6 inches (152 mm) of the ceiling. Rooms shall be provided with not fewer than one automatic fire sprinkler to provide container cooling in case of fire.

[F] 427.2.2 One-hour interior room.

Where an *exterior wall* cannot be provided for the room, a 1-hour interior room shall be provided and shall be a room or enclosure separated from the remainder of the *building* by *fire barriers* constructed in accordance with Section 707 or *horizontal assemblies* constructed in accordance with Section 711, or both, with a *fire-resistance rating* of not less than 1 hour. Openings between the room or enclosure and interior spaces shall be provided with *self-closing* smoke- and draft-control assemblies having a *fire protection rating* of not less than 1 hour. An *automatic sprinkler system* shall be installed within the room. The room shall be exhausted through a duct to the exterior. Supply and exhaust ducts shall be enclosed in a 1-hour rated *shaft enclosure* from the room to the exterior. *Approved* mechanical *ventilation* shall comply with the *International Mechanical Code* and be provided with a minimum rate of 1 cubic foot per minute per square foot (0.00508 $m^3/s/m^2$) of the area of the room.

Revise as follows:

[F] 428.3.1 Separation from other nonlaboratory areas.

Laboratory suites shall be separated from other portions of the *building* in accordance with the most restrictive of the following:

1. *Fire barriers* and *horizontal assemblies* as required in Table 428.3. ~~*Fire barriers* shall be constructed in accordance with Section 707 and *horizontal assemblies* constructed in accordance with Section 711.~~

   Exception: Where an individual *laboratory suite* occupies more than one *story*, the *fire-resistance rating* of intermediate floors contained within the *laboratory suite* shall comply with the requirements of this code.

2. Separations as required by Section 508.

[F] 903.2 Where required.
Approved automatic sprinkler systems in new *buildings* and *structures* shall be provided in the locations described in Sections 903.2.1 through 903.2.12.

Exception: Spaces or areas in telecommunications *buildings* used exclusively for telecommunications equipment, associated electrical power distribution equipment, batteries not required to have an *automatic sprinkler system* by Section 1207 of the *International Fire Code* for energy storage systems and standby engines, provided that those spaces or areas are equipped throughout with an *automatic smoke detection system* in accordance with Section 907.2 and are separated from the remainder of the *building* by not less than 1-hour *fire barriers* ~~constructed in accordance with Section 707~~ or not less than 2-hour *horizontal assemblies* ~~constructed in accordance with Section 711,~~ or both.

[F] 909.11.1 Equipment room.
The standby power source and its transfer switches shall be in a room separate from the normal power transformers and switch gears and ventilated directly to and from the exterior. The room shall be enclosed with not less than 1-hour *fire barriers* ~~constructed in accordance with Section 707 or~~ *horizontal assemblies* ~~constructed in accordance with Section 711,~~ or both.

[F] 910.4.5 Manual control location.
Manual controls shall be located where they are able to be accessed by the fire service from an exterior door of the *building* and separated from the remainder of the *building* by not less than 1-hour *fire barriers* ~~constructed in accordance with Section 707~~ or *horizontal assemblies* ~~constructed in accordance with Section 711,~~ or both.

[F] 911.1.2 Separation.
The *fire command center* shall be separated from the remainder of the *building* by not less than ~~a~~ 1-hour *fire barriers* ~~constructed in accordance with Section 707~~ or *horizontal* assemblies ~~*assembly*~~ ~~constructed in accordance with Section 711,~~ or both.

Reason: This proposal is designed to provide consistency with references to fire-resistance-rated construction requirements. The 2024 IFC makes multiple references to the IBC for construction of fire walls, fire barriers, fire partitions, smoke barriers, smoke partitions and horizontal assemblies. The format of these references is not consistent. In some cases, the IFC simply specifies a “1-hour fire barrier” as in Section 6304.1.6.

6304.1.6 Separation of Class 4 oxidizers from other materials. In addition to the requirements in Section 5003.9.8, Class 4 oxidizer liquids and solids shall be separated from other hazardous materials by not less than a 1-hour fire barrier or stored in hazardous materials storage cabinets.

In other cases, the IFC specifies a “2-hour fire barrier constructed in accordance with Section 707 of the International Building Code.” See Section 909.20.2 in the code change. These various formats also occur with horizontal assemblies, fire walls, etc., and this inconsistency can create confusion. This code change proposes the following revisions to simplify the references:

1. Section 702.1 is added to cover all references to the construction requirements in the IBC.
2. Rather than calling out “Section 7xx of the International Building Code”, each reference only needs to state “fire walls”, or “fire barrier”, or “smoke barrier.”
3. A separate code change is removing the list of defined terms in Section 702. In that code change, Section 702.1 reads exactly the same as shown in this proposal. However, this code change goes one step further to revise all the referenced sections.
4. In Section 702.1 each type of fire-resistant component is listed along with a reference to the appropriate Section in the IBC. In this fashion, the IFC makes only a single reference the requirements in the IBC and it does not need repetition throughout the book. Repeating the reference is not necessary, because when the IFC requires a fire barrier, where else will the code user go to determine the construction requirements.

5. Sections 605.4.2.6 and 2311.8.3 retain the reference to a 1-hour rated opening protectives, because this is different than the requirement for ¾-hour in IBC Table 716.1(2). This is intentionally retained, because it is more restrictive and is specific to the application.
6. In Sections 3704.3, the reference to ¾-hour opening protectives is deleted, because IBC Table 716.1(2) already makes this requirement for a 1-hour fire barrier.
7. In Sections 3704.4 and 3704.5, the reference to 1½-hour opening protectives is deleted, because IBC Table 716.1(2) already makes this requirement for a 2-hour fire barrier.

There are multiple occurrences in the 2024 IFC where fire barriers or horizontal assemblies are specified with any reference to the IBC. Some of those sections are:

1. **1206.6.2** Separation or rooms containing stationary fuel cell power systems
2. **3509.4** Manifolding of oxygen cylinders
3. **3403.2** Location of buffing operations
4. **Table 5003.8.2 Footnote d** Detached buildings
5. **5606.5.2.1 #3.6** Smokeless propellants
6. **Table 5704.3.4.1 Footnote a** MAQs for Flammable and Combustible Liquids in Wholesale and Retail Sales Occupancies
7. **5705.3.6.2.5** Separation of parts cleaning machines

This proposal will provide consistency throughout all the references and will eliminate unnecessary language.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is editorial and simply removes superfluous language from the code. There is no change in code requirements or code application.

FS21-24 Part II

FS22-24

IBC: SECTION 202 (New), 706.1.1

Proponents: Ronald Clements, Chesterfield County, VA, Chesterfield County, VA (clementsro@chesterfield.gov)

2024 International Building Code

Add new definition as follows:

PARTY WALL. Any wall located on a *lot line* between adjacent *buildings*, which is used or adapted for *joint* service between the two *buildings.*

Revise as follows:

706.1.1 Party walls. ~~Any wall located on a *lot line* between adjacent *buildings*, which is used or adapted for *joint* service between the two *buildings*,~~ A *party wall* shall be installed on lot lines that divide a building. *Party walls* shall be constructed as a *fire wall* in accordance with Section 706. Party walls shall be constructed without openings and shall create separate *buildings*.

Exceptions:

1. Openings in a party wall separating an *anchor building* and a *mall* shall be in accordance with Section 402.4.2.2.1.
2. Party walls and *fire walls* are not required on *lot lines* dividing a *building* for ownership purposes where the aggregate height and area of the portions of the *building* located on both sides of the *lot line* do not exceed the maximum height and area requirements of this code. For the *building official's* review and approval, the official shall be provided with copies of dedicated access easements and contractual agreements that permit the *owners* of portions of the building located on either side of the *lot line* access to the other side for purposes of maintaining fire and *life safety systems* necessary for the operation of the building.

Reason: It is commonly understood that a party wall is required to be installed on a lot line when a lot line divides a building. The issue is that 706.1.1 does not clearly state the party wall is required when a lot line divides a building. Section 706.1.1only states that "any wall located on a lot line" shall be constructed as a fire wall. If the designer chooses not to install a wall on the lot line, 706.1.1 does not mandate installation of the wall, only compliance if the wall is provided. Clearly that is not the intent. There is no provision that states a building cannot cross a lot line. The commentary to this section suggests use of a party wall is an option to back to back exterior walls, which goes back to fire separation distance (FSD) requirements. But, neither the FSD definition nor section 705 mention use of the FSD requirements for interior lot lines. Section 705 is exterior walls and the definition of exterior wall does not include walls on property lines, it is specific to "enclosing" walls of a building. The intent for party walls to be required on lot lines is further supported by 706.1.1 exception 2, which would not be necessary if the intent of 706.1.1 was not to required party walls whenever a lot line divides a building. The designer could just choose not to install the wall and exception 2 would not be necessary. Clearly the intent is that a party wall is to be provided on a lot line dividing a building.This code change clearly states the requirement to install the party wall on the lot line. The clause in 706.1.1, which effectively defines the "party wall" term has been moved to Section 202 as a formal definition. This is a cleaner approach to referring to the wall as both an undefined "party wall" and a defined "fire wall" within section 706.1.1. Text has been added to 706.1.1 to clearly state that a party wall shall be installed on lot lines that divide buildings.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This code change is editorial so there is no cost impact to calculate.

FS22-24

FS23-24

IBC: 706.3

Proponents: David Bueche, Hoover Treated Wood Products, Hoover Treated Wood Products (dbueche@frtw.com)

2024 International Building Code

Revise as follows:

706.3 Materials.
Fire walls shall be of any *approved* noncombustible materials.

Exception: *Buildings* of Type <u>III or</u> V construction.

Reason: Type III construction allows use of untreated combustible materials in all locations except in a fire wall or an exterior wall. The code already allows 2 hour exterior wall to be constructed of fire-retardant-treated wood in lieu of noncombustible materials in Type III construction. It makes sense to extend that to a fire wall as the performance would be no different. This code change eliminates any potential conflict with Section 602.3.

Furthermore, building a fire wall using a completely different construction method such as concrete or masonry not employed in the remainder of the building requires a specialty contractor. This may result in scheduling and coordination conflicts and delays that necessarily result in higher costs.

Note that the fire resistances listed in Table 706.4 remain unchanged.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0.00

The addition of fire-retardant-treated wood as an option to this section of the code may decrease the cost of construction.

Estimated Immediate Cost Impact Justification (methodology and variables):

Fire-retardant-treated wood is generally less expensive than noncombustible materials. Because FRTW may be used as an alternate to these materials, the cost may be less.

FS23-24

FS24-24

IBC: 706.5

Proponents: Tim Pate, City and County of Broomfield, Colorado Chapter Code Development Committee (tpate@broomfield.org)

2024 International Building Code

Revise as follows:

706.5 Horizontal continuity.
Fire walls shall be continuous from *exterior wall* to *exterior wall* and shall extend not less than 18 inches (457 mm) beyond the exterior surface of *exterior walls*.

Exceptions:

1. *Fire walls* shall be permitted to terminate at the interior surface of combustible exterior sheathing or siding provided that the *exterior wall* has a *fire-resistance rating* of not less than 1 hour for a horizontal distance of not less than 4 feet (1220 mm) on both sides of the *fire wall*. Openings within such *exterior walls* shall be protected by opening protectives having a *fire protection rating* of not less than $^3/_4$ hour.
2. *Fire walls* shall be permitted to terminate at the interior surface of *fire-retardant-treated-wood* or noncombustible exterior sheathing, exterior siding or other noncombustible exterior finishes provided that the sheathing, siding or other exterior noncombustible finish extends a horizontal distance of not less than 4 feet (1220 mm) on both sides of the *fire wall*.
3. *Fire walls* shall be permitted to terminate at the interior surface of *fire-retardant-treated-wood* or noncombustible exterior sheathing where the *building* on each side of the *fire wall* is protected by an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2.

Reason: This proposal is to add fire retardant treated wood in addition to the noncombustible sheathing in 706.5 exception 2 and 3. This would be equivalent to 706.6 #4 for vertical continuity which requires fire-retardant-treated wood roof sheathing for roof sheathing or installing the ⅝" type X drywall to underside of regular roof sheathing.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal will not increase or decrease cost of construction since it is adding another type of product to meet the code

FS24-24

FS25-24

IBC: 706.5.1

Proponents: Tim Pate, City and County of Broomfield, Colorado Chapter Code Development Committee (tpate@broomfield.org)

2024 International Building Code

Revise as follows:

706.5.1 Exterior walls.
Where the *fire wall* intersects *exterior walls* and the *exterior walls* form an angle on the exterior of the building of less than 180 degrees (3.14 rad), the *fire-resistance rating* and opening protection of the *exterior walls* shall comply with one of the following:

1. The *exterior walls* on both sides of the *fire wall* shall have a 1-hour *fire-resistance rating* with $^3/_4$-hour protection where opening protection is required by Section 705.9. The *fire-resistance rating* of the *exterior wall* shall extend not less than 4 feet (1220 mm) on each side of the intersection of the *fire wall* to *exterior wall*. ~~*Exterior wall* intersections at *fire walls* that form an angle equal to or greater than 180 degrees (3.14 rad) do not need exterior wall protection.~~
2. *Buildings* or spaces on both sides of the intersecting *fire wall* shall assume to have an imaginary *lot line* at the *fire wall* and extending beyond the exterior of the *fire wall*. The location of the assumed line in relation to the *exterior walls* and the *fire wall* shall be such that the *exterior wall* and opening protection meet the requirements set forth in Sections 705.5 and 705.9. ~~Such protection is not required for *exterior walls* terminating at *fire walls* that form an angle equal to or greater than 180 degrees (3.14 rad).~~

Reason: This proposal is to move the language in 706.5.1 #1 and #2 for the location of fire wall to the main scope of section 706.5.1 and to modify the language to only apply to exterior walls that form an angle of less than 180 degrees, rather than indication when the requirements do not apply. The horizontal continuity of the fire wall is dealt with in section 706.5 and fire rating and opening protection is listed in that section based on installing an 18" fire wall projection or one of the three exceptions.

This change is proposed to revise the current language that indicates when "exterior wall protection" is not needed to instead indicate when a "fire-resistance rating and opening protection" is needed in the exterior walls. The current language is problematic in that it talks about "exterior wall protection", but never indicates what this is since this term is not used elsewhere in this section. Because of this, designers have mis-interpreted this as being not only an exception to the exterior wall requirements in 706.5.1, but also an exception to the fire wall continuity requirements in 706.5 that has similar wording in Exception 1. The revised wording makes it clear when the requirements of 706.5.1 apply and cannot be mis-interpreted as an exception to 706.5 Exception 1.

There is also added language to help explain where the angle is measured (on exterior).

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal will not have any cost impact since it is modifying language to clarify the code requirements

FS25-24

FS26-24

IBC: 707.3, 707.3.12 (New)

Proponents: Micah Chappell, Seattle Department of Construction and Inspections, Seattle Department of Construction and Inspections (micah.chappell@seattle.gov); Ardel Jala, Seattle Dept of Construction & Inspections, Seattle Dept of Construction & Inspections (ardel.jala@seattle.gov)

2024 International Building Code

707.3 Fire-resistance rating.
The *fire-resistance rating* of *fire barriers* shall comply with this section.

Add new text as follows:

707.3.12 **Energy Storage Systems.** The *fire barrier* separating *energy storage systems* from other spaces in the building shall have a minimum 2-hour *fire-resistance rating.*

Reason: The 2024 International Fire Code (IFC) requires fire barriers provide a 2-hour fire resistance rating when separating areas containing energy storage systems (ESS), from other areas of the building, and has a pointer to Section 707 of the International Building Code (IBC). This proposed additional language to Section 707.3 of the IBC provides the minimum fire resistance rating required for those fire barriers aligning the IBC with IFC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The IFC already required the rated separation and this code change proposal only aligns the IBC with the existing requirement.

FS26-24

FS27-24

IBC: 707.4, 707.4.1 (New), 707.4.2 (New), 708.5.1 (New)

Proponents: Angela Haupt, City of Kirkland, City of Kirkland WA, Plan Review Supervisor (ashaupt@kirklandwa.gov); Jonathan Siu, Jon Siu Consulting, LLC, Self

2024 International Building Code

Revise as follows:

707.4 Exterior walls. ~~Where *exterior walls* serve as a part of a required fire-resistance-rated *shaft,* or separation or enclosure for a *stairway, ramp* or *exit passageway*, such walls shall comply with the requirements of Section 705 for *exterior walls* and the fire-resistance-rated enclosure or separation requirements shall not apply.~~ <u>Exterior walls that are a part of a rated enclosure or intersect a fire barrier, shall comply with Section 707.4.1 and 707.4.2.</u>

~~**Exceptions:**~~

1. ~~*Exterior walls* required to be *fire-resistance rated* in accordance with Section 1021 for exterior egress balconies, Section 1023.7 for *interior exit stairways and ramps,* Section 1024.8 for *exit passageways* and Section 1027.6 for *exterior exit stairways and ramps.*~~
2. ~~*Exterior walls* required to be *fire-resistance rated* in accordance with Section 1207 of the *International Fire Code* for enclosure of energy storage systems.~~

Add new text as follows:

<u>**707.4.1 Exterior walls of shafts, separations, or stairway, ramp, or exit passageway enclosures.** Where *exterior walls* serve as a part of a required fire-resistance-rated *shaft*, or separation or enclosure for a *stairway*, *ramp* or *exit passageway*, such walls shall comply with the requirements of Section 705 for *exterior walls* and the fire-resistance-rated enclosure or separation requirements shall not apply.</u>

<u>**Exceptions:**</u>

1. <u>*Exterior walls* required to be *fire-resistance rated* in accordance with Section 1021 for exterior egress balconies, Section 1023.7 for *interior exit stairways and ramps*, Section 1024.8 for *exit passageways* and Section 1027.6 for *exterior exit stairways* and *ramps.*</u>
2. <u>*Exterior walls* required to be *fire-resistance rated* in accordance with Section 1207 of the *International Fire Code* for enclosure of energy storage systems.</u>

<u>**707.4.2 Fire barrier intersections at exterior walls.** Where *fire barriers* other than those in Section 707.4.1 intersect exterior walls, the fire-resistance rating and opening protection of the exterior walls shall comply with one of the following:</u>

1. <u>The exterior walls on both sides of the *fire barrier* shall have the same *fire-resistance rating* as the *fire barrier*with opening protection in accordance with Section 716. The fire-resistance rating of the exterior wall shall extend not less than 4 feet (1220) on each side of the intersection of the fire partition to exterior wall.</u>

2. <u>Spaces on both sides of the intersecting *fire barrier* shall assume to have an imaginary lot line at the *fire barrier* and extending beyond the exterior of the *fire barrier*. The location of the assumed line in relation to the exterior walls and the *fire barrier* shall be such that the exterior wall and opening protection meet the requirements set forth in Sections 705.5 and 705.9.</u>

<u>**Exception:** *Exterior walls* forming an angle equal to or greater than 180 degrees (3.14 rad) at intersections with *fire barriers* do not need to be fire-resistance rated and openings do not need a fire protection rating unless otherwise required by this code.</u>

<u>**708.5.1 Dwelling and sleeping unit separation walls.** Where *exterior walls* intersect *fire partitions* required in Section 420.2 to separate</u>

dwelling or sleeping units from each other and from other occupancies, the *fire-resistance rating* and opening protection of the *exterior walls* shall comply with one of the following:

1. The *exterior walls* on both sides of the *fire partition* shall have the same *fire-resistance rating* as the *fire partition* with opening protection in accordance with Section 716. The *fire-resistance rating* of the *exterior wall* shall extend not less than 4 feet (1220 mm) on each side of the intersection of the *fire partition* to *exterior wall*.
2. Spaces on both sides of the intersecting *fire partition* shall assume to have an imaginary lot line at the *fire partition* and extending beyond the exterior of the *fire partition*. The location of the assumed line in relation to the *exterior walls* and the *fire partition* shall be such that the *exterior wall* and opening protection meet the requirements set forth in Sections 705.5 and 705.9.

Exception: *Exterior walls* forming an angle equal to or greater than 180 degrees (3.14 rad) at intersections with *fire partitions* do not need to be fire-resistance rated and openings do not need a *fire protection rating* unless otherwise required by this code.

Reason: The purpose of this code change proposal is to provide a measure of protection to prevent fire from spreading around fire barriers and dwelling/sleeping unit fire partitions where they intersect exterior walls.

Fire barriers are required for separated occupancies and fire area separations, among other building elements. The fire barriers are required to be fire-resistance rated, and openings in them are required to be protected. The point of these requirements is to prevent the spread of fire within the building. However, there is no requirement protection provided where the fire barriers intersect exterior walls. Thus, the current code would allow the spread of fire between adjacent compartments, around the end of the fire barrier, via unprotected walls and openings in exterior walls. As shown in Figure 1 below, a door in the fire barrier immediately adjacent to the intersection with the exterior wall would be required to have a fire protection rating, but the openings adjacent to the same intersection could be unrated. This does not make sense, as a fire in Compartment B can easily flank the end of the fire barrier and enter Compartment A.

Similarly, the code requires fire-resistance rated construction and opening protection between dwelling units/sleeping rooms, separating each from themselves, each other and between them and other occupancies. However, the code does not address the separation between them if it is an exterior wall of the same building. If there are dwelling units separated with a fire partition that terminates at an exterior wall that is less than 180 degrees, such as the inside corner of a court or L shaped structure, the exterior walls have no requirement for fire protection and no restrictions on openings. See Figure 2 for a real-life example. If instead there are two residential towers that meet at their corners to form a 90 degree angle, then per IBC 705.3 an imaginary lot line is required between the buildings. In this case fire separation distance and opening protection is required for both structures. Whether the exterior walls are two separate dwelling units in the same building or in an adjacent building, fire travels the same. With unrated walls and openings in close proximity to each other, the fire can travel from one unit to the next more easily, similar to the scenario in Figure 1.

This code change proposal addresses these issues by requiring either 4-foot “wings” on either side of the fire barriers (Section 707.4.2, Item 1) or fire partitions (Section 708.5.1, Item 1) or providing exterior wall ratings and opening protection required by the location of an imaginary property line (Item 2 of each section). Figure 3 shows an example of how this can be done for the fire barrier scenario shown in Figure 1 but could be applied to fire partitions as well. The proposed language is based on the parallel requirements for fire walls and only applies where the exterior walls form an angle of less than 180 degrees. It also does not apply to exterior walls for fire-resistance-rated *shafts,* or separation or enclosure for a *stairway, ramp* or *exit passageway.*

The struck-through text in Section 707.4 has been relocated to Section 707.4.1 without change.

There is an ever-increasing demand for greater density housing. Architects are becoming more creative in their designs and how to maximize the number of units in a given space. This means more units with more uniquely shaped buildings that provide the highest amount of exterior wall area that meet light and ventilation requirements. Requiring the exterior walls and openings of separate dwelling units to meet the fire ratings required as if they are separate buildings is a needed improvement for life safety.

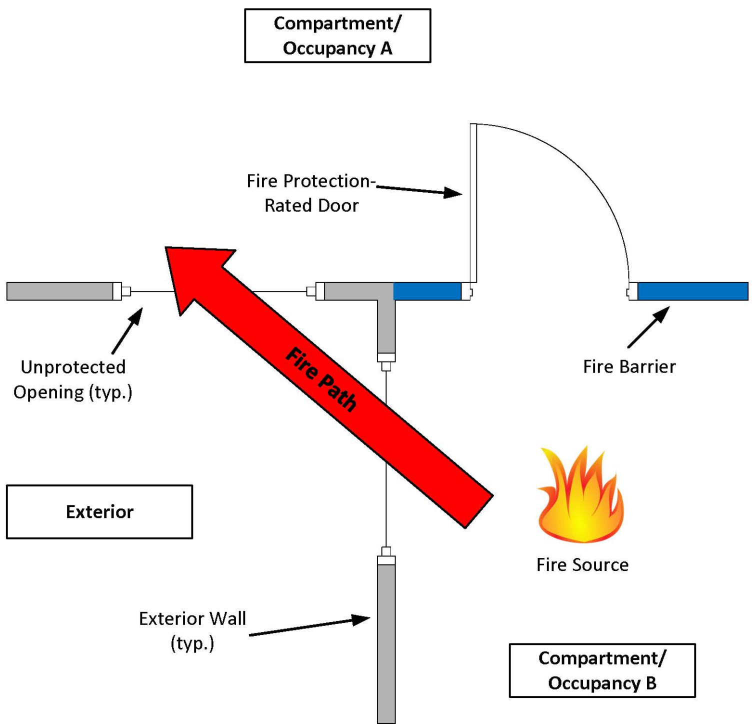


Figure 1 – Current code allows fire to go around the fire barrier

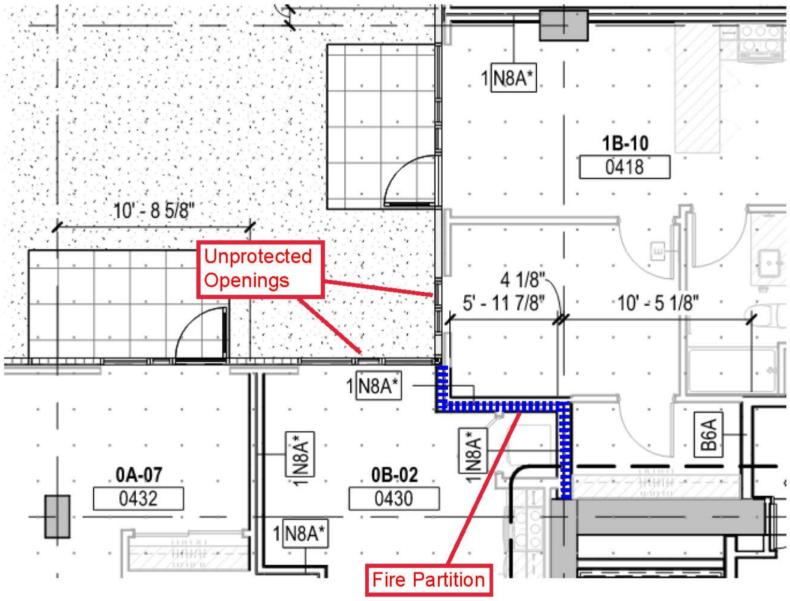


Figure 2 - Unit Separation Wall (Fire Partition)

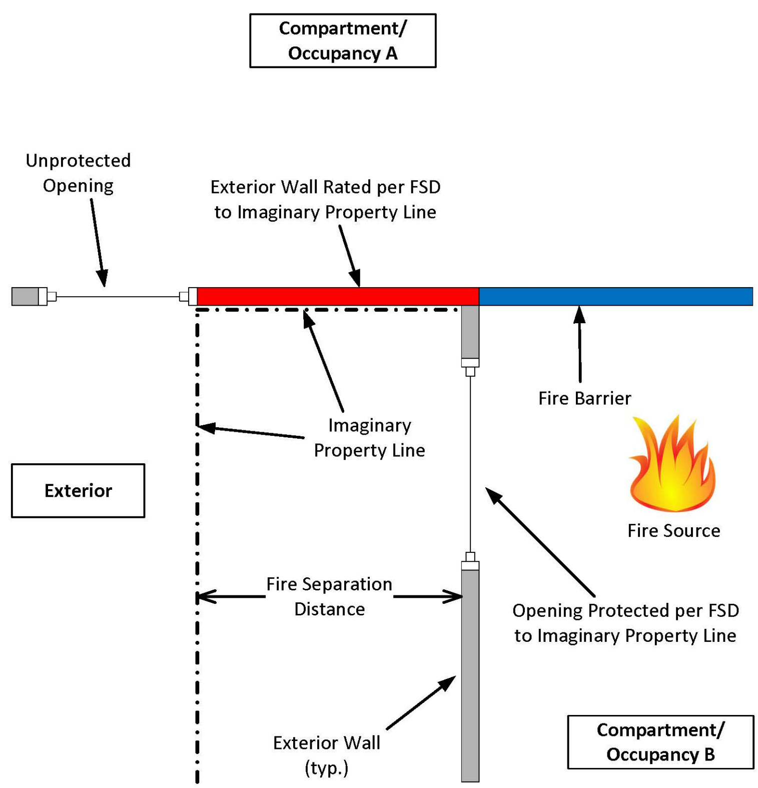


Figure 3 – Example Imaginary Property Line Solution

Cost Impact: Increase

Estimated Immediate Cost Impact:

This change may increase the cost of portions of exterior walls by requiring the use of fire-rated construction and protected openings where it wasn't previously required.

Estimated Immediate Cost Impact Justification (methodology and variables):

Currently, exterior walls adjoining fire barriers and fire partitions do not require fire-rating or protected openings except for specific conditions such as construction type and fire separation distance. This new provision would require exterior walls that are less than 180 degrees at the fire barrier or fire partition intersection to possibly be fire rated with protected openings for a minimal distance of 4 feet. These new provisions would not apply to all exterior walls that intersect fire barriers and fire partitions. The fire rating and opening protection requirements would normally apply at narrow interior courts, inside corners of courts, recessed wall areas and inside corners of non-rectangular structures. The impact can also be mitigated by using design techniques such as shifting openings and proper placement of the fire barriers and fire partitions away from inside corners or recesses. For mid-rise type V-B wood frame multi-family buildings that don't typically require rated exterior walls, the added cost will be equivalent to two layers of Type X GWB, one on the interior and one on the exterior.

Non-rated wood wall cost: $10 + $17 = $27/4ft width
Fire-rated wood shear wall cost: $20 + $20 = $40/4ft section width
Difference in cost= $13/4ft width

For steel construction that doesn't typically require rated exterior walls, the added cost would be a layer of DensGlass on the exterior and type X GWB on the inside.

Non-rated steel construction: $10/4ft width
Fire-rated steel construction: $28 + $20 = $48/4ft section width
Difference in cost= $38/4ft width

Protected openings (doors & windows) can add $200-$900 depending on the size and rating.
Approximate prices of materials:

For Rated Walls

(Wood Construction) 5/8 x 4 x 8 sheet Type X Gypsum Exterior & Interior - $20

(Steel Construction) 5/8 x 4 x 8 DensGlass Gold Fireguard- $28

Non-rated Walls

(Wood Construction for Shear walls) OSB/CDX Exterior - $17
(Steel and wood interior) Drywall - $10

Fire-rated Doors
Avg $650
Fire-rated Glazing
Avg $200-$400

Estimated Life Cycle Cost Impact:

N/A

Estimated Life Cycle Cost Impact Justification (methodology and variables):

N/A

FS27-24

FS28-24

IBC: 707.5.1

Proponents: Paul Battaglia, STC Sound Control, STC Sound Control (paul@stcsoundcontrol.com)

2024 International Building Code

Revise as follows:

707.5.1 Supporting construction.
The supporting construction for a *fire barrier* shall be protected to afford the required *fire-resistance rating* of the *fire barrier* supported. Hollow vertical spaces within a *fire barrier* shall be fireblocked in accordance with Section 718.2 at every floor level.

Exceptions:

1. The maximum required *fire-resistance rating* for assemblies supporting *fire barriers* separating tank storage as provided for in Section 415.9.1.2 shall be 2 hours, but not less than required by Table 601 for the building construction type.
2. Supporting construction for 1-hour *fire barriers* required by Table 509.1 in *buildings* of Types IIB, IIIB and VB construction is not required to be *fire-resistance rated* unless required by other sections of this code.
3. Supporting construction for 1- and 2-hour fire barriers in buildings of Type IIB, IIIB and VB construction is not required to be fire resistance rated in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2.

Reason: Section 707.5.1 of the IBC requires protection of supporting construction for a fire barrier, which is a reasonable requirement. Exception 2 to the paragraph allows an exception for 1-hour fire barriers in buildings of Type IIB, IIIB and VB construction. This exception is also reasonable since the structure of these buildings have no protection per Table 601 and protection of the supporting construction alone has no perceivable benefit.

We propose that the exceptions be expanded to **include 2-hour fire barriers,** based upon the provision that the building is protected throughout with **an automatic sprinkler system.** Sprinklers provide an additional level of safety for the building and protection of the supporting construction alone has no perceivable benefit.

Proposed text: **ADD the following Exception to 707.5.1:**

"3. Supporting construction for 1- and 2-hour fire barriers in buildings of Type IIB, IIIB and VB construction is not required to be fire-resistance rated in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2."

Cost Impact: Decrease

Estimated Immediate Cost Impact:

The total cost of materials and labor for fire protection is decreased, dependent on scope of the project.

Estimated Immediate Cost Impact Justification (methodology and variables):

Example: A recent project had 2 fire stairs and 2 elevators, each 4 stories (basement through 3rd floor). Fire protection of steel supporting the 2-hour fire partitions at the vertical openings cost $129,700. The building has 89,568 gsf, so the additional cost is $1.45 psf for the project budget. This should be comparable to other buildings.

Estimated Life Cycle Cost Impact:

The savings are included in a lower initial construction cost, assuming the building is sprinklered for other reasons. Life cycle cost impacts are lower due to lower debt service costs.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

The savings are included in a lower initial construction cost, assuming the building is sprinklered for other reasons. Life cycle cost impacts are lower due to lower debt service costs. Example: With a 6%, 30-year mortgage the annual savings for the $1.45 psf cost is $0.105 psf, so a 100,000 sf building would save $10,534 annually. For the term of the mortgage the cost savings would be $316,017.

FS29-24

IBC: SECTION 202, 707.9, 715.6

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Building Code

Revise as follows:

[BF] CONTINUITY HEAD-OF-WALL SYSTEM. An assemblage of specific materials or products that are designed to resist the passage of fire through voids created at the intersection of fire barriers and the underside of floor or roof assemblies that are not fire-resistance rated for a prescribed period of time.

707.9 Voids at intersections.
The voids created at the intersection of a *fire barrier* and a nonfire-resistance-rated floor assembly, nonfire-resistance-rated *roof assembly* or a nonfire-resistance-rated *exterior wall* assembly shall comply with Section 715.

715.6 Fire barrier/nonfire-resistance-rated floor or roof assembly intersections.
Voids created at the intersection of a fire barrier and the underside of a nonfire-resistance-rated floor or roof sheathing, slab or deck above shall be filled by an *approved* material or system to retard the passage of fire and hot gases, or shall be protected by an *approved continuity head-of-wall system* tested in accordance with ASTM E2837 to provide an *F rating*/*T rating* for a time period not less than the required *fire-resistance rating* of the *fire barrier* in which it is installed.

Reason: By adding the word "floor" this proposal provides additional language which is consistent with the language already found in Section 707.5 covering the fire barrier continuity provisions. Although the continuity provisions imply the protection of the void above a fire barrier, the new language provides much needed specific guidance which will ensure proper continuity when this construction scenario is encountered within the built environment.Adding the word "floor" ensures that the space above the top of a fire barrier wall, and below the non-rated horizontal construction above is properly filled by an approved material or system.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal does not increase cost of construction. The continuity provisions contained in Section 707.5 requires any void at the top of wall to be protected whether it is a roof assembly or the underside of a floor assembly. Although adding the word floor is new language, it simply confirms a requirement already contained in Section 707.5 covering the fire barrier continuity provisions. This new language provides additional details on how to maintain the continuity. The need to protect this void between the top of the wall and the floor or roof, slab, or deck is already required.

FS29-24

FS30-24

IBC: 708.1, 708.4.2

Proponents: David Renn, PE, SE, City and County of Denver, Colorado Chapter Code Development Committee (david.renn@denvergov.org)

2024 International Building Code

708.1 General.
The following wall assemblies shall comply with this section:

1. Separation walls as required by Section 420.2 for Group I-1 and Group R occupancies.
2. Walls separating tenant spaces in *covered and open mall buildings* as required by Section 402.4.2.1.
3. *Corridor* walls as required by Section 1020.3.
4. Enclosed elevator lobby separation as required by Section 3006.3.
5. Egress balconies as required by Section 1021.2
6. Walls separating *ambulatory care facilities* from adjacent spaces, *corridors* or tenants as required by Section 422.2.
7. Walls separating *dwelling and sleeping units* in Groups R-1 and R-2 in accordance with Sections 907.2.8.1 and 907.2.9.1.
8. Vestibules in accordance with Section 1028.2.

Revise as follows:

708.4.2 Supporting construction.
The supporting construction for a *fire partition* shall have a *fire-resistance rating* that is equal to or greater than the required *fire-resistance rating* of the supported *fire partition*.

> **Exception:** In *buildings* of Types IIB, IIIB and VB construction, the supporting construction requirement shall not apply to *fire partitions* separating tenant spaces in *covered and open mall buildings, fire partitions* separating *dwelling units*, *fire partitions* separating *sleeping units*, *fire partitions* serving as *corridor* walls, *fire partitions* separating *ambulatory care facilities* from adjacent spaces or *corridors, fire partitions* separating *dwelling and sleeping units* ~~from~~ in ~~Group~~ Groups R-1 and R-2 in accordance with Sections 907.2.8.1 and 907.2.9.1, ~~occupancies~~ and *fire partitions* separating vestibules from the *level of exit discharge* .

Reason: This proposal corrects what is believed to be a typo in the current language which includes "fire partitions separating dwelling and sleeping units from Group R-1 and R-2 occupancies", which makes no sense since dwelling and sleeping units are Group R-1 and R-2 occupancies. This portion of the exception was added in the 2021 code through proposal FS33-18 with included "in Group R-1 and R-2" instead of "from Group R-1 and R-2" and this proposal makes a change to reflect this. Also, this portion of the exception was intended to match the new Item 7 that was added to 708.1 through FS33-18. To clarify this further, wording is revised to match Item 7 with reference to 907.2.8.1 and 907.2.9.1, which require fire partitions as part of exceptions for manual fire alarm systems - this is needed to distinguish this from fire partitions separating dwelling units and sleeping units that are included earlier in this exception.

Note that Section 708.1 is included in this proposal as reference only - there are no changes proposed to this section.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is editorial in nature to change the wording in the exception to match the wording in Section 708.1, so there will be no cost impact.

FS30-24

FS31-24

IBC: 709.10 (New)

Proponents: Jeff O'Neil, Chair, Committee on Healthcare (ahc@iccsafe.org); William Koffel, Koffel Associates, Inc., California Solar and Storage Association (CALSSA) (wkoffel@koffel.com)

2024 International Building Code

Add new text as follows:

709.10 Separating smoke compartments. Where the horizontal assembly is required to be a smoke barrier, the assembly shall comply with Section 909.

Reason: The code does not completely address where the floors (horizontal assemblies) are required to also be designed as smoke barriers. Section 711.2.4.4 sends you to Section 709 for smoke barriers that are horizontal assemblies. Smoke compartments are required in ambulatory care, Group I-1 Condition 2, Group I-2 and Group I-3. Pressurized stairways also use horizontal smoke barriers.

As indicated in Section 422.3, smoke barriers shall be provided on any story containing an ambulatory care facility which is greater than 10,000 sq. ft. in area. The creation of smoke compartments is required to allow a protect-in-place environment. These compartments allow staff a safer environment to stabilize the care recipients before evacuation and protection for fire personnel who may have to evacuate both care recipients and staff. The requirement for a smoke barrier is based solely on a story-by-story basis without consideration of fire-resistance ratings for the floor assemblies. As such, a smoke barrier is not required for the floor assemblies.

Since the primary performance of smoke barriers is to achieve protection on the fire floor, the supporting construction is not required to provide the same degree of fire resistance for buildings of Types IIB, IIIB and VB construction as specified in Section 709.4. These three construction types are identified since the floor construction is not otherwise required to have a fire-resistance rating and it is not considered essential to require fire-resistance-rated floor construction due to the floor supporting a smoke barrier. As such, since the building in question is of Type IIB construction, the supporting construction for the smoke barrier is not required to have a fire-resistance rating.

This proposal is submitted by the ICC Committee for Healthcare (CHC).
The Committee on Healthcare (CHC) was established by the ICC Board of Directors in 2011 to pursue opportunities to study and develop effective and efficient provisions for Hospital, Nursing Homes, Assisted Living and Ambulatory Care Facilities. This committee was formed in cooperation with the American Society for Healthcare Engineering (ASHE). In July of 2017, the ICC Board made CHC a standing committee. In 2023 the CHC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the CHC website at CHC webpage.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is a clarification with no change to construction requirements. Please refer to the reason statement.

FS31-24

FS32-24

IBC: 711.2.3

Proponents: Jeffrey Evans, Codified Life Safety, Codified Life Safety (jevans@codifiedlifesafety.com)

2024 International Building Code

Revise as follows:

711.2.3 Supporting construction.
The supporting construction shall be protected to afford the required *fire-resistance rating* of the *horizontal assembly* supported.

Exception: In *buildings* of Type IIB, IIIB or VB construction, the construction supporting the *horizontal assembly* is not required to be fire-resistance rated at the following:

1. *Horizontal assemblies* at the separations of incidental uses as specified by Table 509.1 provided that the required *fire-resistance rating* does not exceed 1 hour.
2. *Horizontal assemblies* at the separations of *dwelling units* and *sleeping units* as required by Section 420.3, and Section 420.2 where unit separation wall continuity is in accordance with Section 708.4, Item 2.
3. *Horizontal assemblies* at *smoke barriers* constructed in accordance with Section 709.

Reason: The existing provisions exempting rated supporting construction for horizontal assemblies separating dwelling units only references horizontal assemblies provided per 420.3. Whereas a horizontal assembly may be provided in a building of Type IIB, IIIB, or VB for the purpose of fire partition vertical continuity in accordance with 708.4, Item 2, the lack of reference to this section in the horizontal assembly rated supporting construction exceptions suggests that rated supporting construction is required for a horizontal assembly when it is only provided for dwelling/sleeping unit separation as part of the permitted fire partition continuity. Without reference to 708.4, Item 2, in the horizontal assembly rated supporting construction exceptions, horizontal assemblies in buildings of Type IIB, IIIB, and VB that are only provided for fire partition dwelling/sleeping unit separation continuity are the only assemblies required to have rated supporting construction, which is inconsistent with the principal that dwelling/sleeping unit separations in buildings of non-rated construction types do not require rated supporting construction as established in Sections 708.4.1 and 711.2.3.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0.

This clarification has the potential to save the initial construction cost of providing rated supporting construction for horizontal assemblies serving as fire partition vertical continuity.

Estimated Immediate Cost Impact Justification (methodology and variables):

The decrease in construction cost will only apply in the limited case of jurisdictions where rated supporting construction is being required for horizontal assemblies providing continuity for unit separation walls in buildings of non-rated construction types.

Estimated Life Cycle Cost Impact:

There will be no change to life cycle cost resulting from this clarification.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

Structural fire-resistance is understood to have limited life cycle costs.

FS32-24

FS33-24

IBC: 711.2.3

Proponents: David Renn, PE, SE, City and County of Denver, Colorado Chapter Code Development Committee (david.renn@denvergov.org)

2024 International Building Code

Revise as follows:

711.2.3 Supporting construction.
The supporting construction shall be protected to afford the required *fire-resistance rating* of the *horizontal assembly* supported.

Exception: In *buildings* of Type IIB, IIIB or VB construction, the construction supporting the *horizontal assembly* is not required to be fire-resistance rated at the following:

1. *Horizontal assemblies* at the separations of incidental uses as specified by Table 509.1 provided that the required *fire-resistance rating* does not exceed 1 hour.
2. *Horizontal assemblies* at the separations of *dwelling units* and *sleeping units* as required by Section 420.3.
3. *Horizontal assemblies* at *smoke barriers* constructed in accordance with Section 709.
4. <u>*Horizontal assemblies* that have a *fire-resistance-rating* for the sole purpose of complying with Section 708.4 for *fire partition* continuity and the *fire partition* is exempt from supporting construction requirement of Section 708.4.2.</u>

Reason: In non-rated construction types IIB, IIIB and VB, it is common to provide a fire-resistance-rating (FRR) at roofs to allow fire partitions to stop at the ceiling of the roof/ceiling assembly, as allowed by Section 708.4 Item 2. Where these fire partitions are exempt from supporting construction requirements, such as for dwelling or sleeping unit separations, there is no need for the horizontal assembly above these fire partitions to have supporting construction with the same FRR as the roof. Also, Section 711.2.3 Exception Item 2 allows horizontal assemblies that separate dwelling units and sleeping units to not have a supporting construction fire-resistance-rating - this item is intended for floors but is also used to justify not having a supporting construction fire-resistance-rating at the roof since the roof completes the separation between side by side units when the fire partition stops at the ceiling, but this is not completely clear in the current wording.

This proposal adds a 4th item to the exception for horizontal assembly supporting construction FRR to make it clear that this is not required when the FRR is only provided for fire partition continuity requirements and the fire partition itself is exempt from supporting construction requirements. It is believed that this proposal is in line with current design and construction practices since it meets the intent of the exception for fire partition supporting construction requirements.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is a clarification as it is in line with current design and construction practices since it meets the intent of the exception for fire partition supporting construction requirements, so it will have no cost impact.

FS33-24

FS34-24

IBC: 711.2.4, 711.2.4.7 (New)

Proponents: Micah Chappell, Seattle Department of Construction and Inspections, Seattle Department of Construction and Inspections (micah.chappell@seattle.gov); Ardel Jala, Seattle Dept of Construction & Inspections, Seattle Dept of Construction & Inspections (ardel.jala@seattle.gov)

2024 International Building Code

711.2.4 Fire-resistance rating.
The *fire-resistance rating* of *horizontal assemblies* shall comply with Sections 711.2.4.1 through 711.2.4.6 but shall be not less than that required by the *building* type of construction.

Add new text as follows:

711.2.4.7 Energy Storage Systems. Where the *horizontal assembly* separates *energy storage systems* from the remainder of the building, the assembly shall have a minimum 2-hour *fire-resistance rating*.

Reason: The 2024 International Fire Code (IFC) requires horizontal assemblies provide a 2-hour fire resistance rating when separating areas containing energy storage systems (ESS), from other areas of the building, and has a pointer to Section 711 of the International Building Code (IBC). This proposed additional language to Section 711.2 of the IBC provides the minimum fire resistance rating required for those horizontal assemblies aligning the IBC with IFC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The IFC already required the rated separation and this code change proposal only aligns the IBC with the existing requirement.

FS34-24

FS35-24

IBC: 711.2.4, 711.2.4.7 (New), 711.3, 711.3.3 (New)

Proponents: William Koffel, Koffel Associates, Inc., Firestop Contractors International Association (FCIA) (wkoffel@koffel.com)

2024 International Building Code

Revise as follows:

711.2.4 Fire-resistance rating.
The *fire-resistance rating* of *horizontal assemblies* shall comply with Sections 711.2.4.1 through ~~711.2.4.6~~ 711.2.4.7 but shall be not less than that required by the *building* type of construction.

Add new text as follows:

711.2.4.7 Occupiable roofs. Occupiable roofs shall have penetrations protected in accordance with Section 714 and joints and voids protected in accordance with Section 715. Skylights shall not be located within the occupied area of occupiable roofs.

711.3 Nonfire-resistance-rated floor and roof assemblies.
Nonfire-resistance-rated floor, floor/ceiling, roof and roof/ceiling assemblies shall comply with Sections 711.3.1 and 711.3.2.

Add new text as follows:

711.3.3 Occupiable roofs. Occupiable roofs shall have penetrations, joints and voids protected with materials or systems that prevent the spread of fire through the roof assembly. Skylights shall not be located within the occupied area of occupiable roofs.

Reason: When a roof becomes occupied or occupiable, the safety of the occupants on the roof becomes the same as if they were standing on the floor below. Without a fire-resistance rating and protected penetrations, joints and voids along with restrictions for skylights in the occupied roof area, the occupants are exposed to a fire and life safety risk. When a roof becomes occupied or occupiable, the safety of the occupants on the roof becomes the same as if they were standing on the floor below. Without a fire-resistance rating and protected penetrations, joints and voids, along with regulations for skylights in the occupied roof area, the occupants are exposed to a fire and life safety risk.

The proposal builds on the concept of occupiable roofs, added to the 2024 IBC.

Cost Impact: Increase

Estimated Immediate Cost Impact:

The estimated cost is $35 - $50 per installed firestop system and $35 - $50 per lineal ft. of installed joint sytems.

Estimated Immediate Cost Impact Justification (methodology and variables):

The estimate includes materials and labor costs for any type of penetration system and fire-resistant joint system through a roof assembly. The total cost for any specific building will depend upon the number of penetrations and joint systems.

FS35-24

FS36-24

IBC: 712.1.9

Proponents: Ronald Geren, RLGA Technical Services, LLC, Self (ron@specsandcodes.com)

2024 International Building Code

Revise as follows:

712.1.9 Two-story openings.
In other than Groups I-2 and I-3, a vertical opening that is not used as one of the applications specified in this section shall be permitted if the opening complies with all of the following items:

1. Does not connect more than two *stories.*
2. Does not penetrate a *horizontal assembly* that separates *fire areas* or *smoke barriers* that separate *smoke compartments*.
3. Is not concealed within the construction of a wall or a floor/ceiling assembly.
4. Is ~~not open to~~separated from a *corridor* in Group I and R occupancies by a fire-resistance-rated assembly tested under ASTM E119 or UL 263, or by *smoke partitions* complying with Section 710. In addition, doors protecting openings in the *smoke partitions* shall comply with Sections 710.5.2.2 and 710.5.2.3. Doors in other fire-resistance-rated assemblies shall comply with Section 716.2.2.
5. Is ~~not open to~~separated from a *corridor* on nonsprinklered floors by a fire-resistance-rated assembly tested under ASTM E119 or UL 263, or by *smoke partitions* complying with Section 710. In addition, doors protecting openings in the *smoke partitions* shall comply with Sections 710.5.2.2 and 710.5.2.3. Doors in other fire-resistance-rated assemblies shall comply with Section 716.2.2.
6. Is separated from floor openings and air transfer openings serving other floors by construction conforming to required *shaft enclosures.*

Reason: The words "not open to" in items #4 and #5 are not defined or described. "Not open to" could be interpreted to mean not atmospherically connected and separated by some physical barrier without openings. Or "not open to" could mean that openings are allowed, but there are means of controlling the passage of smoke between the two-story opening and the adjacent corridors.

This proposal eliminates the ambiguity by replacing the words "not open to" with specific provisions that define when a two-story opening is "not open to" a corridor.

Since the intent is to eliminate the passage of smoke from a two-story opening into a corridor under the stated circumstances, providing a means of controlling the smoke is the only option, and the provisions for fire-resistance-rated assemblies and smoke partitions offer that capability.

Cost Impact: Increase

Estimated Immediate Cost Impact:

For jurisdictions requiring some form of physical separation with no openings (i.e., doors and windows) between the two-story opening and a corridor, this change would allow the designer more flexibility, which may or may not reduce cost. If jurisdictions interpret this section to mean that corridors can open into two-story spaces as long as a door with a closer is provided, then this change would add some cost due to the minimal protection required by a smoke partition between the corridor and the two-story space that requires smoke and draft control for any doors. If the separation is already provided by a fire-resistance-rated assembly through some other code requirement, there would be no additional cost since openings would be required to be protected.

Estimated Immediate Cost Impact Justification (methodology and variables):

If minimal protection is required, the cost would be $65 to $100 per opening for "S" labels on the doors and frames and smoke seals around the door perimeter. The majority of the cost will be for the "S" labels (about $40 for the door and frame) and $25 for the seals for a standard 3' by 7' door. Double doors will be at the higher end for the additional label and extra length of perimeter to seal.

FS37-24

IBC: 712.1.15, 711.4 (New), 711.5 (New)

Proponents: Jeffrey Grove, Coffman Engineers, Coffman Engineers (jeff.grove@coffman.com)

2024 International Building Code

Delete without substitution:

~~**712.1.15 Skylights.**~~
~~*Skylights*and other penetrations through a fire-resistance-rated *roof deck* or slab are permitted to be unprotected, provided that the structural integrity of the fire-resistance-rated *roof assembly* is maintained. Unprotected *skylights* shall not be permitted in *roof assemblies* required to be fire-resistance rated in accordance with Section 705.9.6. The supporting construction shall be protected to afford the required *fire-resistance rating* of the *horizontal assembly* supported.~~

Add new text as follows:

711.4 Roof Openings. Roof openings in a fire-resistance-rated roof deck or slab are permitted to be unprotected, provided that the structural integrity of the fire-resistance-rated roof assembly is maintained. Unprotected roof openings shall not be permitted in roof assemblies required to be fire-resistance rated in accordance with Section 705.9.5 and shall comply with the opening protectives of Section 716. The supporting construction shall be protected to afford the required fire-resistance rating of the horizontal assembly supported.

711.5 Roof Penetrations.. Penetrations through a fire-resistance-rated roof deck or slab are permitted to be unprotected, provided that the structural integrity of the fire-resistance-rated roof assembly is maintained. Unprotected through penetrations shall not be permitted in roof assemblies required to be fire-resistance rated in accordance with Section 705.9.5 and shall comply with Section 714 for through penetrations of fire-resistance-rated horizontal assemblies.

Reason: The code does not address unprotected openings within a fire-resistance-rated roof assembly. Historically the skylight section has been used to permit unprotected openings within a fire-resistance rated roof deck or slab as the IBC Code Commentary states that “fire-resistance-rated roof construction is not intended to create a barrier in order to contain the fire within the building, except for Exception 1 of Section 705.8.6 and the exception to Section 706.6.1.”

This code change will still apply to skylights but will now address broader roof penetrations and openings. Relocating IBC 712.1.15 to Section 711 aligns with the code's organization, such as how fire and smoke barriers address openings and penetrations within their respective sections. Furthermore, IBC 712.1.15 differs from the type of vertical openings addressed in Section 712 such as shafts, atriums, or two-story vertical openings.

Separating and renaming the skylight section into a roof penetration and roof opening section will clearly indicate the intent/application of the code. Furthermore, this will not limit the application to skylights and make it more general.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This code change is intended to be editorial in nature, but it does have the potential to decrease the cost of a project. As the code is currently written it is not very clear that penetrations and openings within a fire-resistance rated roof are permitted to be unprotected where the structural integrity of the roof is maintained. Due to the location and language in IBC Section 712.1.15, not all AHJs have permitted penetrations and openings through a fire-resistance rated roof assembly to be unprotected. This change would clarify the application of IBC Section 712.1.15 reducing the number of fire-stopping details required for a project and decreasing the cost of construction as there would be less fire-stopping/opening protection required where AHJs have previously required penetrations and openings to be protected. Where AHJs use IBC Section 712.1.15 to permit unprotected openings and penetrations within a fire-resistance rated roof, this code change would not impact the cost of construction.

FS38-24

IBC: 713.4, 403.2.1.2, 403.2.1

Proponents: Nicholas Pirkl, Self (info@design2functionllc.com)

2024 International Building Code

Revise as follows:

713.4 Fire-resistance rating.

Shaft enclosures shall have a *fire-resistance rating* of not less than 2 hours where connecting four *stories* or more, and not less than 1 hour where connecting less than four *stories*. The number of *stories* connected by the *shaft enclosure* shall include any *basements* but not any *mezzanines. Shaft enclosures* shall have a *fire-resistance rating* not less than the floor assembly penetrated, but need not exceed 2 hours. *Shaft enclosures* shall meet the requirements of Section 703.2.1.1.

> **Exception:** ~~Shafts having a reduced fire-resistance rating in *high-rise buildings* in accordance with Section 403.2.1.2.~~For *buildings* not greater than 420 feet (128 m) in *building height*, the required *fire-resistance rating* of the *fire barriers* enclosing vertical *shafts*, other than *interior exit stairway* and elevator hoistway enclosures, is permitted to be reduced to 1 hour where *automatic* sprinklers are installed within the *shafts* at the top and at alternate floor levels.

~~**403.2.1.2 Shaft enclosures.**~~

~~For *buildings* not greater than 420 feet (128 m) in *building height*, the required *fire-resistance rating* of the *fire barriers* enclosing vertical *shafts*, other than *interior exit stairway* and elevator hoistway enclosures, is permitted to be reduced to 1 hour where *automatic* sprinklers are installed within the *shafts* at the top and at alternate floor levels.~~

403.2.1 Reduction in fire-resistance rating.

The *fire-resistance rating* reductions specified in Sections 403.2.1.1 and ~~403.2.1.2~~ 713.4 shall be allowed in *buildings* that have sprinkler control valves equipped with supervisory *initiating devices* and water-flow *initiating devices* for each floor.

Reason: The reduction in the 2-hour fire-resistance rating for shafts connecting 4 or more stories that is allowed in high-rise construction per Section 403.2.1.2, should also be allowed for other fully sprinklered buildings that do not meet the requirements to be classified as a high rise. The code requirements that are specific to high-rise structures (i.e. stairwell pressurization, fire command center, etc.) do not modify the code requirement for the construction of vertical shafts except to add an exception to the fire-resistance rating requirement in Section 713. If it is deemed appropriate to reduce the shaft rating by adding sprinklers inside the shaft for high rise structures up to 420 feet in height, then the use of this provision for structures less than 75' in height would seem equally appropriate.

Cost Impact: Decrease

- **ICC-Shaft-Design-and-Costs.pdf**
  https://www.cdpaccess.com/proposal/9927/29118/documentation/137848/attachments/download/4602/

Estimated Immediate Cost Impact:

This proposed change would reduce the shaft wall construction to 1-hour while only adding a few sprinkler heads inside the shaft. The proposed change would be for fully sprinkled buildings only, so the cost of the additional few sprinkler heads would be less than the material and labor costs for the 2-hour rated shaft walls. Also, since the 2-hour shafts must be supported by 2-hour construction, this change would simplify the detailing at the intersection of shafts and floor/ceiling horizontal assemblies.

Estimated Immediate Cost Impact Justification (methodology and variables):

Mechanical and similar shafts rated for 2-hour fire resistance require either (2) layers of 5/8" gypsum on each face of a studwall, or (1) layer of 1" shaft liner on one face and (2) layers of 5/8" gypsum on the opposite face. 1-hour shafts only require (1) layer of 5/8" gypsum on each face resulting in less material (gypsum board and screws) as well as less labor. Additionally, this proposed change allows for the 1-hour shafts to be supported by 1-hour floor construction.

The addition of (4) sprinkler heads in a 7-story shaft is less expensive than the 1 layer of gypsum board on the exterior face (shaft liner assembly) assuming a 70' tall 2'-0" by 2'-0" interior dimension shaft.

I have attached estimates for the above work from a drywall contractor and sprinkler contractor we are using on a current project in Colorado Springs, CO. The cost comparison is only for the single layer of gypsum board and the 4 sprinkler heads. There are dozens of UL assemblies for 2-hour and 1-hour shafts that would probably result in a higher cost delta, but the proposed comparison should represent the lowest cost delta.

FS38-24

FS39-24

IBC: 713.13.1

Proponents: Tim Pate, City and County of Broomfield, Self (tpate@broomfield.org)

2024 International Building Code

Revise as follows:

713.13.1 Waste, recycling and linen chute enclosures.
A*shaft enclosure* containing a recycling, waste or linen chute shall not be used for any other purpose and shall be enclosed in accordance with Section 713.4. A *shaft enclosure* shall be permitted to contain recycling and waste chutes. Openings into the *shaft* , from access rooms ~~and discharge rooms, ~~shall be protected in accordance with this section and Section 716. Openings into chutes shall not be located in *corridors*. Doors into chutes shall be *self-closing*. Discharge doors shall be self-or automatic-closing upon the actuation of a *smoke detector* in accordance with Section 716.2.6.6, except that heat-activated closing devices shall be permitted between the *shaft* and the discharge room.

Reason: This proposal is to delete the requirement to provide protection between the chute discharge room and the shaft above. Sections 713.11 exception 2 and 713.13.4 both require the chute discharge room to be separated from remainder of the building by fire barriers that match the fire rating of the shaft. The words in the general scope of section 713.13.1 therefore do not make sense since this would require installing a horizontal fire damper at the bottom of the shaft. The intent of required protection of chute discharge room along with the chute shaft is separating potential fire for the remainder of the building. It is not clear why you would need protection between discharge room and the chute above and installing a fire damper could become a potential fire issue if the damper closes by mistake and items pile up on top of the closed damper.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

It is estimated that this would result in approximately $1,000 per horizontal fire damper.

Estimated Immediate Cost Impact Justification (methodology and variables):

Provided estimated cost of individual horizontal fire damper - it will be depending on size and number in the overall building

Estimated Life Cycle Cost Impact:

Same as above since it is a one time cost savings per damper

FS39-24

FS40-24

IBC: 714.2, 714.2.1 (New), ASTM Chapter 35 (New)

Proponents: Bill McHugh, CM Services, Firestop Contractors International Association (bill@mc-hugh.us)

2024 International Building Code

714.2 Installation. A *listed penetration firestop* system shall be installed in accordance with the manufacturer's installation instructions and the listing criteria.

Add new text as follows:

714.2.1 Firestop Identification Device. Penetration firestop systems shall be permanently identified with a device, label or similar treatment installed in accordance with ASTM WK 70416.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

WK70416	New Practice for On-Site Identification of Penetration Firestop Systems and Fire-Resistive Joint Systems and Perimeter Fire Barrier

Staff Analysis: A review of the new standard proposed for inclusion in the code, ASTM WK70416 New Practice for On-Site Identification of Penetration Firestop Systems and Fire-Resistive Joint Systems and Perimeter Fire Barrier, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: At ASTM, a new standard is at the ASTM E06 Main Committee approval process to govern the content and installation of firestop identification devices, WK70416, New Practice for On-Site Identification of Penetration Firestop Systems and Fire-Resistive Joint Systems and Perimeter Fire Barriers. The standard is anticipated to be published during this code development cycle.

The reason to require a firestop identification system is that installing penetration firestop systems looks as easy as applying red caulk into the annular space of a penetration or gap, breach created for a joint or void. Firestop systems are very complex, detailed listed systems that take understanding of the listing tolerances and manufacturers instructions so they work when called upon by fire. The listing number is the driver for correct application. The listing number identifies the penetrating item(s), annular space, breach gap or void size limitations, firestop material manufacturer, materials and thicknesses, compression used, and of course the fire-resistance-rated assemblies to protect.

Special inspection for firestop systems, joints and voids, has been in the IBC Chapter 17 for over 10 years. Firestop inspection is happening wherever special inspection is used by a jurisdiction.

This proposal adds a requirement to identify the system used to maintain fire-resistance of the assembly where the firestop system, fire-resistive joint system, or perimeter fire barrier occurs at the fire-resistance-rated assembly.

Both firestop installation contractors and firestop special inspection agency inspectors use the listing numbers in addition to manufacturers instructions to get the systems installed and inspected correctly.

There are literally thousands of system designs in the UL Product iQ, Intertek Directory, FM Approval Guide or other laboratory listing system. Knowing the system or engineering judgement/equivalent fire-resistance-rated assembly number installed at the jobsite speeds up the special inspection agency inspector's work by eliminating the need to figure out what system number. The listing number identifies the materials and systems that were used. The Special Inspector then simply looks up the systems during the inspections to compare the listing to the firestop system installation in the field. Huge efficiency gain.

Having the listing number at the penetrating item (joint or void) helps the building owner and manager compare the listings to the installations during the annual visual inspections required for the life cycle of the building. Having the identification device makes the firestop special inspection verification process and building owner's repair process much more cost efficient and effective.

Labeling items that protect breaches in fire-barriers (and other fire-resistance-rated assemblies) is used with other fire-resistance-rated assemblies. In Section 703.5, Marking and Identification, the walls are identified. Fire doors and frames have labels. Fire dampers have identification labels. Fire rated glazing is identified with a mark on the glazing as well. Labelling firestop systems installed in the field is consistent with the requirements for the fire-resistance-rated wall assembly and breach protection items.

This Firestop Identification Device - used under the WK70416, New Practice for On-Site Identification of Penetration Firestop Systems and Fire-Resistive Joint Systems and Perimeter Fire Barriers, provides confidence that the appropriate level of protection is provided, and provides efficiency at inspection as well as during the annual visual inspection during the building life cycle.

Cost Impact: Increase

Estimated Immediate Cost Impact:

This code proposal will increase the cost of construction by about $0.10 per label.

Estimated Immediate Cost Impact Justification (methodology and variables):

The number of labels varies considerably based on type of building and type of occupancy. The ASTM WK 704016, New Practice for On-Site Identification of Penetration Firestop Systems and Fire-Resistive Joint Systems and Perimeter Fire Barriers, allows grouping of penetrations to get one label, vs. the non standard way which has no rules and might mandate that ALL penetrations are labeled. Where special inspection takes place, inspections are faster due to work looking up listings being reduced significantly.

Estimated Life Cycle Cost Impact:

Since the labels are permanent, there should not be extra expense to maintain them.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

See standard ASTM WK 704016, New Practice for On-Site Identification of Penetration Firestop Systems and Fire-Resistive Joint Systems and Perimeter Fire Barrier.

FS40-24

FS41-24

IBC: 714.2 (New), 715.2 (New)

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Building Code

Add new text as follows:

714.2 System variations. Where variations between the installed system and the tested through- or membrane-penetration firestop system exist, sufficient documentation shall be provided to the building official to show that the required ratings are not reduced.

715.2 System variations. Where variations between the installed system and the tested fire-resistant joint system, perimeter fire containment system or continuity head-of wall system exist, sufficient documentation shall be provided to the building official to show that the required ratings are not reduced.

Reason: Despite the fact there are over 10,000 individual firestop systems, fire-resistant joint systems, perimeter fire containment systems and continuity head-of-wall systems, each with multiple construction variations tested as required by the IBC, field conditions frequently occur for which there are no tested system available. These two new sections are intended to address how these unique installations need to be addressed between the design professional, the contractor and the code official. The language proposed emulates the language contained in existing Section 703.2.1.4 other than the fact it addresses all variations and not just supplemental features. For example, it would cover situations where a required component of a tested assembly is not installed, or where some feature not described is installed.

The sufficient documentation required is normally provided in the form of an equivalent firestop system obtained from some knowledgeable party. This process is a necessary and well-established program used on a daily basis in the firestopping industry when not tested systems are available. Industry practice has been to use the equivalent firestop system process only when a tested system is not available.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0.00

Estimated Immediate Cost Impact Justification (methodology and variables):

Alternative means and methods submissions are costly to prepare. However, it has been common practice for AHJ's to accept either a system variation (e.g. engineering judgment) provided by the manufacturer, or a system variation stamped by a professional engineer to cover the installation. Manufacturers provide system variations at no cost. Even where an AHJ requires an Engineer's seal, this is still less costly than an alternative means and methods submission.

Using system variations as proposed will eliminate the need for a costly alternative means and methods submittal. Manufacturers provide system variations (e.g. engineering judgments) at no cost. If an AHJ requires an Engineer's seal, the cost can range is from $1000 to $2000 depending on the area of the country.

FS41-24

FS42-24

IBC: SECTION 202 (New), 714.2, 714.2.1 (New), 715.2, 715.2.3 (New)

Proponents: William Koffel, Koffel Associates, Inc., Firestop Contractors International Association (FCIA) (wkoffel@koffel.com)

2024 International Building Code

Add new definition as follows:

FIRESTOP IDENTIFICATION DEVICE. A label, placard, or device of any type that identifies the installed firestop system.

714.2 Installation. A *listed penetration firestop* system shall be installed in accordance with the manufacturer's installation instructions and the listing criteria.

Add new text as follows:

714.2.1 Firestop identification devices. Penetration firestop systems shall be permanently identified with a device, label or similar treatment. The device shall be handwritten with permanent ink, or pre-printed, legible tag or label, or format readable by an electronic device and readable from a distance of 24 in. (610 mm) at a 45-degree angle. The device shall at a minimum have the following information:

1. Listing system number or engineering judgement number.
2. Date of Installation
3. Installing company name, contact information.
4. "Warning, Penetration Firestop System - Do Not Remove or Tamper.

Adhesive or mechanically attached Identification devices shall be located within 6 in. (150 mm) below or beside the penetration firestop system edge, on the bottom of a horizontal assembly, or on both sides of a vertical barrier. For multiple penetrations of the same listing number arranged within 6 in. (150 mm) of each other, the device shall be located centered under or within 6 in. (150 mm) to either side of the grouping. Hanging tags shall be attached to the penetrating item with permanent wire, string or plastic tie, within 6 in. (150 mm) of the assembly.

Revise as follows:

715.2 Installation.
Systems or materials protecting *joints* and voids shall be installed in accordance with Sections 715.2.1 and ~~715.2.2~~ 715.2.3.

Add new text as follows:

715.2.3 Firestop identification devices. Joint and void protection shall be permanently identified with a device, label or similar treatment. The device shall be handwritten with permanent ink, or pre-printed, legible tag or label, or format readable by an electronic device readable from a distance of 24 in. (610 mm) at a 45-degree angle, both sides of the fire barrier, smoke barrier or fire wall. The device shall at a minimum have the following information:

1. Listing system number or engineering judgement number.
2. Date of Installation.
3. Installing company name, contact information.
4. "Warning, Joint and Void Protection System - Do Not Remove or Tamper.

Adhesive or mechanically attached Identification devices shall be located within 6 in. (150 mm), of the joint and void system edge.

Reason: Installing penetration firestop systems looks as easy as applying red caulk into the annular space of a penetration or gap, breach created for a joint or void. Firestop systems are very complex, detailed listed systems that take understanding of the tolerances so they work when called upon by fire. Firestop systems are not easy to install once the listings are introduced to the installation – which is the only way to install and inspect firestopping.

The proposal adds a requirement to identify the system used to maintain fire-resistance of the assembly where a breach was made to pass penetrating item(s). This is a way for the firestop installation contractor to make others aware of what was installed. Knowing the system or engineering judgement/equivalent fire-resistance-rated assembly installed speeds up the special inspection agency inspector's work by eliminating the need to look up systems during the inspections. It also helps the building owner and manager compare the listings to the jobsite installations during the annual visual inspections required for the life cycle of the building.

This firestop system identification system allows all parties to understand what listing has been used, which then identifies the manufacturer's materials used in the system. The listing identifies the penetrating item(s), annular space size limitations, firestop material manufacturer, and assemblies to protect.

The assemblage of materials designed to keep fire from spreading outside a fire resistance rated assembly needs to be properly installed, inspected and maintained. The identification device makes the firestop special inspection verification process much more cost efficient and effective.

Labeling items at fire-barriers is consistent with other fire-resistance-rated assemblies. In Section 703.5, Marking and Identification, the walls are identified. Fire doors, fire dampers, and fire rated glazing are identified as well. The firestop labelling would be consistent with the requirements for the fire-resistance-rated wall assembly. This identification device provides confidence that the appropriate level of protection is provided, and the fire-resistance-rated design maintained easily.

Cost Impact: Increase

Estimated Immediate Cost Impact:

The identification device cost per penetration firestop system is approximately $0.10 US per penetration.

Estimated Immediate Cost Impact Justification (methodology and variables):

The cost increase is limited because the worker is already at the assembly, climbing a ladder or on a lift, with the materials, installing the system. All that needs to happen is adding the identification device, usually a label or tag. However, the device lowers the cost of inspection during construction and annual visual inspection because it saves the inspector time sorting through listings to find the right listing which was used.

FS42-24

FS43-24

IBC: SECTION 202 (New), 714.2, 715.2, 715.2.1

Proponents: William Koffel, Koffel Associates, Inc., Firestop Contractors International Association (FCIA) (wkoffel@koffel.com)

2024 International Building Code

Add new definition as follows:

<u>**MANUFACTURER'S INSTALLATION INSTRUCTIONS.**</u> <u>Printed instructions included with materials, systems, or equipment.</u>

Revise as follows:

714.2 Installation. A *listed penetration firestop* system shall be installed in accordance with the manufacturer's installation instructions and the listing criteria. <u>*Manufacturer's installation instructions* and listings shall be available on the job site at the time of installation and inspection.</u>

715.2 Installation.
Systems or materials protecting *joints* and voids shall be installed in accordance with Sections 715.2.1 and 715.2.2.<u>*Manufacturer's installation instructions* and listings shall be available on the job site at the time of installation and inspection.</u>

715.2.1 ~~List~~ <u>Listed</u> system installation.
Listed fire-resistant joint systems, perimeter fire containment systems and *continuity head-of-wall systems* shall be securely installed in accordance with the manufacturer's installation instructions and the listing criteria in or on the joint or void for its entire length so as not to dislodge, loosen or otherwise impair its ability to accommodate expected *building* movements and to resist the passage of fire and hot gases.

Reason: The International Residential Code contains a definition for manufacturer's installation instructions. The proposed definition is similar to, but not identical, to the definition in the IRC. Throughout the IBC, there are multiple references to installation instructions, manufacturer's installation instructions, and manufacturer's instructions, yet there is no definition in the Code and the dictionary is of little value.

The IMC contains a requirement that the manufacturer's installation instructions must be present on the jobsite.

IMC - 304.1 General. *Equipment and appliances shall be installed as required by the terms of their approval, in accordance with the conditions of the listing, the manufacturer's installation instructions and this code. Manufacturer's installation instructions shall be available on the job site at the time of inspection.*

Firestop systems including penetrations, joints and voids, perimeter fire containment, must be installed in accordance with the manufacturer's installation instructions and the listing, where such systems are listed, to achieve the published F, T and L Ratings. The firestop systems protect breaches made in fire-resistance-rated assemblies to allow penetrating items to pass into or through the barrier, with or without independent movement between the penetrating item and the barrier. In firestopping, there are no 'generic' installations, only listings tested to prove the combination of products can achieve the required ratings. If the listings and manufacturer's installation instructions are not on the project site, neither the firestop installation contractor, the special inspection agency inspector, or the code official will know what is being installed or inspected, causing a life/fire safety risk.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Providing the manufacturer's installation instructions on a job site are essential but should not result in an increase in cost. It is possible that the cost of construction could decrease by enabling more efficient inspections by code officials or special inspectors.

FS43-24

FS44-24

IBC: 714.2.1 (New), 715.2.3 (New)

Proponents: William Koffel, Koffel Associates, Inc., Firestop Contractors International Association (FCIA) (wkoffel@koffel.com)

2024 International Building Code

Add new text as follows:

714.2.1 Installer Qualifications. In high-rise buildings, in buildings assigned to Risk Category III or IV, or in fire areas containing Group R occupancies with an occupant load greater than 250, penetration firestop systems shall be installed by contractors qualified by a Nationally Recognized Testing Laboratory.

Exceptions:

1. Where the work is of a minor nature as approved by the code official.
2. Where the work is a Repair or Alternation Level 1 as defined by the International Existing Building Code.

715.2.3 Installer Qualifications. In high-rise buildings, in buildings assigned to Risk Category III or IV, or in fire areas containing Group R occupancies with an occupant load greater than 250, fire-resistant joint systems shall be installed by contractors qualified by a Nationally Recognized Testing Laboratory.

Exceptions:

1. Where the work is of a minor nature as approved by the code official.
2. Where the work is a Repair or Alternation Level 1 as defined by the International Existing Building Code.

Reason: The cost to participate in such programs is minimal to a company that is truly in the firestop installation contracting business. The firestop contractor that understands systems selection, analysis, the listings and manufacturers installation instructions gets the penetration firestop systems installed correctly the first time at the correct price.

The firestop installation contractor that does not know the industry protocol installs 'fire caulk' and not systems. That firestop installation contractor is not providing the work result demanded by the code and will be non-compliant, meaning the true cost of installation is currently incorrect, even though the installation might 'pass inspection'. When installing certain systems incorrectly, the cost difference can be 10 to 50 times the initial cost. Some installations are 10% more, and some 10 to 20 times more expensive.

Special inspection was added in the 2012 version of the IBC and is starting to get used more and more. With an unqualified installation contractor, the price for inspection increases significantly as deviations from listings are discovered and installations fail inspection, meaning the inspector has to look at installations much more. It causes the firestop installation contractor to go back and redo firestopping, slowing job progress.

The cost to get FM 4991 Approved or UL Qualified is spread across multiple projects.

There are enough FM 4991 Approved and UL Qualified Firestop Contractors nationally serving major, regional and small cities that have these types of buildings. The large number of approved and qualified contractors can provide competitive costs for the general contractor, building owner and manager for firestop installations.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposal could result in an increased cost for some projects, but it will likely decrease the cost of any special inspections. The firestop contractor that understands system selection, analysis, the listings, and manufacturer's installation instructions will more likely get the firestop system installed correctly the first time, at the quoted price. A contractor who does not know the industry protocol and code requirements will more likely result in high special inspection costs, rejections, repairs, and replacement, which will increase the cost.

FS45-24

IBC: 602.1, 714.4

Proponents: Quyen Thai, City of Tacoma, Washington Association of Building Officials Technical Code Development Committee (qthai@cityoftacoma.org); Micah Chappell, Seattle Department of Construction and Inspections, Washington Association of Building Officials Technical Code Development Committee (micah.chappell@seattle.gov); Julius Carreon, City of Bellevue, Washington Association of Building Officials Technical Code Development Committee (jcarreon@bellevuewa.gov); Hoyt Jeter, City of Tacoma, City of Tacoma (hjeter@cityoftacoma.org)

2024 International Building Code

Revise as follows:

602.1 General.
Buildings and *structures* erected or to be erected, altered or extended in height or area shall be classified in one of the five *construction types* defined in Sections 602.2 through 602.5. The *building elements* shall have a *fire-resistance rating* not less than that specified in Table 601 and *exterior walls* shall have a *fire-resistance rating* not less than that specified in Table 705.5. Where required to have a *fire-resistance rating* by Table 601, *building elements* shall comply with the applicable provisions of Section 703.2. The protection of penetrations, openings, ducts and air transfer openings in *building elements* shall not be required unless required by other provisions of this code.

714.4 Fire-resistance-rated walls.
Penetrations into or through *fire walls*, *fire barriers*, *smoke barrier* walls, ~~and~~ *fire partitions,* and bearing walls required to be rated by other provisions of this code shall comply with Sections 714.4.1 through 714.4.3. Penetrations in *smoke barrier* walls shall also comply with Section 714.5.4.

Reason: Membrane penetration protection in rated bearing walls have been inconsistent with its enforcement. Designers and contractors have been arguing that jurisdictions have not required it while others have since the code does not specifically identify this requirement even though it is the intent. This proposal is to bring clarity that protection of membrane penetration through a rated bearing wall must be protected. ICC staff, has in the past, provided similar interpretation to building officials.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Since this proposal is more of a clarification on a code interpretation that most jurisdictional members are already requiring with a few that have gone either direction in the interpretation, this will not increase or decrease the cost of construction. This code proposal is for clarification and interpretation only.

FS45-24

FS46-24

IBC: 714.4.1, 714.5.1

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Building Code

Revise as follows:

714.4.1 Through penetrations.
Through penetrations of fire-resistance-rated walls shall comply with Section 714.4.1.1 or 714.4.1.2.

Exception: Where the penetrating items are steel, ferrous or copper pipes, tubes or conduits, the *annular space* between the penetrating item and the fire-resistance-rated wall is permitted to be protected ~~by either of the following measures:~~

~~1.~~ In concrete or *masonry* walls where the penetrating item is a maximum 6-inch (152 mm) nominal diameter and the area of the opening through the wall does not exceed 144 square inches (0.0929 m^2), concrete, grout or *mortar* is permitted where installed the full thickness of the wall or the thickness required to maintain the *fire-resistance rating*.

~~2. The material used to fill the *annular space* shall prevent the passage of flame and hot gases sufficient to ignite cotton waste when subjected to ASTM E119 or UL 263 time-temperature fire conditions under a minimum positive pressure differential of 0.01 inch of water (2.49 Pa) at the location of the penetration for the time period equivalent to the *fire-resistance rating* of the construction penetrated.~~

714.5.1 Through penetrations.
Through penetrations of *horizontal assemblies* shall comply with Section 714.5.1.1 or 714.5.1.2.

Exceptions:

~~1. Penetrations by steel, ferrous or copper conduits, pipes, tubes or vents or concrete or *masonry* items through a single fire-resistance-rated floor assembly where the *annular space* is protected with materials that prevent the passage of flame and hot gases sufficient to ignite cotton waste when subjected to ASTM E119 or UL 263 time-temperature fire conditions under a minimum positive pressure differential of 0.01 inch of water (2.49 Pa) at the location of the penetration for the time period equivalent to the *fire-resistance rating* of the construction penetrated. Penetrating items with a maximum 6-inch (152 mm) nominal diameter shall not be limited to the penetration of a single fire-resistance-rated floor assembly, provided that the aggregate area of the openings through the assembly does not exceed 144 square inches (92 900 mm^2) in any 100 square feet (9.3 m^2) of floor area.~~

~~2~~1. Penetrations in a single concrete floor by steel, ferrous or copper conduits, pipes, tubes or vents with a maximum 6-inch (152 mm) nominal diameter, provided that the concrete, grout or *mortar* is installed the full thickness of the floor or the thickness required to maintain the *fire-resistance rating*. The penetrating items shall not be limited to the penetration of a single concrete floor, provided that the area of the opening through each floor does not exceed 144 square inches (92 900 mm^2).

~~3~~2. Penetrations by *listed* electrical boxes of any material, provided that such boxes have been tested for use in fire-resistance-rated assemblies and installed in accordance with the instructions included in the listing.

~~4~~3. Penetrations of concrete floors or ramps within parking garages or *structures* constructed in accordance with Sections 406.5 and 406.6 where the areas above and below the penetrations are parking areas.

Reason: The Annular Space Protection Material (ASPM) language being deleted in Section 714.4.1, Exception 2 and Section 714.5.1, Exception 1 is the language which mandated the protection of penetrations before the development of the fire test standards ASTM E814 and UL 1479 now referenced in the IBC. When the ASPM language was included in the 1979 Uniform Building Code, it was an attempt to describe the fire test procedure and the acceptance criteria all within one short paragraph of the code in the absence of a published test standard. The acceptance criteria incorporated into the code simply required the material protecting the annular space be securely installed and capable of maintaining its integrity when subjected to an ASTM E119 or UL 263 time-temperature fire exposure. That early language morphed into what we see in the IBC today. With the inclusion of ASTM E814 and UL 1479 into the three legacy codes in the early 90s, the ASPM language was retained as an exception to the use of the two fire test standards. Now 30 plus years later it is time to delete this exception for the following reasons:

1. The important details on how that test is to be conducted are left up to the discretion of the testing laboratory. Items missing from this exception include the details of the furnace construction, the furnace size, the construction of the test sample, the instrumentation of the furnace and test assembly, the procedures for conducting the test, including how the cotton waste is to be conditioned and applied to the test sample. Without these details it is impossible to consistently and reproducibly conduct this fire test.
2. The retention of this test procedure establishes a two-tier performance level for firestopping. The ASPM criteria simply relates to the ignition of cotton waste. Tests conducted in accordance with ASTM E814 or UL 1479 require the system to maintain either an F (fire) rating or a T (temperature) rating, both of which require the system to meet the hose stream test following fire exposure. Firestop systems through horizontal assemblies, with some exceptions, are required by the IBC to maintain a T rating. The T rating limits the temperature on the unexposed side of the assembly to a 325°F temperature rise.
3. Since 1987, there is only one known series of fire tests conducted using this ASPM method.

The ASPM exceptions and the concrete, grout or mortar exceptions to Sections 714.4.1 and 714.5.1 are often thought of as being identical. That is not the case. These two exceptions in each of these two sections are unique and stand alone. The exceptions in Sections 714.4.1 and 714.5.1 covering the protection of metallic penetrants using concrete, grout or mortar are not revised in any way by this proposal. Now is the time to delete this antiquated test procedure.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The code change proposal will not increase or decrease the cost of construction. There are simply no tested systems which will be negated by the deletion of this antiquated test method. Design professionals and contractors will continue to use the over 7000 firestop systems, most containing multiple construction variations, tested in accordance with ASTM E814 or UL 1479.

FS46-24

FS47-24

IBC: 714.5, 714.5.1

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Building Code

714.5 Horizontal assemblies.
Penetrations of a *fire-resistance-rated* floor, floor/ceiling assembly or the ceiling membrane of a roof/ceiling assembly not required to be enclosed in a *shaft* by Section 712.1 shall be protected in accordance with Sections 714.5.1 through 714.5.4.

Revise as follows:

714.5.1 Through penetrations.
Through penetrations of *horizontal assemblies* shall comply with Section 714.5.1.1 or 714.5.1.2.

Exceptions:

1. Penetrations by steel, ferrous or copper conduits, pipes, tubes or vents or concrete or *masonry* items through a single fire-resistance-rated floor assembly where the *annular space* is protected with materials that prevent the passage of flame and hot gases sufficient to ignite cotton waste when subjected to ASTM E119 or UL 263 time-temperature fire conditions under a minimum positive pressure differential of 0.01 inch of water (2.49 Pa) at the location of the penetration for the time period equivalent to the *fire-resistance rating* of the construction penetrated. Penetrating items with a maximum 6-inch (152 mm) nominal diameter shall not be limited to the penetration of a single fire-resistance-rated floor assembly, provided that the aggregate area of the openings through the assembly does not exceed 144 square inches (92 900 mm ^{2}) in any 100 square feet (9.3 m^2) of floor area.
2. Penetrations in a single concrete floor by steel, ferrous or copper conduits, pipes, tubes or vents with a maximum 6-inch (152 mm) nominal diameter, provided that the concrete, grout or *mortar* is installed the full thickness of the floor or the thickness required to maintain the *fire-resistance rating*. The penetrating items shall not be limited to the penetration of a single concrete floor, provided that the area of the opening through each floor does not exceed 144 square inches (92 900 mm^2).
3. Penetrations by *listed* electrical boxes of any material, provided that such boxes have been tested for use in fire-resistance-rated assemblies and installed in accordance with the instructions included in the listing.
4. ~~Penetrations of concrete floors or ramps within parking garages or *structures* constructed in accordance with Sections 406.5 and 406.6 where the areas above and below the penetrations are parking areas.~~<u>Vehicle ramps within or adjacent to parking garages or structures constructed in accordance with Sections 406.5 and 406.6 that are not used for vehicle parking do not require penetrations to comply with Section 714.5.1.1, 714.5.1.2 or 714.5.1.3.</u>

Reason: During the 2021 to 2024 code cycle, Proposal No. FS64-21 introduced a new Exception 4 to Section 714.5.1 which permits unprotected penetrations through floors and ramps of both enclosed and open parking garages where the areas above and below the penetrations are parking areas. We believe this new exception is does not represent good fire protection practices and as such are proposing modifications to the scope of the exception.

The modifications being proposed are intended to limit the application of the exception to vehicle ramps serving parking garage where the ramps are not directly above or below the parking areas. This limitation will minimize the chances of a fire from below involving parked vehicles.

Parking garages often have penetrants (roof drains, electrical conduit, cables, etc.) extending vertically throughout multiple levels of the parking garage. The need to protect penetrations above or below parking areas is critical in preventing ignition of parked vehicles.

The construction of modern vehicles has changed to include more plastics and other combustibles. While this benefits the vehicle weight and fuel economy, and lowers the vehicle price, it increases the fuel load and fire growth we see in parking garages. Modern vehicles present new hazards due to the incorporation of larger quantities of combustible materials (e.g. fuels, plastics, synthetic materials, etc.) into their designs. Another recent vehicle construction change is the use of plastic fuel tanks. Plastic fuel tanks can result in an earlier release of fuel in a fire. Fire tests at Southwest Research Institute showed fuel leakage as a result of fire exposure occurs after less than five minutes of fire exposure. Fuel spill fires represent a likely means of vehicle-to-vehicle fire spread.1 As alternative fuel vehicles are popularized, concerns regarding their unique hazards, burn characteristics, and typical burn duration have been raised. Compared to older vehicles, modern vehicles burn differently. At the same time, modern parking garages have optimized space requirements for vehicle parking and storage. It is clear that the design assumption of only one or two fire burning has to be revisited. Cars are larger and have more fuel load than before, and the parking spaces have become smaller. This enhances the probability of fire spread between vehicles.

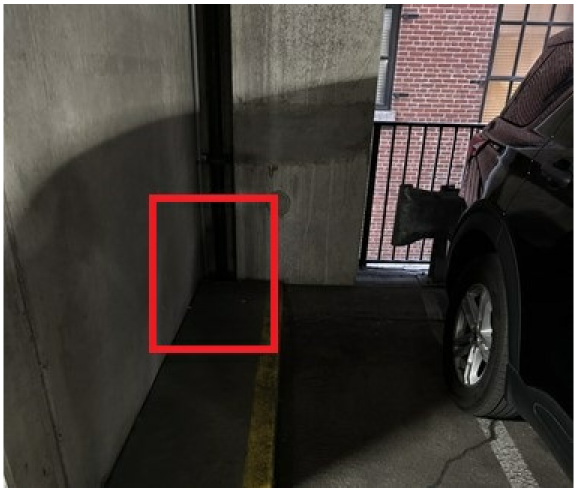
New electric vehicle battery and charging equipment technologies are also leading to much more rapid fire growth than previously contemplated in parking garage design. Fire accidents caused by the thermal runaway of lithium-ion battery have demonstrated that additional fire safety precautions are needed. It is particularly important to prevent these open and closed parking garage fires from occurring due to the challenges the fire services face in fighting parking garage fires.

There have been a number of recent cases and studies around the world that are demonstrating that fire safety in parking garages should be enhanced, not further reduced as done with Exception 4 of Section 714.5. In recent years, Europe has seen a series of large fires (Liverpool, UK (2017); Cork, Ireland (2018); Stavanger Airport in Sola, Norway (2020)1; Warsaw, Poland (2020)) that brought fires in parking garages into the focus of public discussions. In October, 2023, a major multi-storey parking garage fires occurred at the Luton Airport, London resulting in structural collapse.

A 2020 study on fires of electric vehicles concluded that in just 22 seconds, cell thermal runaway spreads flames throughout the battery compartment. A full-scale fire test was carried out on a battery system of seventeen 3P6S battery modules mounted with control systems in a car chassis. One battery module was overcharged until thermal runaway occurred. Within five seconds, thermal runaway spread to the four adjacent modules. Released gas was immediately ignited, with jet flame and smoke, and temperatures reached over 600°C. These five modules then smouldered, and further modules ignited after around two minutes. The authors note that water fire suppression would be hindered by the battery pack casings.[1]

An NFPA Journal article published in 2019 indicated a typical garage fire today is much more likely to involve multiple vehicles than two decades ago, hinting that fires are in fact burning with more severity. In garage fires between 1995 and 1997, only 1 percent of fires involved more than five vehicles. By contrast, between 2010 and 2014, 8 percent of the garage fires involved more than five vehicles.[2]

The photos below show an example of a parking garage penetration. These photos were taken at the Marriott St Louis Grand Hotel multi-story parking garage. An approximate 12 in. by 12 in. opening was located approximately 4 ft from an adjacent parked car. By the 2024 IBC, this unprotected opening is permitted. Is the level of protection we should be permitting?



FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: Increase

Estimated Immediate Cost Impact:

The average cost of an installed firestop system for concrete floors is $35 - $50 per penetration.

Estimated Immediate Cost Impact Justification (methodology and variables):

The immediate cost impact estimate is based on industry and manufacturer input.This includes materials and labor costs for any type of penetrant through the floor assembly. The cost range includes, sealant based, intumescent, or mechanical devices. The total cost in any given parking garage will depend upon the number of penetrations.

FS47-24

FS48-24

IBC: 714.5, 714.5.1

Proponents: William Koffel, Koffel Associates, Inc., Firestop Contractors International Association (FCIA) (wkoffel@koffel.com)

2024 International Building Code

714.5 Horizontal assemblies.
Penetrations of a *fire-resistance-rated* floor, floor/ceiling assembly or the ceiling membrane of a roof/ceiling assembly not required to be enclosed in a *shaft* by Section 712.1 shall be protected in accordance with Sections 714.5.1 through 714.5.4.

Revise as follows:

714.5.1 Through penetrations.
Through penetrations of *horizontal assemblies* shall comply with Section 714.5.1.1 or 714.5.1.2.

Exceptions:

1. Penetrations by steel, ferrous or copper conduits, pipes, tubes or vents or concrete or *masonry* items through a single fire-resistance-rated floor assembly where the *annular space* is protected with materials that prevent the passage of flame and hot gases sufficient to ignite cotton waste when subjected to ASTM E119 or UL 263 time-temperature fire conditions under a minimum positive pressure differential of 0.01 inch of water (2.49 Pa) at the location of the penetration for the time period equivalent to the *fire-resistance rating* of the construction penetrated. Penetrating items with a maximum 6-inch (152 mm) nominal diameter shall not be limited to the penetration of a single fire-resistance-rated floor assembly, provided that the aggregate area of the openings through the assembly does not exceed 144 square inches (92 900 mm ^{2}) in any 100 square feet (9.3 m^2) of floor area.
2. Penetrations in a single concrete floor by steel, ferrous or copper conduits, pipes, tubes or vents with a maximum 6-inch (152 mm) nominal diameter, provided that the concrete, grout or *mortar* is installed the full thickness of the floor or the thickness required to maintain the *fire-resistance rating*. The penetrating items shall not be limited to the penetration of a single concrete floor, provided that the area of the opening through each floor does not exceed 144 square inches (92 900 mm^2).
3. Penetrations by *listed* electrical boxes of any material, provided that such boxes have been tested for use in fire-resistance-rated assemblies and installed in accordance with the instructions included in the listing.
4. ~~Penetrations of concrete floors or ramps within parking garages or *structures* constructed in accordance with Sections 406.5 and 406.6 where the areas above and below the penetrations are parking areas.~~

Reason: During the 2024 code development cycle, Proposal No. FS64-21 introduced a new Exception 4 to Section 714.5.1 which permits unprotected penetrations through floors and ramps of both open and enclosed parking garages, where the areas above and below the penetrations are parking areas. FCIA believes the new exception does not represent good fire protection practices and as such are proposing the deletion of the exception.

Parking garages often have penetrants (roof drains, electrical conduit, cables, etc.) extending vertically throughout multiple levels of the parking garage. The need to protect penetrations above or below parking areas is critical in preventing floor-to-floor fire propagation and ignition of parked vehicles.

The construction of modern vehicles has changed to include more plastics and other combustibles (e.g. fuels, plastics, synthetic materials, etc.). While this benefits the vehicle weight and fuel economy, and lowers the vehicle price, it increases the fuel load and fire growth in parking garages.

Another recent vehicle construction change is the use of plastic fuel tanks. Plastic fuel tanks can result in an earlier release of fuel in a fire. Fire tests at Southwest Research Institute showed fuel leakage as a result of fire exposure occurs after less than five minutes of fire exposure. Fuel spill fires represent a likely means of vehicle-to-vehicle fire spread.[1]

As alternative fuel vehicles are popularized, concerns regarding their unique hazards, burn characteristics, and typical burn duration have been raised. Fuels such as propane, natural gas and hydrogen all create different hazards.

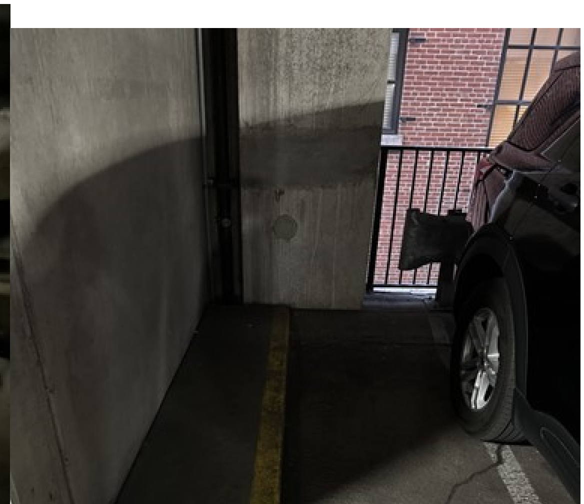
New electric vehicle battery and charging equipment technologies are also leading to much more rapid-fire growth than previously contemplated in parking garage design. Fire accidents caused by the thermal runaway of lithium-ion batteries have demonstrated that additional fire safety precautions are needed.

Compared to older vehicles, modern vehicles burn differently. At the same time, modern parking garages have optimized space requirements for vehicle parking and storage. It is clear that the design assumption of only one or two fire burning has to be revisited. Cars are larger and have more fuel load than before, and the parking spaces have become smaller. This enhances the probability of fire spread between vehicles – and possibly to the floor above.

It is particularly important to prevent fires in open and enclosed parking garage from occurring due to the challenges the fire services face in fighting parking garage fires.There have been a number of recent cases and studies around the world that are demonstrating that fire safety in parking garages should be enhanced, not further reduced as done with Exception 4 of Section 714.5. In recent years, Europe has seen a series of large fires (Liverpool, UK (2017); Cork, Ireland (2018); Stavanger Airport in Sola, Norway (2020)[1]; Warsaw, Poland (2020)) that brought fires in parking garages ~~-~~into the focus of public discussions. In October, 2023, a major multi-story parking garage fire occurred at the Luton Airport, London resulting in structural collapse.

A 2020 study on fires of electric vehicles concluded that in just 22 seconds, cell thermal runaway spreads flames throughout the battery compartment. A full-scale fire test was carried out on a battery system of seventeen 3P6S battery modules mounted with control systems in a car chassis. One battery module was overcharged until thermal runaway occurred. Within five seconds, thermal runaway spread to the four adjacent modules. Released gas was immediately ignited, with jet flame and smoke, and temperatures reached over 600°C. These five modules then smoldered, and further modules ignited after around two minutes. The authors note that water fire suppression would be hindered by the battery pack casings.[2]

An NFPA Journal article published in 2019 indicated a typical garage fire today is much more likely to involve multiple vehicles than two decades ago, hinting that fires are in fact burning with more severity. In garage fires between 1995 and 1997, only 1 percent of fires involved more than five vehicles. By contrast, between 2010 and 2014, 8 percent of the garage fires involved more than five vehicles.[3]The photos below show an example of a parking garage penetration. These photos were taken at the Marriott St. Louis, MO Grand Hotel multi-story parking garage. An approximate 12 in. by 12 in. opening was located about 4 ft. from an adjacent parked car. By the 2024 IBC, this unprotected opening is permitted. Is the level of protection we should be permitting?



It is now time to recognize the hazards of parking structures and delete the various exceptions which are eliminating the need to protect penetrations, joints and voids in open and enclosed parking garages. This proposal on penetrations parallels similar proposals covering joints and voids which will be heard separately.

Bibliography: 1 NFPA Research Foundation - Modern Vehicle Hazards in Parking Structures and Vehicle Carriers by Haavard Boehmer, PE, Michael Klassen, PhD, PE, Stephen Olenick, PE

2 Li, Huang, Peng, Wen, Yang, Xulai, Chen, Haodong, Sun, Jinhua, Wang, Qingsong, Full-Scale Experimental Study on the Combustion Behavior of Lithium Ion Battery Pack Used for Electric Vehicle Fire Technology, Volume 56- 6, November 01, 2020, https://doi.org/10.1007/s10694-020-00988-w

3 NFPA Journal - Protecting Parking Garages, Mar Apr 2019, Ramp Risk, By Jesse Roman.

Cost Impact: Increase

Estimated Immediate Cost Impact:

$35 - $50 per penetration or joint to be protected

Estimated Immediate Cost Impact Justification (methodology and variables):

The average cost of an installed firestop system for concrete floors based on input from contractors and manufacturers.

FS48-24

FS49-24

IBC: 714.5.2

Proponents: Jeffrey Grove, Southern Nevada ICC Chapter (jeff.grove@coffman.com)

2024 International Building Code

Revise as follows:

714.5.2 Membrane penetrations.
Penetrations of membranes that are part of a *horizontal assembly* shall comply with Section 714.5.1.1 or 714.5.1.2. Where floor/ceiling assemblies are required to have a *fire-resistance rating*, recessed fixtures shall be installed such that the required *fire resistance* will not be reduced.

Exceptions:

1. *Membrane penetrations* by steel, ferrous or copper conduits, pipes, tubes or vents, or concrete or *masonry* items where the *annular space* is protected either in accordance with Section 714.5.1 or to prevent the free passage of flame and the products of combustion. The aggregate area of the openings through the membrane shall not exceed 100 square inches (64 500 mm^2) in any 100 square feet (9.3 m^2) of ceiling area in assemblies tested without penetrations.
2. Ceiling *membrane penetrations* of maximum 2-hour *horizontal assemblies* by steel electrical boxes that do not exceed 16 square inches (10 323 mm^2) in area, provided that the aggregate area of such penetrations does not exceed 100 square inches (44 500 mm^2) in any 100 square feet (9.29 m^2) of ceiling area, and the *annular space* between the ceiling membrane and the box does not exceed $^1/_8$ inch (3.2 mm).
3. *Membrane penetrations* by electrical boxes of any size or type, that have been *listed* as part of an opening protective material system for use in *horizontal assemblies* and are installed in accordance with the instructions included in the listing.
4. *Membrane penetrations* by *listed* electrical boxes of any material, provided that such boxes have been tested for use in fire-resistance-rated assemblies and are installed in accordance with the instructions included in the listing. The *annular space* between the ceiling membrane and the box shall not exceed $^1/_8$ inch (3.2 mm) unless *listed* otherwise.
5. The *annular space* created by the penetration of a fire sprinkler, provided that it is covered by a metal escutcheon plate.
6. Noncombustible items that are cast into concrete building elements and that do not penetrate both top and bottom surfaces of the element.
7. The ceiling membrane of a maximum 2-hour fire-resistance-rated *horizontal assembly* is permitted to be interrupted with the double 2x wood top plate of a wall assembly that is sheathed with *Type X gypsum wallboard*, provided that all penetrating items through the double top plates are protected in accordance with Section 714.5.1.1 or 714.5.1.2 and the ceiling membrane is tight to the top plates.
8. The ceiling membrane of a maximum 1-hour fire-resistance-rated horizontal assembly is permitted to be interrupted with a single 2x wood top plate of a wall assembly that is sheathed with Type X gypsum wallboard, provided that all penetrating items through the top plate are protected in accordance with Section 714.5.1.1 or 714.5.1.2 and the ceiling membrane is tight to the top plates.

~~8.~~9. Ceiling *membrane penetrations* by *listed* luminaires (light fixtures) or by luminaires protected with *listed* materials, which have been tested for use in fire-resistance-rated assemblies and are installed in accordance with the instructions included in the listing.

Reason: The current code language merely requires a “double wood top plate”. As currently written, the top plate could consist of two ½” plywood strips or two 4x8s with no regard to the ability of the material to resist fire. The fact that a clarification statement needed to be added to the code commentary for this item is a clear indication this section needs to be revised. It is important to clarify exactly what the minimum is to achieve the continuity of the membrane rating at the penetration. This code change would allow for a single 2x top plate or a combination of a single 2x top plate with a 1x top plate as a minimum to add clarification to the section. An additional reason for this change is to allow for current construction methods. Standard construction methods in wood construction require a gap to be placed between the bottom of the floor joists or truss and the top of a non-bearing partition. This allows for deflection of the truss without adverse loading from interference of a non-bearing partition. The standard method for creating this gap is to use a single 2x top plate with a 1x top plate to create a double top plate. Bearing walls and exterior walls are already required to use a double 2x top plate per IBC section 2308.9.3.2 and therefore are not generally affected by this code clarification.

Compliant nailing of the gypsum board can be maintained with a single 2x top plate. In a 1-hour assembly with a single layer of drywall, a single 2x top plate is sufficient to achieve drywall nailing. The standard 2x is 1 ½" thick. If you remove ⅝" for drywall, you are left with ⅞" of plate width for nailing. The required edge distance of a fastener in gypsum board is ⅜" per IBC Section 2508.6.3 allowing an edge distance of ½" on the plate. A standard joint at a stud in a fire rated wall would require ⅜" edge distance for each gypsum sheet leaving only ⅜" edge distance on each side of the stud. This shows that the proposed top plate configuration allows more nailing width than is required in the fire rated assembly.

In a 2 layer assembly, compliant nailing can be achieved with a 2x top plate with a 1x top plate. A 2x, which is 1 ½", and a 1x, which is ¾", will achieve a total top plate thickness of 2 ¼". If one subtracts 1 ¼" for 2 layers of ⅝" gypsum board from 2 ¼", there is 1" remaining. This will allow for ⅜" edge distance on the gypsum sheet as well as ⅝" edge distance on the top plate. This is also in excess of the minimums required for fire rated assemblies.

The 2x with a 1x plate application will also work with resilient channel (RC) and a single layer of gypsum board. The RC is ½" plus the ⅝" gypsum board for a total of 1 ⅛" leaving ¾" of edge distance on the top plate after subtracting the ⅜" drywall edge distance. This would even allow for a full ¾" RC without degrading the fire rating of the assembly.

The order of nailing can also be modified to provide even more edge distance. If the wall sheathing is nailed first, the installer could take full advantage of the entire top plate thickness for edge distance. The ceiling membrane could then be butted tightly to the wall sheathing to achieve the rating. This configuration is demonstrated in U.L. listed assembly system number F-C-2387.

The single wood top plate exceeds the fire resistance of a single layer of ⅝" gypsum board. IBC table 722.6.2(1) assigns a 40 minute rating to ⅝" type x gypsum wall board on wood frame. Table 16.2.1A of the ANSI/AWC National Design Specification for Wood Construction (NDS), as referenced in IBC Section 722.1, assigns a 1-hour char rating to 1 ½" of sawn lumber. Utilizing a single 2x wood top plate as a membrane penetration in a 1 hour application does not reduce the fire resistance rating of the assembly.

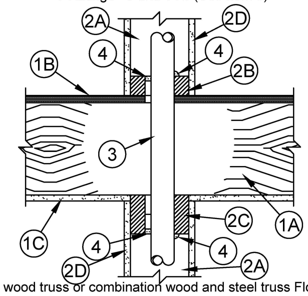
Testing has been performed on this condition and there are currently listed assemblies available. One listing is Specified Technologies Inc. system number F-C-2014 which allows for a single 2x4 or 2x6 top plate. Another listing is 3M system number F-C-2387 which also allows for a single 2x4 or 2x6 top plate. Both of these listings are approved by Underwriters Laboratories to maintain the fire rating of the floor ceiling assembly. It is inappropriate to eliminate options from the code that have been proven by testing to meet the fire resistant requirements.

This proposed change does not limit the design of the building. The design professionals are still free to use a double top plate including 2x and 3x in any situation they deem necessary. This merely allows flexibility for the designer to use different methods while still achieving the required fire ratings.

Classified by
Underwiters Laboratories, Inc.
to ASTM/UL1479 (ASTM E814)

System No. F-C-2014

F Rating - 1 Hr
T Ratings - 0 and 1 Hr (See Item 3)



1. **Floor Assembly -** The 1 hr fire rated wood truss or combination wood and steel truss Floor-Ceiling assembly shall be constructed of the materials and in the manner described in the individual L500 Series Design in the UL Fire Resistance Directory, as summarized below:
   A. **Joists -** Nom 10 in. (254 mm) deep (or deeper) lumber, steel or combination lumber and steel joists, trusses or **Structural Wood Members*** with bridging as required and with ends firestopped.
   B. **Flooring System -** Lumber or plywood subfloor with finish floor of lumber, plywood or **Floor Topping Mixture*** as specified in the individual Floor-Ceiling Design. Diam of opening in flooring shall be 3/16 to 5/8 in. (5 to 16 mm) larger than the outside diam of nonmetallic pipe or conduit (Item 3).
   C. **Gypsum Board* -** Thickness, type, number of layers and fasteners shall be as specified in the individual Floor-Ceiling Design. Diam of opening shall be 3/16 to 5/8 in. (5 to 16 mm) larger than the outside diam of nonmetallic pipe or conduit (Item 3).
2. **Chase Wall -** (Optional) - The through penetrants (Item 3) may be routed through a single, double or staggered wood stud/gypsum board chase wall and shall include the following construction features:
   A. **Studs -** Nom 2 by 4 in. (51 by 102 mm), 2 by 6 in. (51 by 152 mm), 2 by 8 in. (51 by 203 mm) or double nom 2 by 4 in. (51 by 102 mm) lumber studs.
   B. **Sole Plate -** Nom 2 by 4 in. (51 by 102 mm) or 2 by 6 in. (51 by 152 mm) lumber plates or double nom 2 by 4 in. (51 by 102 mm) lumber plates tightly butted together. Diam of opening shall be 3/16 to 5/8 in. (5 to 16 mm) larger than the outside diam of nonmetallic pipe or conduit (Item 3).
   C. **Top Plate -** The single or double top plate shall consist of one or two nom 2 by 4 in. (51 by 102 mm) or 2 by 6 in. (51 by 152 mm) lumber plates or one or two sets of nom 2 by 4 in. (51 by 102 mm) lumber plates tightly butted together. Diam of opening shall be 3/16 to 5/8 in. (5 to 16 mm) larger than the outside diam of nonmetallic pipe or conduit (Item 3).
   D. **Gypsum Board* -** Min 1/2 in. thick rated or non-rated gypsum board.
3. **Through Penetrant -** One nonmetallic pipe or conduit to be installed concentrically or eccentrically within the firestop system. Annular space between pipe or conduit and edge of opening to be min 0 in. (point contact) to max 1/2 in. (0 to 13 mm). Pipe to be rigidly supported on both sides of floor-ceiling assembly. The following types and sizes of nonmetallic pipes may be used:
   A. **Polyvinyl Chloride (PVC) Pipe -** Nom 2 in. (51 mm) diam (or smaller) Schedule 40 solid or cellular core PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
   B. **Chlorinated Polyvinyl Chloride (CPVC) Pipe -** Nom 2 in. (51 mm) diam (or smaller) SDR13.5 CPVC pipe for use in closed (process or supply) piping systems.

   Note: When the annular space is min 1/2 in. T Rating is 1 hr, otherwise the T Rating is 0 Hr.
4. **Fill, Void or Cavity Materials* - Caulk -** Min 1/2 in. (13 mm) thickness of fill material applied within the annulus, flush with top surface of sole plate or subfloor. Min 1/2 in. (13 mm) thickness of fill material applied within the annulus, flush with bottom surface of top plate or gypsum board. At the point contact location or when the annulus between the through penetrant and sole plate or subfloor or top plate or gypsum board is 1/8 in. (3 mm) or less, min 1/2 in. (13 mm) diam bead of fill material applied at the through penetrant/sole plate interface or penetreant/top plate or gypsum board interface.

   SPECIFIED TECHNOLOGIES INC - Type WF300 Caulk

   *** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

STI®

Specified Technologies Inc. 210 Evans Way Somerville, NJ 08876

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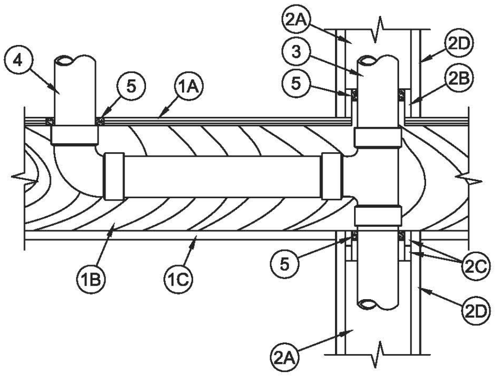
F-C-2014
PAGE 1 OF 1

System No. F-C-2387

March 20, 2009
F Rating – 1 Hr
T Rating – 0 Hr



1. **Floor Assembly** – The 1 hr fire rated wood truss or combination wood and steel truss Floor-Ceiling assembly shall be constructed of the materials and in the manner described in the individual L500 Series Design in the UL Fire Resistance Directory, as summarized below:
   A. **Flooring System** – Lumber or plywood subfloor with finish floor of lumber, plywood or **Floor Topping Mixture*** as specified in the individual Floor-Ceiling Design. Diam of opening shall be 1/2 in. to 1 in. (13 to 25 mm) larger than the outside diam of nonmetallic pipe (Items 3 and 4).
   B. **Joists** – Nom 10 in. (254 mm) deep (or deeper) lumber, steel or combination lumber and steel joists, trusses or **Structural Wood Members*** with bridging as required and ends firestopped.
   C. **Gypsum Board*** – Nom 4 ft (1.2 m) wide by 5/8 in. (16 mm) thick, attached as described in the individual Floor-Ceiling Design.
2. **Chase Wall** – The through penetrant (Item No. 3) shall be routed through a single, double or staggered wood studs/gypsum board chase wall and shall include the following construction features:
   A. **Studs** – Nom 2 by 4 in. (51 by 102 mm) or 2 by 6 in. (51 by 152 mm) lumber studs.
   B. **Sole Plate** – Nom 2 by 4 in. (51 by 102 mm) or 2 by 6 in. (51 by 152 mm) lumber plates. Diam of opening or length of notch-out in sole plate to be 1/2 in. to 1 in. (13 to 25 mm) larger than outside diam of pipe.
   C. **Top Plate** – The single or double top plate shall consist of one or two nom 2 by 4 in. (51 by 102 mm) or 2 by 6 in. (51 by 152 mm) lumber plates. Diam of opening or length of notch-out in top plate to be 1/2 in. to 1 in. (13 to 25 mm) larger than outside diam of pipe.
   D. **Gypsum Board** – Min ½ in. thick rated or nonrated gypsum board.
3. **Through Penetrant** – One nonmetallic pipe to be installed within the firestop system. Pipe to be rigidly supported on both sides of floor-ceiling assembly. The annular space between pipe and periphery of opening shall be min 0 in. (point contact) to max 1/2 in. (0 to max 13 mm). The following types and sizes of nonmetallic pipes may be used:
   A. **Polyvinyl Chloride (PVC) Pipe** – Nom 3 in. (76 mm) diam (or smaller) Schedule 40 solid core PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping system.
   B. **Cellular Core Polyvinyl Chloride (ccPVC)** Pipe – Nom 3 in. (76 mm) diam (or smaller) Schedule 40 cellular core PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping system.
   C. **Acrylonitrile Butadiene Styrene (ABS) Pipe** – Nom 3 in. (76 mm) diam (or smaller) Schedule 40 solid core ABS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping system.
   D. **Cellular Core Acrylonitrile Butadiene Styrene (ccABS) Pipe** – Nom 3 in. (76 mm) diam (or smaller) Schedule 40 cellular core ABS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping system.
   E. **Chlorinated Polyvinyl Chloride (CPVC) Pipe** – Nom 3 in. (76 mm) diam (or smaller) SDR13.5 CPVC pipe for use in closed (process or supply) piping systems.
4. **Branch Piping** – (Optional) – One nonmetallic pipe to be connected to through penetrant (Item 3) and installed within opening in subfloor. The annular space between pipe and periphery of opening shall be min 0 in. (point contact) to max 1/2 in. (13 mm). The following types and sizes of nonmetallic pipes may be used:
   A. **Polyvinyl Chloride (PVC) Pipe** – Nom 3 in. (76 mm) diam (or smaller) Schedule 40 solid core PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping system.

System No. F-C-2387 *continued*

B. **Cellular Core Polyvinyl Chloride (ccPVC) Pipe** – Nom 3 in. (76 mm) diam (or smaller) Schedule 40 cellular core PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping system.

C. **Acrylonitrile Butadiene Styrene (ABS) Pipe** – Nom 3 in. (76 mm) diam (or smaller) Schedule 40 solid core ABS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

D. **Cellular Core Acrylonitrile Butadiene Styrene (ccABS) Pipe** – Nom 3 in. (76 mm) diam (or smaller) Schedule 40 cellular core ABS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping system.

5. **Fill, Void or Cavity Materials* – Caulk or Sealant** – Min 3/4 in. (19 mm) thickness of caulk applied within annular space around perimeter of through penetrant (Item 3), flush with top surface of floor or sole plate and flush with bottom surface of lower top plate. Min 3/4 in. (19 mm) thickness of caulk applied within annular space around perimeter of branch piping (Item 4), flush with top surface of floor. Min 1/2 in. (13 mm) diam bead applied at the pipe/floor interface.

3M COMPANY
3M FIRE PROTECTION PRODUCTS – CP 25WB+ caulk, IC 15WB+ caulk or FB-3000 WT sealant
(Note: CP 25WB+ not suitable for use with CPVC pipes.)

*Bearing the UL Classification Mark

Bibliography: Specified Technologies System No. F-C-2014

3M Fire Protection Products System No. F-C-2387

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The code change proposal is not anticipated to increase or decrease the cost of construction This code change proposal is to clarify the intent of the original code change that brought this exception into the code.

FS49-24

FS50-24

IBC: 714.5.2, 714.5.2.1 (New)

Proponents: Jonathan Roberts, UL Solutions, UL Solutions (jonathan.roberts@ul.com)

2024 International Building Code

Revise as follows:

714.5.2 Membrane penetrations.
Penetrations of membranes that are part of a *horizontal assembly* shall comply with Section 714.5.1.1 or 714.5.1.2.Membrane penetrations by luminaires shall comply with Section 714.5.2.1. ~~Where floor/ceiling assemblies are required to have a *fire-resistance rating*, recessed fixtures shall be installed such that the required *fire resistance* will not be reduced.~~

Exceptions:

1. *Membrane penetrations* by steel, ferrous or copper conduits, pipes, tubes or vents, or concrete or *masonry* items where the *annular space* is protected either in accordance with Section 714.5.1 or to prevent the free passage of flame and the products of combustion. The aggregate area of the openings through the membrane shall not exceed 100 square inches (64 500 mm^2) in any 100 square feet (9.3 m^2) of ceiling area in assemblies tested without penetrations.
2. Ceiling *membrane penetrations* of maximum 2-hour *horizontal assemblies* by steel electrical boxes that do not exceed 16 square inches (10 323 mm^2) in area, provided that the aggregate area of such penetrations does not exceed 100 square inches (44 500 mm^2) in any 100 square feet (9.29 m^2) of ceiling area, and the *annular space* between the ceiling membrane and the box does not exceed $^1/_8$ inch (3.2 mm).
3. *Membrane penetrations* by electrical boxes of any size or type, that have been *listed* as part of an opening protective material system for use in *horizontal assemblies* and are installed in accordance with the instructions included in the listing.
4. *Membrane penetrations* by *listed* electrical boxes of any material, provided that such boxes have been tested for use in fire-resistance-rated assemblies and are installed in accordance with the instructions included in the listing. The *annular space* between the ceiling membrane and the box shall not exceed $^1/_8$ inch (3.2 mm) unless *listed* otherwise.
5. The *annular space* created by the penetration of a fire sprinkler, provided that it is covered by a metal escutcheon plate.
6. Noncombustible items that are cast into concrete building elements and that do not penetrate both top and bottom surfaces of the element.
7. The ceiling membrane of a maximum 2-hour fire-resistance-rated *horizontal assembly* is permitted to be interrupted with the double wood top plate of a wall assembly that is sheathed with *Type X gypsum wallboard*, provided that all penetrating items through the double top plates are protected in accordance with Section 714.5.1.1 or 714.5.1.2 and the ceiling membrane is tight to the top plates.
8. ~~Ceiling *membrane penetrations* by *listed* luminaires (light fixtures) or by luminaires protected with *listed* materials, which have been tested for use in fire-resistance-rated assemblies and are installed in accordance with the instructions included in the listing.~~

Add new text as follows:

714.5.2.1 Membrane penetrations by luminaires. Penetrations of membranes that are part of a *horizontal assembly* by luminaires (light fixtures) shall comply with one of the following:

1. Luminaires *listed* and *labeled* for use in fire-resistance rated assemblies. The listing shall indicate that the luminaire is suitable for installation in the *horizontal assembly* penetrated with a fire-resistance rating not less than the required rating of the *horizontal assembly* penetrated.
2. Luminaires tested for use in a fire-resistance rated assemblies and are installed in accordance with tested assembly construction specifications.

3. Luminaires protected by an enclosure *listed* and *labeled* for use in fire-resistance designs certified by an *approved agency*.

Reason: This proposal accomplishes the following:

1. Section 714.5.2 currently covers two distinctly different requirements, (a) exceptions to the basic membrane penetration requirements and (b) description of how to cover penetrations by luminaires. This proposal separates the legacy exceptions from the distinctly different luminaire protection requirements, which move to a new 714.5.2.1

2. Section 714.5.2 has been revised to only cover exceptions 1 through 7, and remove reference to luminaires.

3. Section 714.5.2.1 now covers acceptable methods for addressing membrane penetrations by luminaires as follows:

Item 1 covers luminaires that are listed and labeled for use in fire-resistance rated horizontal assemblies. The reference to the listing indicating that the luminaire is suitable for the horizontal assembly penetrated is consistent with how these products are listed. Additional information on this can be found in the guide information for Luminaires, Luminaire Assemblies and Luminaire Enclosures Certified for Fire Resistance (CDHW).

Item 2 addresses the requirements that were previously in exception 8 in a more concise fashion. The reference in exception 8 allowing “luminaires protected with listed materials” was eliminated because we are not aware of materials that have been listed for this application.

Item 3 addresses the requirements for enclosures that have been tested for use in specific fire-resistance rated horizontal designs. The approved agency language is consistent with Section 703.2.2(5).

4. The ambiguous requirement in 713.5.2 that indicate “recessed fixtures shall be installed such that the required fire resistance will not be reduced” has been replaced in 714.5.2.1 with more definitive wording.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Listing for luminaires (light fixtures) that are membrane penetrations regulated by this section of the code currently have a “listing” option (part of the list of exceptions) for compliance with the requirement to maintain fire resistance. As listing as an option is currently included in this code, so there is no additional cost impact. The proposal is a simple editorial revision to provide clarity for the code official with the methods by which to determine code compliance.

FS50-24

FS51-24

IBC: 714.5.4

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Building Code

Revise as follows:

714.5.4 Penetrations in smoke barriers.
Penetrations in *smoke barriers* shall be protected by an *approved through-penetration firestop system* installed and tested in accordance with the requirements of UL 1479 for air leakage. The *L rating* of the system measured at 0.30 inch of water (74.7 Pa) in both the ambient temperature and elevated temperature tests shall meet one ~~not exceed either~~ of the following:

1. A maximum 5.0 cfm per square foot (0.025 $m^3/ s \times m^2$) of penetration opening for each *through-penetration firestop system*.
2. A maximum ~~total~~ cumulative leakage of 50 cfm (0.024 m^3/s) for all through-penetration firestop systems within any 100 square feet (9.3 m^2) of wall area, or floor area.

Reason: This proposal corrects a long-standing misunderstanding relating to the inter-relationship of the two criteria of Section 715.5.4. The first criteria, relating to the leakage of each individual system, was added to the 2006 IBC under Proposal FS96-04/05. The second criteria, relating to the cumulative leakage was added to the 2009 IBC under Proposal FS99-07/08. The intent of FS99-07/08, as stated in Tony Crimi's Public Comment Reason statement was to "…retain the existing 5.0 cfm/ft2 for individual through penetrations as one option, but … allow a new alternative requirement for the cumulative total leakage of all through-penetrations in a smoke barrier." The logic was there are certain types of penetrations, such as bundled cables, which inherently have a significant leakage and will not meet the original (first) criteria of 5.0 cfm per square foot of penetration opening. The new (second) criteria then looks at the leakage wholistically as the leakage over a relatively large area. One, or maybe more, of the systems not meeting the 5.0 CFM per square foot may be used as long as the cumulative leakage does not exceed 50 cfm for any 100 square foot area.

In retrospect, the language chosen at in FS99-07/08 was confusing at best. It stated the L rating shall not exceed the first criteria or the second criteria. This could certainly be interpreted as meaning the leakage must meet both criteria which was not the original intent. The 2018 IBC was then revised to state the L rating shall not exceed either the first criteria or the second criteria. We have been unable to identify the specific proposal which prompted this change so presumably it was done by ICC staff as an editorial clarification based on what they thought was the meaning of the 2015 IBC. However, it was in direct conflict with the original Reason statement of FS99-07/08.

This proposal then will align the code language to the original intent of FS99-07/08.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This will not increase the cost of construction as it is simply a clarification that only one of the criteria must be met to satisfy the L rating. As currently written, it can be misinterpreted to require both.

FS51-24

FS52-24

IBC: 714.5.4

Proponents: Jonathan Roberts, UL Solutions, UL Solutions (jonathan.roberts@ul.com); Richard Walke, Creative Technology Inc. and CM Services, Firestop Contractors International Association (richwalke61@gmail.com)

2024 International Building Code

Revise as follows:

~~714.5.4~~ 714.6 Penetrations in smoke barriers.
Penetrations in *smoke barriers* shall be protected by an *approved through-penetration firestop system* installed and tested in accordance with the requirements of UL 1479 for air leakage. The *L rating* of the system measured at 0.30 inch of water (74.7 Pa) in both the ambient temperature and elevated temperature tests shall not exceed either of the following:

1. 5.0 cfm per square foot (0.025 $m^3/s \times m^2$) of penetration opening for each *through-penetration firestop system*.
2. A total cumulative leakage of 50 cfm (0.024 m^3/s) for any 100 square feet (9.3 m^2) of wall area, or floor area.

Reason: The 2006 through 2012 editions of the International Building Code (IBC) required penetrations in *smoke barriers* which by definition are both vertical or horizontal assemblies to be protected by an *approved through-penetration firestop system* tested in accordance with UL 1479 for air leakage and meeting the requirements contained in the code. The language in this proposal is existing language that was originally located in a standalone section at the end of Section 714, from the 2006 edition through the 2012 edition. In the 2015 edition of the code it was relocated during a reorganization of the numbering for Section 714. It was moved into a subsection under the section 714.5 which relates only to through penetrations in horizontal assemblies. Moving this back toward the end of Section 714 and placing the language in its own section, rather than the subsection related only to penetrations in horizontal assemblies, will allow this requirement to apply to both walls and horizontal assemblies fixing the issue.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This section is currently used to determine allowable leakage (L Rating) for walls and floors so it will maintain the current requirements while making a slight editorial change to ensure it is not overlooked and will apply to both vertical barriers and horizontal barriers.

FS52-24

FS53-24

IBC: 715.3

Proponents: Jeffrey Grove, Southern Nevada ICC Chapter (jeff.grove@coffman.com)

2024 International Building Code

Revise as follows:

715.3 Fire-resistance-rated assembly intersections.
Joints installed in or between fire-resistance-rated walls, floor or floor/ceiling assemblies and roofs or roof/ceiling assemblies shall be protected by an *approved fire-resistant joint* system designed to resist the passage of fire for a time period not less than the required *fire-resistance rating* of the wall, floor or roof in or between which the system is installed.

Exception: *Fire-resistant joint systems* shall not be required for *joints* in the following locations:

1. Floors within a single *dwelling unit*.
2. Floors where the *joint*s protected by a *shaft enclosure* in accordance with Section 713.
3. Floors within *atriums* where the space adjacent to the *atrium* is included in the volume of the *atrium* for smoke control purposes.
4. Floors within *malls*.
5. Floors and ramps within parking garages or *structures* constructed in accordance with Sections 406.5 and 406.6.
6. *Mezzanine* floors.
7. Walls that are permitted to have unprotected openings.
8. Roofs where openings are permitted.
9. Control *joints* not exceeding a maximum width of 0.625 inch (15.9 mm) and tested in accordance with ASTM E119 or UL 263.
10. The intersection of exterior curtain wall assemblies and the roof slab or *roof deck*.
11. Between the bottom of a fire-resistance-rated wall and a floor or floor/ceiling assembly, unless the wall abuts two or more interconnected levels.

Reason: Based on the following, fire-resistive joint systems are not required or necessary where a fire-resistance-rated wall is supported by (sits on) a floor or floor/ceiling assembly.

Although the charging section can be interpreted to apply, the assemblies in question do not meet the definition of a joint in Chapter 2 of the 2024 IBC.

JOINT. The opening in or between adjacent assemblies that is created due to building tolerances, or is designed to allow independent movement of the building in any plane caused by thermal, seismic, wind or any other loading.

Where a wall is supported by a floor or floor/ceiling assembly, the bottom of a wall is not designed to allow independent movement. Although "building tolerances" is not defined in the IBC, these assemblies also have little if any tolerances due to the methods of construction. As such, the bottom of a fire-resistance-rated wall does not constitute a joint within the intent of Section 715 and additional protection is not required.

Furthermore, the Gypsum Association manual (GA-216) specifies that "Gypsum panel products applied to walls shall be applied with the bottom edge spaced a minimum of 1/4 in. (6 mm) above the floor." Drywall is attached to studs, which are connected to a base plate and, as such, there will rarely if ever be a gap at the bottom of a wall sufficient to allow migration of fire, smoke or superheated gasses.

In addition, NFPA® 80, the Standard for Fire Doors and Other Opening Protectives specifies that "Clearance under the bottom of a door shall be a maximum of 3⁄4 in. (19 mm)." This is an indication that the bottom of a fire-resistance-rated wall assembly isn't as critical as the top, or even the sides.

Based on the preceding, it is clear that joint protection in accordance with Section 715.3 is not required for bottom of wall assemblies and provides little to no additional protection.

THE PHYSICS:

During a fire, the room of origin becomes positively pressurized above the neutral plane and negatively pressurized below the neutral plane. As such, fire, smoke and superheated gasses will rarely if ever migrate from the room of origin into adjacent spaces at the bottom of a wall and protection at the bottom of the wall contradicts the physics of the requirement.

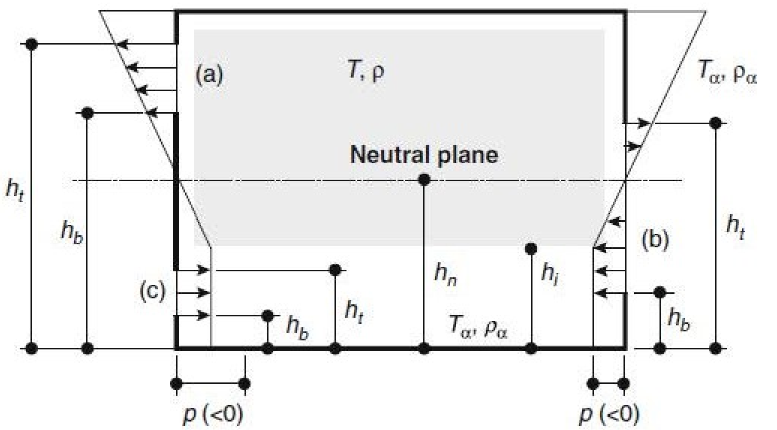


Figure 15.24 from the SFPE Handbook of Fire Protection Engineering – Fifth Edition.

Bibliography: SFPE Handbook of Fire Protection Engineering, Fifth Edition

NFPA® 80, the Standard for Fire Doors and Other Opening Protectives

Cost Impact: Decrease

Estimated Immediate Cost Impact:

Installation of a listed joint system between the bottom of a fire-resistance-rated wall and the floor that supports it ranges from $3 - $4.5 per lineal foot. As such, this clarification of code intent will reduce the cost of construction.

Estimated Immediate Cost Impact Justification (methodology and variables):

Cost information was obtained from mechanical vendors and contractors.

FS53-24

FS54-24

IBC: 715.3

Proponents: William Koffel, Koffel Associates, Inc., Firestop Contractors International Association (FCIA) (wkoffel@koffel.com)

2024 International Building Code

Revise as follows:

715.3 Fire-resistance-rated assembly intersections.
Joints installed in or between fire-resistance-rated walls, floor or floor/ceiling assemblies and roofs or roof/ceiling assemblies shall be protected by an *approved fire-resistant joint* system designed to resist the passage of fire for a time period not less than the required *fire-resistance rating* of the wall, floor or roof in or between which the system is installed.

Exception: *Fire-resistant joint systems* shall not be required for *joints* in the following locations:

1. Floors within a single *dwelling unit*.
2. Floors where the*joint*is protected by a *shaft enclosure* in accordance with Section 713.
3. Floors within *atriums* where the space adjacent to the *atrium* is included in the volume of the *atrium* for smoke control purposes.
4. Floors within *malls*.

~~5. Floors and ramps within parking garages or *structures* constructed in accordance with Sections 406.5 and 406.6.~~

5 ~~6~~. *Mezzanine* floors.

6~~7~~. Walls that are permitted to have unprotected openings.

7~~8~~. Roofs where openings are permitted.

8~~9~~. Control *joints* not exceeding a maximum width of 0.625 inch (15.9 mm) and tested in accordance with ASTM E119 or UL 263.

9 ~~10~~. The intersection of exterior curtain wall assemblies and the roof slab or *roof deck*.

Reason: During the 2024 code development cycle, Proposal No. FS64-21 and FS75-21 introduced new Exceptions to Section 714.5.1, Section 715.4 and Section 715.5, which permit unprotected penetrations and unprotected perimeter voids through floors and ramps of both open and enclosed parking garages where the areas above and below the penetrations and voids are parking areas. The proposal on penetrations and voids brought attention to the fact that joints in floors and ramps within open and enclosed parking garages likewise do not require protection. FCIA believes unprotected joints in open and enclosed parking garages and structures does not represent good fire protection practices and as such are proposing the deletion of this exception.

The need to protect joints above or below parking areas is critical in preventing ignition of parked vehicles and ultimately floor-to-floor fire propagation. Joints within floor assemblies of parking garages and ramps extend long distances throughout an entire parking structure. These joints could potentially be located directly above or below parked vehicles, which can further complicate fire-fighting operations.

The construction of modern vehicles has changed to include more plastics and other combustibles. While this benefits the vehicle weight and fuel economy, and lowers the vehicle price, it increases the fuel load and fire growth we see in parking garages.

Modern vehicles present new hazards due to the incorporation of larger quantities of combustible materials (e.g. fuels, plastics, synthetic materials, etc.) into their designs. Another recent vehicle construction change is the use of plastic fuel tanks. Plastic fuel tanks can result in an earlier release of fuel in a fire. Fire tests at Southwest Research Institute showed fuel leakage as a result of fire exposure occurs after less than five minutes of fire exposure. Fuel spill fires represent a likely means of vehicle-to-vehicle fire spread.[1]

As alternative fuel vehicles are popularized, concerns regarding their unique hazards, burn characteristics, and typical burn duration have been raised. Fuels such as propane, natural gas and hydrogen all create different hazards.

New electric vehicle battery and charging equipment technologies are also leading to much more rapid-fire growth than previously contemplated in parking garage design. Fire accidents caused by the thermal runaway of lithium-ion battery have demonstrated that additional fire safety precautions are needed. It is particularly important to prevent these open and enclosed parking garage fires from occurring due to the challenges the fire services face in fighting parking garage fires.

Compared to older vehicles, modern vehicles burn differently. At the same time, modern parking garages have optimized space requirements for vehicle parking and storage. It is clear that the design assumption of only one or two fire burning has to be revisited. Cars are larger and have more fuel load than before, and the parking spaces have become smaller. This enhances the probability of fire spread between vehicles.

There have been a number of recent cases and studies around the world that are demonstrating that fire safety in parking garages should be enhanced, not further reduced as done with these exceptions. In recent years, Europe has seen a series of large fires (Liverpool, UK (2017); Cork, Ireland (2018); Stavanger Airport in Sola, Norway (2020)[1]; Warsaw, Poland (2020)) that brought fires in parking garages into the focus of public discussions. In October, 2023, a major multi-storey parking garage fires occurred at the Luton Airport, London resulting in structural collapse.

A 2020 study on fires of electric vehicles concluded that in just 22 seconds, cell thermal runaway spreads flames throughout the battery compartment. A full-scale fire test was carried out on a battery system of seventeen 3P6S battery modules mounted with control systems in a car chassis. One battery module was overcharged until thermal runaway occurred. Within five seconds, thermal runaway spread to the four adjacent modules. Released gas was immediately ignited, with jet flame and smoke, and temperatures reached over 600°C. These five modules then smoldered, and further modules ignited after around two minutes. The authors note that water fire suppression would be hindered by the battery pack casings.[2]

An NFPA Journal article published in 2019 indicated a typical garage fire today is much more likely to involve multiple vehicles than two decades ago, hinting that fires are in fact burning with more severity. In garage fires between 1995 and 1997, only 1 percent of fires involved more than five vehicles. By contrast, between 2010 and 2014, 8 percent of the garage fires involved more than five vehicles.[3]The photo below shows an example of a non-rated construction joint system in the concrete floor of a multi-story parking garage located at the Miracle Mile Shops in Las Vegas, NV. This joint system consists of a steel or aluminum cover plate on the top of the floor, with nothing underneath. This car was one of many parked directly over the top of this and other similar joint systems. In the event of a fire beneath, the underside of the cars, including the fuel tank or battery pack, would see significant radiant heat from the steel cover plate transmitting upward or the aluminum plate simply disappearing and fire propagating. By the 2024 IBC, this non-rated construction joint is permitted. Is the level of protection we should be permitting?

It is now time to recognize the hazards of parking structures and delete the various exceptions which are eliminating the need to protect penetrations, joints and voids in open and enclosed parking garages. This proposal on joints parallels similar proposals covering penetrations and voids which will be heard separately.

Bibliography: 1 NFPA Research Foundation - Modern Vehicle Hazards in Parking Structures and Vehicle Carriers by Haavard Boehmer, PE, Michael Klassen, PhD, PE, Stephen Olenick, PE

2 Li, Huang, Peng, Wen, Yang, Xulai, Chen, Haodong, Sun, Jinhua, Wang, Qingsong, Full-Scale Experimental Study on the Combustion Behavior of Lithium Ion Battery Pack Used for Electric Vehicle Fire Technology, Volume 56- 6, November 01, 2020, https://doi.org/10.1007/s10694-020-00988-w

3 NFPA Journal - Protecting Parking Garages, Mar Apr 2019, Ramp Risk, By Jesse Roman.

Cost Impact: Increase

Estimated Immediate Cost Impact:

$35 - $50 per lineal foot of joints to be protected.

Estimated Immediate Cost Impact Justification (methodology and variables):

Based on industry and manufacturer input, the average cost of an installed joint systems for concrete floors is $35 to $50 per linear ft. The estimate includes materials and labor costs for any type of fire-resistant joint system through a concrete floor assembly. The cost range includes the backing material and sealant components, but excludes the cost of any metallic cover plate which would be required whether the joint was fire-rated or not. The total cost in any given parking garage will depend upon the number and size of joint systems to be installed.

FS54-24

FS55-24

IBC: 715.3, 715.4

Proponents: William Koffel, Koffel Associates, Inc., Firestop Contractors International Association (FCIA) (wkoffel@koffel.com)

2024 International Building Code

Revise as follows:

715.3 Fire-resistance-rated assembly intersections.
Joints installed in or between fire-resistance-rated walls, floor or floor/ceiling assemblies and roofs or roof/ceiling assemblies shall be protected by an *approved fire-resistant joint* system designed to resist the passage of fire for a time period not less than the required *fire-resistance rating* of the wall, floor or roof in or between which the system is installed.

Exception: *Fire-resistant joint systems* shall not be required for *joints* in the following locations:

1. Floors within a single *dwelling unit*.
2. Floors where the*joint*is protected by a *shaft enclosure* in accordance with Section 713.
3. Floors within *atriums* where the space adjacent to the *atrium* is included in the volume of the *atrium* for smoke control purposes.
4. Floors within *malls*.
5. Floors and ramps within parking garages or *structures* constructed in accordance with Sections 406.5 and 406.6.
6. *Mezzanine* floors.
7. Walls that are permitted to have unprotected openings.
8. Roofs where openings are permitted.
9. Control *joints* not exceeding a maximum width of 0.625 inch (15.9 mm) and tested in accordance with ASTM E119 or UL 263.
10. ~~The intersection of exterior curtain wall assemblies and the roof slab or *roof deck*.~~

715.4 Exterior curtain wall/fire-resistance-rated floor intersections. Voids created at the intersection of exterior curtain wall assemblies and fire-resistance-rated floor, ~~or~~
floor/ceiling, roof, or roof/ceiling assemblies shall be protected with an *approved perimeter fire containment system* to prevent the ~~interior~~ spread of fire. Such systems shall provide an *F rating* for a time period not less than the *fire-resistance rating* of the floor or floor/ceiling assembly.

Exceptions: An approved perimeter fire containment system shall not be required for voids in the following locations:

1. Floors within a single *dwelling unit*.
2. Floors and ramps within parking garages or *structures* constructed in accordance with Sections 406.5 and 406.6.
3. *Mezzanine* floors.

Reason: Exception 10 is inappropriately located in Section 715. Section 715.3 addresses fire-resistant joint systems, whereas Exception 10 addresses perimeter fire containment systems and should be deleted.
Protecting the breach made at the roof level brings needed firefighter protection while handling firefighting operations from the rooftop.

Cost Impact: Increase

Estimated Immediate Cost Impact:

$35 - $50 per lineal foot of perimeter containment system to be protected.

Estimated Immediate Cost Impact Justification (methodology and variables):

Based on industry and manufacturer input, the average cost of an installed perimeter containment system is $35 - $50/ linear ft.

This includes materials and labor costs for application. The cost estimate is conservative in that if a perimeter containment system is not required, there is still some protection of the intersection that would be required at the roof or roof/ceiling level.

FS56-24

IBC: 715.4, 715.5

Proponents: Tony Crimi, A.C. Consulting Solutions Inc., North American Insulation Manufacturers Association (tcrimi@sympatico.ca)

2024 International Building Code

Revise as follows:

715.4 Exterior curtain wall/fire-resistance-rated floor intersections.
Voids created at the intersection of exterior curtain wall assemblies and fire-resistance-rated floor or floor/ceiling assemblies shall be protected with an *approved perimeter fire containment system* to prevent the interior spread of fire. Such systems shall provide an *F rating* for a time period not less than the *fire-resistance rating* of the floor or floor/ceiling assembly.

Exceptions: An approved perimeter fire containment system shall not be required for voids in the following locations:

1. Floors within a single *dwelling unit*.
2. ~~Floors and ramps within parking garages or *structures* constructed in accordance with Sections 406.5 and 406.6.~~

~~3~~2. *Mezzanine* floors.

715.5 Exterior curtain wall/nonfire-resistance-rated floor assembly intersections.
Voids created at the intersection of exterior curtain wall assemblies and nonfire-resistance-rated floor or floor/ceiling assemblies shall be filled with an *approved* material or system to retard the interior spread of fire and hot gases.

Exceptions: An *approved* material or system to retard the interior spread of fire and hot gases shall not be required for voids in the following locations:

1. Floors within a single *dwelling unit*.
2. ~~Floors and ramps within parking garages or *structures* constructed in accordance with Sections 406.5 and 406.6.~~

~~3~~2. *Mezzanine* floors.

Reason: During the 2024 code cycle, Proposal No. FS75-21 introduced several exceptions to the requirements to protect perimeter voids in open and closed parking garages for both rated and non-rated floor construction. With this change, perimeter openings are not required to be filled with any material, leaving them entirely open though all floors of the parking garage, in a direct vertical path for flames and hot gases to travel. Voids at curtain walls extend long distances throughout an entire parking structure. The openings will often be located directly above or below parked vehicles, which can further complicate fire fighting operations with multiple floors engaged in fire.

Modern vehicles present new hazards due to the incorporation of larger quantities of combustible materials (e.g. fuels, plastics, synthetic materials, etc.) into their designs. Another recent vehicle construction change is the use of plastic fuel tanks. According to the American Chemistry Council, modern vehicles are now composed of about 50 percent plastic by volume, even though plastics account for only 10 percent of the average vehicle's weight. Industry experts believe that as better technologies and additional fuel-efficiency mandates kick in, the percentage of plastics in cars will only increase.[1] As alternative fuel vehicles are popularized, concerns regarding their unique hazards, burn characteristics, and typical burn duration have been raised. Compared to older vehicles, modern vehicles burn differently. At the same time, modern parking garages have optimized space requirements for vehicle parking and storage. It is clear that the design assumption of only one or two fire burning has to be revisited. Cars are larger and have more fuel load than before, and the parking spaces have become smaller. This enhances the probability of fire spread between vehicles.

New electric vehicle battery and charging equipment technologies are also leading to much more rapid fire growth than previously contemplated in parking garage design. Fire accidents caused by the thermal runaway of lithium-ion battery have demonstrated that additional fire safety precautions are needed. It is particularly important to prevent these open and closed parking garage fires from occurring due to the challenges the fire services face in fighting parking garage fires.

An NFPA Journal article published in 2019 indicated a typical garage fire today is much more likely to involve multiple vehicles than two decades ago, hinting that fires are in fact burning with more severity. In garage fires between 1995 and 1997, only 1 percent of fires involved more than five vehicles. By contrast, between 2010 and 2014, 8 percent of the garage fires involved more than five vehicles.[2] In the United States, Corporate Average Fuel Efficiency standards mandate that passenger vehicle fleets average 54.5 miles per gallon by 2025. To meet those requirements, it is expected that the average car will incorporate nearly 350 kilograms of plastics, up from 200 kilograms in 2014, according to an analysis by IHS Chemical, a chemical industry research group.[1]

Bibliography: [1] NFPA Journal - Protecting Parking Garages, Mar Apr 2019, Ramp Risk, By Jesse Roman.

[2]NFPA Research Foundation - Modern Vehicle Hazards in Parking Structures and Vehicle Carriers by Haavard Boehmer, PE, Michael Klassen, PhD, PE, Stephen Olenick, PE

Cost Impact: Increase

Estimated Immediate Cost Impact:

Based on the 2024 IBC, the proposal will increase the cost of construction. However, the proposal would bring the cost of construction back to the level of the 2021 and prior IBC editions. Because the 2024 edition is not yet widely adopted, the cost impact is limited at this time.

Estimated Immediate Cost Impact Justification (methodology and variables):

The proposal would bring the cost of construction back to the level of the 2021 and prior IBC editions. The approximate installed cost is $7-10 per lineal foot.

FS56-24

FS57-24

IBC: 715.4.1

Proponents: Tony Crimi, A.C. Consulting Solutions Inc., International Firestop Council (tcrimi@sympatico.ca)

2024 International Building Code

Revise as follows:

715.4.1 Fire test criteria.
Perimeter fire containment systems shall be tested in accordance with the requirements of ASTM E2307.

Exception: Voids created at the intersection of the exterior curtain wall assemblies and floor assemblies where the vision glass extends to the finished floor level shall be permitted to be protected with an *approved* ~~material~~ system to prevent the interior spread of fire. Such systems~~material~~ shall be securely installed and capable of preventing the passage of flame and hot gases sufficient to ignite cotton waste through the void where subjected to ASTM E119 time-temperature fire conditions under a minimum positive pressure differential of 0.01 inch of water (2.49 Pa) for the time period not less than the *fire-resistance rating* of the floor assembly.

Reason: This proposal provides additional clarification to the requirements for the exceptions to ASTM E2307 tested perimeter fire containment systems (PFC).

The exception in 715.4.1 applies to protection of the perimeter void. As currently written, the exception permits a “material” that has been test to an ASTM E119 fire exposure but is not at all clear as to how that needs to be done for the results to be meaningful. For example, an insulation material tested to ASTM E119 within the cavity of an interior wall assembly provides no assurance that material would provide the intended protection for a void installed horizontally between a floor assembly and a curtain wall.

This proposal clarifies that what is required is a system that that resembles the orientation, dimensions and fastening that needed to prevent the passage of flames and hot gases through the void. This aligns with the performance objectives of the base requirements in 715.4.1. Information such as joint width, adhesion to substrates, fastening, etc. need to be representative of what is being installed.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposal clarifies the intent of the provision and the exception. The wording is consistent with the intent of the base requirement.

FS57-24

FS58-24

IBC: 715.7, 715.7.1 (New)

Proponents: Brendan Smith, CannonDesign, CannonDesign (bsmith@cannondesign.com)

2024 International Building Code

715.7 Exterior wall/vertical fire barrier intersections.
Voids created at the intersection of nonfire-resistance-rated exterior wall assemblies and vertical *fire barriers* shall be filled with an *approved* material or system to retard the interior spread of fire and hot gases.

Add new text as follows:

715.7.1 Materials and systems.. Acceptable materials and systems shall be Fireblocking materials as specified in Section 718.2.1, or other approved materials.

Reason: No specific materials or systems are currently listed in the code as meeting the intent of this section. To comply with the code as currently written, every project with a rated interior wall terminating at a non-rated exterior wall would be required to apply to the building official for approval of its particular proposed materials and systems. These details are often difficult to sequence and construct, and require careful detailing and coordination with adjacent materials and systems. Building officials having inconsistent standards makes it difficult to confidently develop standard details that are well vetted for constructability, and may lead to significant revisions in the field.

Fireblocking materials are already well defined in the code and are intended to serve essentially the same purpose. The Commentary to 2021 IBC 718 states that "...Fireblocking involves the use of building materials to prevent the movement of flame and gases to other areas..." It would make sense to allow these materials, already approved to prevent the arguably greater risk of vertical movement of fire and gases, to be used for a similar function preventing horizontal movement.

This would allow architects and contractors to work together to develop more effective and constructable details through continued use of consistent approaches, and would provide building officials with greater confidence in the design, installation quality, and appropriateness of such details.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposed change would merely codify some optional solutions as acceptable where none are currently explicitly provided. These are likely solutions that are already being used to comply with the current language, and other approved approaches are still allowed. Though there may be savings compared to projects that might be using more expensive alternative methods currently, it would not be possible to make an accurate estimate of the extents or nature of such solutions. We do not believe that the proposed acceptable solutions differ significantly in cost from what we have seen in our experience to date.

FS58-24

FS59-24

IBC: TABLE 716.1(2)

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Building Code

Revise as follows:

TABLE 716.1(2) OPENING FIRE PROTECTION ASSEMBLIES, RATINGS AND MARKINGS

TYPE OF ASSEMBLY	REQUIRED WALL ASSEMBLY RATING (hours)		MINIMUM FIRE DOOR AND FIRE SHUTTER ASSEMBLY RATING (hours)	DOOR VISION PANEL SIZE[a]	FIRE-RATED GLAZING MARKING DOOR VISION PANEL[b, c]	MINIMUM SIDELIGHT/TRANSOM ASSEMBLY RATING (hours)		FIRE-RATED GLAZING MARKING SIDE-LIGHT/TRANSOM PANEL	
						Fire protection	Fire resistance	Fire protection	Fire resistance
Fire walls and fire barriers having a required fire-resistance rating greater than 1 hour	4		3	See Note a	D-H-W-240	Not Permitted	4	Not Permitted	W-240
	3		3[d]	See Note a	D-H-W-180	Not Permitted	3	Not Permitted	W-180
	2		1 1/2	100 sq. in.	≤100 sq. in. = D-H-90 >100 sq. in.=D-H-W-90	Not Permitted	2	Not Permitted	W-120
	1 1/2		1 1/2	100 sq. in.	≤100 sq. in. = D-H-90 >100 sq. in.= D-H-W-90	Not Permitted	1 1/2	Not Permitted	W-90
Double fire walls constructed in accordance with NFPA 221	Single-wall assembly rating (hours)[e]	Each wall of the double-wall assembly (hours)[f]	—						
	4	3	3	See Note a	D-H-W-180	Not Permitted	3	Not Permitted	W-180
	3	2	1 1/2	100 sq. in.	≤ 100 sq. in. = D-H-90 >100 sq. in.= D-H-W-90	Not Permitted	2	Not Permitted	W-120
	2	1	1	100 sq. in.	≤ 100 sq. in. = D-H-60 > 100 sq. in. = D-H-W-60	Not Permitted	1	Not Permitted	W-60
Enclosures for shafts, interior exit stairways and interior exit ramps.	2		1 1/2	100 sq. in.[b]	≤100 sq. in. = D-H-90 > 100 sq. in.= D-H-T-W-90	Not Permitted	2	Not Permitted	W-120
Horizontal exits in fire walls[g]	4		3	100 sq. in.	≤100 sq. in. = D-H-180 > 100 sq. in.=D-H-W-240	Not Permitted	4	Not Permitted	W-240
	3		3[d]	100 sq. in.	≤100 sq. in. = D-H-180 > 100 sq. in.=D-H-W-180	Not Permitted	3	Not Permitted	W-180
Fire barriers having a required fire-resistance rating of 1 hour: Enclosures for shafts, exit access stairways, exit access ramps, interior exit stairways and interior exit ramps; and exit passageway walls	1		1	100 sq. in.	≤100 sq. in. = D-H-60 >100 sq. in.=D-H-T-W-60	Not Permitted	1	Not Permitted	W-60
						Fire protection			
Other fire barriers	1		3/4	Maximum size tested	D-H-45	3/4[h]		D-H-45[h]	
Fire partitions: Corridor walls	1		1/3[a]	Maximum size tested	D-20	3/4[a]		D-H-OH-45	
	0.5		1/3[a]	Maximum size tested	D-20	1/3		D-H-OH-20	
Other fire partitions	1		3/4[i]	Maximum size tested	D-H-45	3/4		D-H-45	
	0.5		1/3	Maximum size tested	D-H-20	1/3		D-H-20	
Exterior walls	3		1 1/2	100 sq. in.[a]	≤100 sq. in. = D-H-90 > 100 sq. in = D-H-W-90	Not Permitted	3	Not Permitted	W-180
	2		1 1/2	Maximum size tested	D-H 90 or D-H-W-90	1 1/2[h]	2	D-H-OH-90[h]	W-120
						Fire protection			
	1		3/4	Maximum size tested	D-H-45	3/4[h]		D-H-45[h]	
Smoke barriers						**Fire protection**			

TYPE OF ASSEMBLY	REQUIRED WALL ASSEMBLY RATING (hours)	MINIMUM FIRE DOOR AND FIRE SHUTTER ASSEMBLY RATING (hours)	DOOR VISION PANEL SIZE	FIRE-RATED GLAZING MARKING DOOR VISION PANEL	MINIMUM SIDELIGHT/TRANSOM ASSEMBLY RATING (hours)		FIRE-RATED GLAZING MARKING SIDE-LIGHT/TRANSOM PANEL	
					Fire protection	Fire resistance	Fire protection	Fire resistance
	1	$^{1}/_{3}$	Maximum size tested	D-20	$^{3}/_{4}$		D-H-OH-45	

For SI: 1 square inch = 645.2 mm.

a. Fire-resistance-rated glazing tested to ASTM E119 or UL 263 in accordance with Section 716.1.2.3 shall be permitted, in the maximum size tested.

b. Under the column heading "Fire-rated glazing marking door vision panel," W refers to the fire-resistance rating of the glazing, not the frame.

c. See Section 716.1.2.2.1 and Table 716.1(1) for additional permitted markings.

d. Two doors, each with a fire protection rating of $1^{1}/_{2}$ hours, installed on opposite sides of the same opening in a fire wall, shall be deemed equivalent in fire protection rating to one 3-hour fire door.

e. As required in Section 706.4.

f. As allowed in Section 4.6 of NFPA 221.

g. See Section 716.2.5.1.2.

h. Fire-protection-rated glazing is not permitted for fire barriers required by Section 1207 of the *International Fire Code* to enclose energy storage systems. Fire-resistance-rated glazing assemblies tested to ASTM E119 or UL 263, as specified in Section 716.1.2.3, shall be permitted.

i. Two doors, each with a fire rating of 20 minutes, installed on opposite sides of the same opening in a fire partition, shall be deemed equivalent in fire protection rating to one 45-minute fire door.

Reason: This proposal is intended to add UL 263 into Footnote a which currently only includes ASTM E119.

Over the last five of so ICC code development cycle, it has been the practice to include both ASTM E119 and UL 263 in all references to testing for a fire-resistance rating. This is based on the fact that these two fire test standards describe the same test equipment, same test procedure and same conditions of acceptance. Adding UL 263 to Footnote a brings consistency with Footnote h of Table 716.1(2) along with approximately forty other references within the IBC.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposed change simply adds an alternate test standard describing the test procedure for establishing a fire-resistance rating.

FS59-24

FS60-24

IBC: TABLE 716.1(2)

Proponents: Richard Walke, Creative Technology Inc., SAFTIFIRST (richwalke61@gmail.com)

2024 International Building Code

Revise as follows:

TABLE 716.1(2) OPENING FIRE PROTECTION ASSEMBLIES, RATINGS AND MARKINGS

TYPE OF ASSEMBLY	REQUIRED WALL ASSEMBLY RATING (hours)		MINIMUM FIRE DOOR AND FIRE SHUTTER ASSEMBLY RATING (hours)	DOOR VISION PANEL SIZE~~a~~	FIRE-RATED GLAZING MARKING DOOR VISION PANEL[b, c]	MINIMUM SIDELIGHT/TRANSOM ASSEMBLY RATING (hours)		FIRE-RATED GLAZING MARKING SIDE-LIGHT/TRANSOM PANEL	
						Fire protection	Fire resistance	Fire protection	Fire resistance
Fire walls and fire barriers having a required fire-resistance rating greater than 1 hour	4		3	~~See Note a~~ Maximum size tested a	D-H-W-240	Not Permitted	4	Not Permitted	W-240
	3		3[d]	~~See Note a~~ Maximum size tested a	D-H-W-180	Not Permitted	3	Not Permitted	W-180
	2		$1^1/_2$	≤ 100 sq. in.	~~≤100 sq. in. =~~ D-H-90 ~~>100 sq. in.= D-H-W-90~~	Not Permitted	2	Not Permitted	W-120
				Maximum size tested a	D-H-W-90				
	$1^1/_2$		$1^1/_2$	≤ 100 sq. in.	~~≤100 sq. in. =~~ D-H-90 ~~>100 sq. in.= D-H-W-90~~	Not Permitted	$1^1/_2$	Not Permitted	W-90
				Maximum size tested a	D-H-W-90				
Double fire walls constructed in accordance with NFPA 221	Single-wall assembly rating (hours)[e]	Each wall of the double-wall assembly (hours)[f]	—						
	4	3	3	~~See Note a~~ Maximum size tested a	D-H-W-180	Not Permitted	3	Not Permitted	W-180
	3	2	$1^1/_2$	≤ 100 sq. in.	~~≤ 100 sq. in. =~~ D-H-90 ~~>100 sq. in.= D-H-W-90~~	Not Permitted	2	Not Permitted	W-120
				Maximum size tested a	D-H-W-90				
	2	1	1	≤ 100 sq. in.	~~≤ 100 sq. in. =~~ D-H-60 ~~> 100 sq. in. = D-H-W-60~~	Not Permitted	1	Not Permitted	W-60
				Maximum size tested a	D-H-W-60				
Enclosures for shafts, interior exit stairways and interior exit ramps.	2		$1^1/_2$	≤ 100 sq. in.[b]	~~≤100 sq. in. =~~ D-H-90 ~~> 100 sq. in.= D-H-T-W-90~~	Not Permitted	2	Not Permitted	W-120
				Maximum size tested a	D-H-T-W-90				
Horizontal exits in fire walls[g]	4		3	≤ 100 sq. in.	~~≤100 sq. in. =~~ D-H-180 ~~> 100 sq. in.= D-H-W-240~~	Not Permitted	4	Not Permitted	W-240

TYPE OF ASSEMBLY	REQUIRED WALL ASSEMBLY RATING (hours)	MINIMUM FIRE DOOR AND FIRE SHUTTER ASSEMBLY RATING (hours)	DOOR VISION PANEL SIZE	FIRE-RATED GLAZING MARKING DOOR VISION PANEL	MINIMUM SIDELIGHT/TRANSOM ASSEMBLY RATING (hours)		FIRE-RATED GLAZING MARKING SIDE-LIGHT/TRANSOM PANEL	
					Fire protection	Fire resistance	Fire protection	Fire resistance
			Mazimum size tested [a]	D-H-W-240				
	3	3[d]	≤ 100 sq. in.	~~≤100 sq. in. =~~ D-H-180 ~~> 100 sq. in.=D-H-W-180~~	Not Permitted	3	Not Permitted	W-180
			Maximum size tested [a]	D-H-W-180				
Fire barriers having a required fire-resistance rating of 1 hour: Enclosures for shafts, exit access stairways, exit access ramps, interior exit stairways and interior exit ramps; and exit passageway walls	1	1	≤ 100 sq. in.	~~≤100 sq. in. =~~ D-H-60 ~~>100 sq. in.=D-H-T-W-60~~	Not Permitted	1	Not Permitted	W-60
			Maximum size tested [a]	D-H-T-W-60				
					Fire protection			
Other fire barriers	1	3/4	Maximum size tested [i]	D-H-45	3/4[h]		D-H-45[h]	
Fire partitions: Corridor walls	1	1/3[a]	Maximum size tested [i]	D-20	3/4[a]		D-H-OH-45	
	0.5	1/3[a]	Maximum size tested [i]	D-20	1/3		D-H-OH-20	
Other fire partitions	1	3/4[i]	Maximum size tested [i]	D-H-45	3/4		D-H-45	
	0.5	1/3	Maximum size tested [i]	D-H-20	1/3		D-H-20	
Exterior walls	3	1 1/2	≤ 100 sq. in.~~[a]~~	~~≤100 sq. in. =~~ D-H-90 ~~> 100 sq. in = D-H-W-90~~	Not Permitted	3	Not Permitted	W-180
			Maximum size tested [a]	D-H-W-90				
	2	1 1/2	Maximum size tested [i]	D-H 90 ~~or D-H-W-90~~	1 1/2[h]	2	D-H-OH-90[h]	W-120
			Maxiumum size tested [a]	D-H-W-90				
					Fire protection			
	1	3/4	Maximum size tested [i]	D-H-45	3/4[h]		D-H-45[h]	
Smoke barriers					Fire protection			
	1	1/3	Maximum size tested [i]	D-20	3/4		D-H-OH-45	

For SI: 1 square inch = 645.2 mm.

a. Fire-resistance-rated glazing tested to ASTM E119 in accordance with Section 716.1.2.3, and as part of the door assembly to NFPA 252, UL 10B or UL 10C shall be permitted, in the maximum size tested.

b. Under the column heading "Fire-rated glazing marking door vision panel," W refers to the fire-resistance rating of the glazing, not the frame.

c. See Section 716.1.2.2.1 and Table 716.1(1) for additional permitted markings.

d. Two doors, each with a fire protection rating of 1 1/2 hours, installed on opposite sides of the same opening in a fire wall, shall be deemed equivalent in fire protection rating to one 3-hour fire door.

e. As required in Section 706.4.

f. As allowed in Section 4.6 of NFPA 221.

g. See Section 716.2.5.1.2.

h. Fire-protection-rated glazing is not permitted for fire barriers required by Section 1207 of the *International Fire Code* to enclose energy storage systems. Fire-resistance-rated glazing assemblies tested to ASTM E119 or UL 263, as specified in Section 716.1.2.3, shall be permitted.

i. Two doors, each with a fire rating of 20 minutes, installed on opposite sides of the same opening in a fire partition, shall be deemed equivalent in fire protection rating to one 45-minute fire door.

j. Fire-protection-rated glazing tested as part of the door assembly to NFPA 252, UL 10B or UL 10C shall be permitted, in the maximum size tested.

Reason: This proposal is intended to clarify the rather confusing format of Table 716.1(2) which limits the size of the glazing in **Door Vision Panel Size** column to 100 sq. in. only to allow larger sizes in the next column if fire-resistance-rated glazing is used. This new format creates two distinct line items for the **Door Vision Panel Size** column; one for fire-protection-rated glazing and one for fire-resistance-rated glazing. Within each line item, the first column now specifies the allowable size and the second column the required glazing marking.

In addition to the above clarifications, other clean-up items have been included as follows:

1. Footnote a, now appearing in the heading information of the **Door Vision Panel Size** column, is being relocated from the heading to the individual table entries to which it applies.
2. An extraneous reference to Footnote b is being deleted from an individual table entry under the **Door Vision Panel Size** column and **Enclosures for shafts, interior exit stairways and interior exit ramps** row. This same footnote appears in the headings relating to the **Fire-Rated Glazing Marking Door Vision Panel** column making it unnecessary in the individual table entries.
3. The less than or equal symbol is being added in front of the 100 sq in. notations in the cells within the **Door Vision Panel Size** column to clarify that the 100 sq in. is the maximum allowable size of glazing corresponding to the marking in the following column.
4. The legend for Footnote a is being expanded to fully describe the test requirements for fire-resistance-rated glazing used in door applications. The requirements include testing the glazing in a wall assembly in accordance with ASTM E119 or UL 263, and testing it as part of a door assembly in accordance with NFPA 252, UL 10B or UL 10C.
5. A new Footnote J is being added to emphasize the test requirements for fire-protection-rated glazing. This footnote applies to individual table entries within the **Door Vision Panel Size** column where fire-protection-rated glazing is permitted in the maximum size tested.

It is believed this new format will reduce the confusion on the allowable glazing size and the testing requirements, and help ensure the proper glazing is used based on the application.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposed changes simply clarify the existing requirements.

FS60-24

FS61-24

IBC: TABLE 716.1(2)

Proponents: Richard Walke, Creative Technology Inc., SAFTIFIRST (richwalke61@gmail.com)

2024 International Building Code

Revise as follows:

TABLE 716.1(2) OPENING FIRE PROTECTION ASSEMBLIES, RATINGS AND MARKINGS

TYPE OF ASSEMBLY	REQUIRED WALL ASSEMBLY RATING (hours)		MINIMUM FIRE DOOR AND FIRE SHUTTER ASSEMBLY RATING (hours)	DOOR VISION PANEL SIZE[a]	FIRE-RATED GLAZING MARKING DOOR VISION PANEL[b, c]	MINIMUM SIDELIGHT/TRANSOM ASSEMBLY RATING (hours)		FIRE-RATED GLAZING MARKING SIDE-LIGHT/TRANSOM PANEL	
						Fire protection	Fire resistance	Fire protection	Fire resistance[i]
Fire walls and fire barriers having a required fire-resistance rating greater than 1 hour	4		3	See Note a	D-H-W-240	Not Permitted	4	Not Permitted	W-240
	3		3[d]	See Note a	D-H-W-180	Not Permitted	3	Not Permitted	W-180
	2		1 1/2	100 sq. in.	≤100 sq. in. = D-H-90 >100 sq. in.=D-H-W-90	Not Permitted	2	Not Permitted	W-120
	1 1/2		1 1/2	100 sq. in.	≤100 sq. in. = D-H-90 >100 sq. in.= D-H-W-90	Not Permitted	1 1/2	Not Permitted	W-90
Double fire walls constructed in accordance with NFPA 221	Single-wall assembly rating (hours)[e]	Each wall of the double-wall assembly (hours)[f]	—						
	4	3	3	See Note a	D-H-W-180	Not Permitted	3	Not Permitted	W-180
	3	2	1 1/2	100 sq. in.	≤ 100 sq. in. = D-H-90 >100 sq. in.= D-H-W-90	Not Permitted	2	Not Permitted	W-120
	2	1	1	100 sq. in.	≤ 100 sq. in. = D-H-60 > 100 sq. in. = D-H-W-60	Not Permitted	1	Not Permitted	W-60
Enclosures for shafts, interior exit stairways and interior exit ramps.	2		1 1/2	100 sq. in.[b]	≤100 sq. in. = D-H-90 > 100 sq. in.= D-H-T-W-90	Not Permitted	2	Not Permitted	W-120
Horizontal exits in fire walls[g]	4		3	100 sq. in.	≤100 sq. in. = D-H-180 > 100 sq. in.=D-H-W-240	Not Permitted	4	Not Permitted	W-240
	3		3[d]	100 sq. in.	≤100 sq. in. = D-H-180 > 100 sq. in.=D-H-W-180	Not Permitted	3	Not Permitted	W-180
Fire barriers having a required fire-resistance rating of 1 hour: Enclosures for shafts, exit access stairways, exit access ramps, interior exit stairways and interior exit ramps; and exit passageway walls	1		1	100 sq. in.	≤100 sq. in. = D-H-60 >100 sq. in.=D-H-T-W-60	Not Permitted	1	Not Permitted	W-60
						Fire protection			
Other fire barriers	1		3/4	Maximum size tested	D-H-45	3/4[h]		D-H-45[h]	
Fire partitions: Corridor walls	1		1/3[a]	Maximum size tested	D-20	3/4[a]		D-H-OH-45	
	0.5		1/3[a]	Maximum size tested	D-20	1/3		D-H-OH-20	
Other fire partitions	1		3/4[i]	Maximum size tested	D-H-45	3/4		D-H-45	
	0.5		1/3	Maximum size tested	D-H-20	1/3		D-H-20	
Exterior walls	3		1 1/2	100 sq. in.[a]	≤100 sq. in. = D-H-90 > 100 sq. in = D-H-W-90	Not Permitted	3	Not Permitted	W-180
	2		1 1/2	Maximum size tested	D-H 90 or D-H-W-90	1 1/2[h]	2	D-H-OH-90[h]	W-120
						Fire protection			
	1		3/4	Maximum size tested	D-H-45	3/4[h]		D-H-45[h]	
Smoke barriers						Fire protection			

TYPE OF ASSEMBLY	REQUIRED WALL ASSEMBLY RATING (hours)	MINIMUM FIRE DOOR AND FIRE SHUTTER ASSEMBLY RATING (hours)	DOOR VISION PANEL SIZE	FIRE-RATED GLAZING MARKING DOOR VISION PANEL	MINIMUM SIDELIGHT/TRANSOM ASSEMBLY RATING (hours)		FIRE-RATED GLAZING MARKING SIDE-LIGHT/TRANSOM PANEL	
					Fire protection	Fire resistance	Fire protection	Fire resistance
	1	$^{1}/_{3}$	Maximum size tested	D-20	$^{3}/_{4}$		D-H-OH-45	

For SI: 1 square inch = 645.2 mm.

a. Fire-resistance-rated glazing tested to ASTM E119 in accordance with Section 716.1.2.3 shall be permitted, in the maximum size tested.

b. Under the column heading "Fire-rated glazing marking door vision panel," W refers to the fire-resistance rating of the glazing, not the frame.

c. See Section 716.1.2.2.1 and Table 716.1(1) for additional permitted markings.

d. Two doors, each with a fire protection rating of $1^{1}/_{2}$ hours, installed on opposite sides of the same opening in a fire wall, shall be deemed equivalent in fire protection rating to one 3-hour fire door.

e. As required in Section 706.4.

f. As allowed in Section 4.6 of NFPA 221.

g. See Section 716.2.5.1.2.

h. Fire-protection-rated glazing is not permitted for fire barriers required by Section 1207 of the *International Fire Code* to enclose energy storage systems. Fire-resistance-rated glazing assemblies tested to ASTM E119 or UL 263, as specified in Section 716.1.2.3, shall be permitted.

i. Two doors, each with a fire rating of 20 minutes, installed on opposite sides of the same opening in a fire partition, shall be deemed equivalent in fire protection rating to one 45-minute fire door.

j. See Section 716.2.5.4 for requirements for fire-resistance-rated glazing installed in sidelight/transom panels.

Reason: This proposal is intended to clarify the type of glazing and frame required in sidelights and transoms in applications where fire-protection-rated glazing is not permitted. Where this issue gets confusing is that for Door Vision Panels which exceed the allowable size for fire-protection-rated glazing, fire-resistance-rated glazing may be used within the typical glass light kit. These glass light kits are considered to be fire-protection-rated in that like the door in which they are installed, they will not meet the heat transmission requirements of ASTM E119 and UL 263. However, when fire-protection-rated glazing is not permitted in sidelights and transoms, a fire-resistance-rated glazing and frame assembly having a fire-resistance rating based on testing the combination of the glazing and frame assembly in accordance with ASTM E119 or UL 263 must be used. The new Footnote j clarifies this point by referencing the code user to Section 716.2.5.4 where the required glazing and frame are clarified. There are multiple fire resistance designs published by the various Nationally Recognized Testing Laboratories which can be used to show compliance with this requirement.

It is believed this new footnote will reduce the confusion on the type of glazing and frame required and help ensure the proper glazing and frame is used in this application.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposed changes simply clarity the existing requirements.

FS61-24

FS62-24

IBC: TABLE 716.1(2), 716.2.5.4

Proponents: Richard Walke, Creative Technology Inc., SAFTIFIRST (richwalke61@gmail.com)

2024 International Building Code

Revise as follows:

TABLE 716.1(2) OPENING FIRE PROTECTION ASSEMBLIES, RATINGS AND MARKINGS

TYPE OF ASSEMBLY	REQUIRED WALL ASSEMBLY RATING (hours)		MINIMUM FIRE DOOR AND FIRE SHUTTER ASSEMBLY RATING (hours)	DOOR VISION PANEL SIZE[a]	FIRE-RATED GLAZING MARKING DOOR VISION PANEL[b, c]	MINIMUM SIDELIGHT/TRANSOM ASSEMBLY RATING (hours)		FIRE-RATED GLAZING MARKING SIDE-LIGHT/TRANSOM PANEL	
						Fire protection	Fire resistance	Fire protection	Fire resistance
Fire walls and fire barriers having a required fire-resistance rating greater than 1 hour	4		3	See Note a	D-H-W-240	Not Permitted	4	Not Permitted	W-240
	3		3[d]	See Note a	D-H-W-180	Not Permitted	3	Not Permitted	W-180
	2		1 1/2	100 sq. in.	≤100 sq. in. = D-H-90 >100 sq. in.=D-H-W-90	Not Permitted	2	Not Permitted	W-120
	1 1/2		1 1/2	100 sq. in.	≤100 sq. in. = D-H-90 >100 sq. in.= D-H-W-90	Not Permitted	1 1/2	Not Permitted	W-90
Double fire walls constructed in accordance with NFPA 221	Single-wall assembly rating (hours)[e]	Each wall of the double-wall assembly (hours)[f]	—						
	4	3	3	See Note a	D-H-W-180	Not Permitted	3	Not Permitted	W-180
	3	2	1 1/2	100 sq. in.	≤ 100 sq. in. = D-H-90 >100 sq. in.= D-H-W-90	Not Permitted	2	Not Permitted	W-120
	2	1	1	100 sq. in.	≤ 100 sq. in. = D-H-60 > 100 sq. in. = D-H-W-60	Not Permitted	1	Not Permitted	W-60
Enclosures for shafts, interior exit stairways and interior exit ramps.	2		1 1/2	100 sq. in.[b]	≤100 sq. in. = D-H-90 > 100 sq. in.= D-H-T-W-90	Not Permitted	2	Not Permitted	W-120
Horizontal exits in fire walls[g]	4		3	100 sq. in.	≤100 sq. in. = D-H-180 > 100 sq. in.=D-H-W-240	Not Permitted	4	Not Permitted	W-240
	3		3[d]	100 sq. in.	≤100 sq. in. = D-H-180 > 100 sq. in.=D-H-W-180	Not Permitted	3	Not Permitted	W-180
Fire barriers having a required fire-resistance rating of 1 hour: Enclosures for shafts, exit access stairways, exit access ramps, interior exit stairways and interior exit ramps; and exit passageway walls	1		1	100 sq. in.	≤100 sq. in. = D-H-60 >100 sq. in.=D-H-T-W-60	Not Permitted	1	Not Permitted	W-60
						Fire protection			
Other fire barriers	1		3/4	Maximum size tested	D-H-45	3/4[h]		D-H-45[h]	
Fire partitions: Corridor walls	1		1/3[a]	Maximum size tested	D-20	3/4[a]		D-H-OH-45	
	0.5		1/3[a]	Maximum size tested	D-20	1/3		D-H-OH-20	
Other fire partitions	1		3/4[i]	Maximum size tested	D-H-45	3/4		D-H-45	
	0.5		1/3	Maximum size tested	D-H-20	1/3		D-H-20	
Exterior walls	3		1 1/2	100 sq. in.[a]	≤100 sq. in. = D-H-90 > 100 sq. in = D-H-W-90	Not Permitted	3	Not Permitted	W-180
	2		1 1/2	~~Maximum size tested~~ 100 sq. in.[a]	≤ 100 sq. in. = D-H 90 ~~or~~ > 100 sq. in = D-H-W-90	~~1 1/2[h]~~ Not Permitted	2	~~D-H-OH-90[h]~~ Not Permitted	W-120
						Fire protection			

TYPE OF ASSEMBLY	REQUIRED WALL ASSEMBLY RATING (hours)	MINIMUM FIRE DOOR AND FIRE SHUTTER ASSEMBLY RATING (hours)	DOOR VISION PANEL SIZE	FIRE-RATED GLAZING MARKING DOOR VISION PANEL	MINIMUM SIDELIGHT/TRANSOM ASSEMBLY RATING (hours)		FIRE-RATED GLAZING MARKING SIDE-LIGHT/TRANSOM PANEL	
					Fire protection	Fire resistance	Fire protection	Fire resistance
	1	$^3/_4$	Maximum size tested	D-H-45	$^3/_4$[h]		D-H-45[h]	
Smoke barriers					Fire protection			
	1	$^1/_3$	Maximum size tested	D-20	$^3/_4$		D-H-OH-45	

For SI: 1 square inch = 645.2 mm.

a. Fire-resistance-rated glazing tested to ASTM E119 in accordance with Section 716.1.2.3 shall be permitted, in the maximum size tested.

b. Under the column heading “Fire-rated glazing marking door vision panel,” W refers to the fire-resistance rating of the glazing, not the frame.

c. See Section 716.1.2.2.1 and Table 716.1(1) for additional permitted markings.

d. Two doors, each with a fire protection rating of 1 $^1/_2$ hours, installed on opposite sides of the same opening in a fire wall, shall be deemed equivalent in fire protection rating to one 3-hour fire door.

e. As required in Section 706.4.

f. As allowed in Section 4.6 of NFPA 221.

g. See Section 716.2.5.1.2.

h. Fire-protection-rated glazing is not permitted for fire barriers required by Section 1207 of the *International Fire Code* to enclose energy storage systems. Fire-resistance-rated glazing assemblies tested to ASTM E119 or UL 263, as specified in Section 716.1.2.3, shall be permitted.

i. Two doors, each with a fire rating of 20 minutes, installed on opposite sides of the same opening in a fire partition, shall be deemed equivalent in fire protection rating to one 45-minute fire door.

716.2.5.4 Fire door frames with transom lights and sidelights.
Fire-protection-rated glazing shall be permitted in door frames with transom lights, sidelights or both, where a $^3/_4$-hour *fire protection rating* or less is required ~~and in 2-hour fire-resistance-rated *exterior walls*~~ in accordance with Table 716.1(2). *Fire door* frames with transom lights, sidelights or both, installed with fire-resistance-rated glazing tested as an assembly in accordance with ASTM E119 or UL 263 shall be permitted where a *fire protection rating* exceeding $^3/_4$ hour is required in accordance with Table 716.1(2).

Reason: This proposal is intended to increase the required level of fire performance for glazing within fire door assemblies and within sidelights and transom panels in 2 hr exterior walls applications. In doing so, it also brings consistency within Table 716.1(2) for all applications requiring a fire door / fire shutter rating in excess of 3/4 hr.

The revisions to Table 716.1(2) and Section 716.2.5.4 are specifically intended to limit the allowable area of fire-protection-rated glazing in 1-1/2 hr fire-protection-rated fire door assemblies in exterior walls to a maximum of 100 sq. in. If more than 100 sq. in. of glazing is needed, then fire-resistance-rated glazing is required. In addition, this proposal is intended to require sidelights and transoms adjacent to these doors to be glazed with fire-resistance-rated glazing in recognition of the relatively large sections of glazing typical installed in the sidelights and transoms.

Both fire-protection-rated glazing and fire-resistance-rated glazing are intended to stop the spread of flame and smoke. However, fire-resistance-rated glazing also complies with an unexposed surface temperature limitation on the glazing. The test standards utilized to determine the fire-resistance rating, ASTM E119 / UL 263, limit the temperature rise on the unexposed side to 250°F average / 325°F individual point for the entire duration of the fire exposure. The standards utilized to determine the fire-protection rating on the fire door assembly, NFPA 252 / UL 10B / UL 10C, and on the sidelights and transom panels, NFPA 257 / UL 9, do not have a temperature limitation. As a result, the glazing gets hot!

Many studies have been conducted over years to quantity the level of radiant heat from fire-protection-rated glazing. The radiant heat from the glazing is significant enough to cause a fire on the other side of the fire-resistance-rated barrier. Three individual Test Reports /Data Packages analyzing the heat transfer and radiant heat from the glazing are described below:

1. The June 9, 2006 **Fire Tests of Building Construction and Materials w/ Radiation Reaction of Mannequins** evaluated three variations of ceramic fire-protection-rated glazing, 44 in wide by 77 in. tall in SAFTI*FIRST*'s EZ frame, installed in a masonry wall assembly. Fully clothed mannequins were placed 20 in. for each of the glazing panels. The mannequin's ignited at 9:06, 12:15 and 16:10 for the three glazing variations. This report is available at https://www.dropbox.com/scl/fi/2vuykq3n8ztk7zkr3sk84/Radiant-Heat-Test-Report.pdf?rlkey=lk6ehccg0kgqjdtvmu0ndrrjs&dl=0

2. The March 20, 2006 **O'Keeffe's Inc. – Glass Profile** data package is a more complete data package of the thermal imaging camera data for fire test described in the June 9, 2006 Report. The data shows the temperature on each of the three glazing materials exceeded 1000°F in approximately 10 min. This report is available at https://www.dropbox.com/scl/fi/8u23sxu4f35g5jjrt08vg/Infrared-Inspection-V2.pdf?rlkey=xa847sn3hnnhk7rji24x9siqc&dl=0

3. The May 13, 2016 **Report of Testing Ceramic Glass with Reference SAFTI FIRST EZ Frame for compliance with the applicable requirements of the following criteria: Modified UL 9, Standard for Safety, Fire Tests of Window Assemblies, 2009** evaluated one 43 in. wide by 77 in. tall ceramic glazing panel in SAFTI*FIRST*'s EZ frame, installed in a gypsum board wall assembly. The thermal imaging camera data for this fire test shows an average temperature of approximately 970°F at 10 min. In addition, this report also shows a radiant heat flux of approximately 24 KW/m^2 at a distance of 1.0 meter from the glazing, at 45 min into the fire exposure test. A generally accepted level of heat flux sufficient to ignite wood under a piloted and nonpiloted scenario is 12.5 and 29 kW / m^2. This report is available at https://www.dropbox.com/scl/fi/knhapos5u2w68bwx4s8ha/Final-Test-Report.pdf?rlkey=0zhuwqmn8e7iazg5c73b8oqea&dl=0

Looking at the current Table 716.1(2), all applications requiring a Minimum Fire Door and Fire Shutter Assembly Rating greater than 3/4 hr other than 1-1/2 hr fire-door assemblies in 2 hr exterior walls, limits the area of fire-protection-rated glazing in the door to 100 sq. in. In addition, all applications other than 1-1/2 hr fire door assemblies in exterior walls do not permit the use of fire-protection-rated glazing in side-lights or transoms regardless of size. As such, the change proposed herein brings consistency to the various applications covered in Table 716.1(2).

In addition to the changes required in Table 716.1(2), Section 716.2.5.4 is also being changed to be consistent with the changes in Table 716.1(2).

On the surface this proposal appears to have major consequences. However, the applications where this proposed change would have an impact is very limited. Based on Tables 601 and 705.5, the applications where this change would have an impact are as follows:

1. Exterior Bearing Walls in Types IB, IIIA, IIIB, IVB, IVC and IVHT types of construction
2. Exterior Nonbearing Walls with Fire Separation Distances < 5 ft in all types of construction in F-1, M and S-1 occupancies
3. Exterior Nonbearing Walls with Fire Separation Distances of 5 ≤ X < 10 ft in all IA and IVA types of construction in F-1, M and S-1 occupancies
4. Exterior Nonbearing Walls with Fire Separation Distances of 5 ≤ X < 10 ft in all types of construction other than IA and IVA in H occupancies
5. Exterior Nonbearing Walls with Fire Separation Distances of 10 ≤ X < 30 ft in IA, IB, IVA and IVB types of construction in H occupancies

The applications where this proposal truly has an impact is further reduced through the application of Table 705.8. This table permits a combination of protected and unprotected openings based on fire separation distance and the use of sprinklers.

Bibliography: Radiant Heat Flux https://guides.firedynamicstraining.ca/g/structural-firefighting-fundamentals-of-fire-and-combustion/118132

Cost Impact: Increase

Estimated Immediate Cost Impact:

The average additional installed cost of fire-resistance-rated glazing as compared to fire-protection-rated glazing is approximately $60 to

$85 / sq. ft, depending on the rating. However as stated in the Reason Statement, the applications where this proposed change would have an impact is very limited.

Estimated Immediate Cost Impact Justification (methodology and variables):

This includes average materials and labor costs for the above items. In the end, the exact increase in cost is based on the fire separation distance, the type of construction, the occupancy and the specific building design in question.

FS62-24

FS63-24

IBC: TABLE 716.1(2), TABLE 716.1(3)

Proponents: Richard Walke, Creative Technology Inc., SAFTIFIRST (richwalke61@gmail.com)

2024 International Building Code

Revise as follows:

TABLE 716.1(2) ~~OPENING~~ FIRE DOOR ASSEMBLY ~~PROTECTION ASSEMBLIES,~~ RATINGS AND FIRE-RATED GLAZING MARKINGS [a]

TYPE OF ASSEMBLY	REQUIRED WALL ASSEMBLY RATING (hours)		MINIMUM FIRE DOOR AND FIRE SHUTTER ASSEMBLY RATING (hours)	DOOR VISION PANEL SIZE[~~a~~b]	FIRE-RATED GLAZING MARKING DOOR VISION PANEL [~~b,~~ c, d]	MINIMUM SIDELIGHT/TRANSOM ASSEMBLY RATING (hours)		FIRE-RATED GLAZING MARKING SIDE-LIGHT/TRANSOM PANEL	
						Fire protection	Fire resistance	Fire protection	Fire resistance
Fire walls and fire barriers having a required fire-resistance rating greater than 1 hour	4		3	See Note ~~a~~ b	D-H-W-240	Not Permitted	4	Not Permitted	W-240
	3		3[~~d~~e]	See Note ~~a~~ b	D-H-W-180	Not Permitted	3	Not Permitted	W-180
	2		1 1/2	100 sq. in.	≤100 sq. in. = D-H-90 >100 sq. in.=D-H-W-90	Not Permitted	2	Not Permitted	W-120
	1 1/2		1 1/2	100 sq. in.	≤100 sq. in. = D-H-90 >100 sq. in.= D-H-W-90	Not Permitted	1 1/2	Not Permitted	W-90
Double fire walls constructed in accordance with NFPA 221	Single-wall assembly rating (hours)[~~e~~f]	Each wall of the double-wall assembly (hours)[~~f~~g]	—						
	4	3	3	See Note ~~a~~ b	D-H-W-180	Not Permitted	3	Not Permitted	W-180
	3	2	1 1/2	100 sq. in.	≤ 100 sq. in. = D-H-90 >100 sq. in.= D-H-W-90	Not Permitted	2	Not Permitted	W-120
	2	1	1	100 sq. in.	≤ 100 sq. in. = D-H-60 > 100 sq. in. = D-H-W-60	Not Permitted	1	Not Permitted	W-60
Enclosures for shafts, interior exit stairways and interior exit ramps~~.~~	2		1 1/2	100 sq. in.[~~b~~ c]	≤100 sq. in. = D-H-90 > 100 sq. in.= D-H-T-W-90	Not Permitted	2	Not Permitted	W-120
Horizontal exits in fire walls[~~g~~h]	4		3	100 sq. in.	≤100 sq. in. = D-H-180 > 100 sq. in.=D-H-W-240	Not Permitted	4	Not Permitted	W-240
	3		3[~~d~~e]	100 sq. in.	≤100 sq. in. = D-H-180 > 100 sq. in.=D-H-W-180	Not Permitted	3	Not Permitted	W-180
Fire barriers having a required fire-resistance rating of 1 hour: Enclosures for shafts, exit access stairways, exit access ramps, interior exit stairways and interior exit ramps; and exit passageway walls	1		1	100 sq. in.	≤100 sq. in. = D-H-60 >100 sq. in.=D-H-T-W-60	Not Permitted	1	Not Permitted	W-60
						Fire protection			
Other fire barriers	1		3/4	Maximum size tested	D-H-45	3/4[~~h~~i]		D-H-45[~~h~~i]	
Fire partitions: Corridor walls	1		1/3[~~a~~b]	Maximum size tested	D-20	3/4[~~a~~b]		D-H-OH-45	
	0.5		1/3[~~a~~b]	Maximum size tested	D-20	1/3		D-H-OH-20	
Other fire partitions	1		3/4[~~i~~j]	Maximum size tested	D-H-45	3/4		D-H-45	
	0.5		1/3	Maximum size tested	D-H-20	1/3		D-H-20	
Exterior walls	3		1 1/2	100 sq. in.[~~a~~ b]	≤100 sq. in. = D-H-90 > 100 sq. in = D-H-W-90	Not Permitted	3	Not Permitted	W-180
	2		1 1/2	Maximum size tested	D-H 90 or D-H-W-90	1 1/2[~~h~~i]	2	D-H-OH-90 [~~h~~i]	W-120
						Fire protection			
	1		3/4	Maximum size tested	D-H-45	3/4[~~h~~i]		D-H-45[~~h~~i]	
Smoke barriers						**Fire protection**			

TYPE OF ASSEMBLY	REQUIRED WALL ASSEMBLY RATING (hours)	MINIMUM FIRE DOOR AND FIRE SHUTTER ASSEMBLY RATING (hours)	DOOR VISION PANEL SIZE	FIRE-RATED GLAZING MARKING DOOR VISION PANEL	MINIMUM SIDELIGHT/TRANSOM ASSEMBLY RATING (hours)		FIRE-RATED GLAZING MARKING SIDE-LIGHT/TRANSOM PANEL	
					Fire protection	Fire resistance	Fire protection	Fire resistance
	1	1/3	Maximum size tested	D-20	3/4		D-H-OH-45	

For SI: 1 square inch = 645.2 mm.

a. Where required, glazing shall also comply with the safety glazing requirements and identification specified in Section 716.1.2.1.

~~a~~b. Fire-resistance-rated glazing tested to ASTM E119 in accordance with Section 716.1.2.3 shall be permitted, in the maximum size tested.

~~b~~c. Under the column heading “Fire-rated glazing marking door vision panel,” W refers to the fire-resistance rating of the glazing, not the frame.

~~c~~d. See Section 716.1.2.2.1 and Table 716.1(1) for additional permitted markings.

~~d~~e. Two doors, each with a fire protection rating of 1 1/2 hours, installed on opposite sides of the same opening in a fire wall, shall be deemed equivalent in fire protection rating to one 3-hour fire door.

~~e~~f. As required in Section 706.4.

~~f~~g. As allowed in Section 4.6 of NFPA 221.

~~g~~h. See Section 716.2.5.1.2.

~~h~~i. Fire-protection-rated glazing is not permitted for fire barriers required by Section 1207 of the *International Fire Code* to enclose energy storage systems. Fire-resistance-rated glazing assemblies tested to ASTM E119 or UL 263, as specified in Section 716.1.2.3, shall be permitted.

~~i~~j. Two doors, each with a fire rating of 20 minutes, installed on opposite sides of the same opening in a fire partition, shall be deemed equivalent in fire protection rating to one 45-minute fire door.

TABLE 716.1(3) FIRE WINDOW ASSEMBLY ~~FIRE PROTECTION~~ RATINGS AND FIRE-RATED GLAZING MARKINGS [a]

TYPE OF WALL ASSEMBLY	REQUIRED WALL ASSEMBLY RATING (hours)	MINIMUM FIRE WINDOW ASSEMBLY RATING (hours)	FIRE-RATED GLAZING MARKING
Interior walls			
Fire walls	All	NP[~~a~~b]	W-XXX[~~b~~c]
Fire barriers	>1	NP[~~a~~b]	W-XXX[~~b~~c]
	1	NP[~~a~~b]	W-XXX[~~b~~c]
Atrium separations (Section 707.3.6), Incidental use areas (Section 707.3.7),[~~c~~d] Mixed occupancy separations (Section 707.3.9)	1	3/4	OH-45 or W-60
Fire partitions	1	3/4	OH-45 or W-60
	0.5	1/3	OH-20 or W-30
Smoke barriers	1	3/4	OH-45 or W-60
Exterior walls	>1	1 1/2	OH-90 or W-XXX[~~b~~c]
	1	3/4	OH-45 or W-60
	0.5	1/3	OH-20 or W-30
Party wall	All	NP	Not Applicable

NP = Not Permitted.

a. Where required, glazing shall also comply with the safety glazing requirements and identification specified in Section 716.1.2.1.

~~a~~b. Not permitted except fire-resistance-rated glazing assemblies tested to ASTM E119 or UL 263, as specified in Section 716.1.2.3.

~~b~~c. XXX = The fire rating duration period in minutes, which shall be equal to the fire-resistance rating required for the wall assembly.

~~c~~d. Fire-protection-rated glazing is not permitted for fire barriers required by Section 1207 of the *International Fire Code* to enclose energy storage systems. Fire-resistance-rated glazing assemblies tested to ASTM E119 orUL 263, as specified in Section 716.1.2.3, shall be permitted.

Reason: This proposal is intended to ensure code users are aware that glazing in or around door assemblies and in fire window assemblies is in most cases required to meet the safety glazing requirements of Chapter 24. The new footnote a to Tables 716.1(2) and 716.1(3) points the code users to Section 716.1.2.1, which in turn points the code readers to Chapter 24. Within Chapter 24, Section 2406 covers the requirements for safety glazing including the marking requirements.

The identification of all subsequent footnotes has been shifted one character as a result of the new Footnote a.

In addition to the new footnote, the titles of Tables 716.1(2) and 716.1(3) have been changed to more accurately reflect the information conveyed in the tables.

It is believed this new footnote a will help ensure the proper glazing is used in applications requiring safety glazing.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposed changes simply clarify the existing requirements.

FS63-24

FS64-24

IBC: 716.2.2.3, 716.2.2.3.1, 716..2.2.3.2 (New)

Proponents: John Woestman, Kellen Company, Builders Hardware Manufacturers Association (BHMA) (jwoestman@kellencompany.com)

2024 International Building Code

Revise as follows:

716.2.2.3 Doors in interior exit stairways and ramps and exit passageways.
Fire door assemblies in *interior exit stairways* and *ramps* and *exit passageways* shall have a maximum transmitted temperature rise of not more than 450°F (250°C) above ambient at the end of 30 minutes of standard fire test exposure.

> **Exception:** The maximum transmitted temperature rise is not required in *buildings* equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2.

716.2.2.3.1 Glazing in doors.
Fire-protection-rated glazing in excess of 100 square inches (0.065 m^2) is not permitted. Fire-resistance-rated glazing in excess of 100 square inches (0.065 m^2) shall be permitted in *fire doors* . *Listed* fire-resistance-rated glazing in a *fire door* shall have a maximum transmitted temperature rise in accordance with Section 716.2.2.3 when the *fire door* is tested in accordance with NFPA 252, UL 10B or UL 10C.

Add new text as follows:

<u>**716..2.2.3.2** **Louvers.** Louvers are prohibited in fire door assemblies in interior exit stairways and ramps and exit passageways.</u>

Reason: The IBC currently requires many doors to interior exit stairways and ramps and exit passageways to comply with Section 716 Opening protectives. Section 716 requires opening protectives to comply with NFPA 80 Standard for Fire Doors and Opening Protectives. There are louvers listed and labeled to NFPA 80. Thus, louvers are currently permitted in fire door assemblies in interior exit stairways and ramps and exit passageways (except where Section 1023.12 refers to Sections 403.5.4, 405.7.2 or 412.2.2.1).

Our BHMA members are asking: Considering the life safety importance of controlling smoke in interior exit stairways, and ramps, and exit passageways, should louvers be permitted – or prohibited – in fire door assemblies in interior exit stairways and ramps and exit passageways?

Our conclusion, and this proposal: louvers should be prohibited in fire door assemblies in interior exit stairways and ramps and exit passageways.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal should not increase or decrease the cost of construction.
This proposal prohibits the use of louvers in fire door assemblies in interior exit stairways and ramps and exit passageways. This may reduce the cost of these doors. On the other hand, if the heating, cooling, and fire safety systems for interior exit stairways and ramps and exit passageways are designed with louvers in fire door assemblies – there are likely better design options, and those options may have an unknown cost effect.

FS64-24

FS65-24

IBC: 716.2.6.1

Proponents: Jeff O'Neil, Chair, Committee on Healthcare (ahc@iccsafe.org)

2024 International Building Code

Revise as follows:

716.2.6.1 Door closing.
Fire doors shall be latching and self- or automatic-closing in accordance with this section.

Exceptions:

1. *Fire doors* located in common walls separating *dwelling units* or *sleeping units* in Group R-1 shall be permitted without automatic- or *self-closing* devices.
2. Fire doors located in corridors and serving sleeping rooms in Group I-1, Condition 2 shall be permitted without automatic- or self-closing devices.
3~~2~~. The elevator car doors and the associated elevator hoistway doors at the floor level designated for recall in accordance with Section 3003.2 shall be permitted to remain open during Phase I emergency recall operation.
4~~3~~. Fire doors required solely for compliance with ICC 500 shall not be required to be *self-closing* or automatic-closing.

Reason: Nursing homes (Group I-2, Condition 2) are not required to have self-closing or automatic-closing corridor doors. This is due to the facilities having smoke compartments to subdivide care recipient sleeping areas, the building being fully sprinklered, and staff trained in fire and safety evacuation plans. Assisted living (Group I-1, Condition 2) are also required to have smoke compartments, the building to be fully sprinklered and the staff trained in fire and safety evacuation plans. In Assisted living (Group I-1, Condition 2), residents, while slower, are required to be capable of self preservation. In these facilities, it is beneficial to allow for door to be open to improved supervision and to increase social interaction - both of which shown to improve the environment and comfort of care recipients.

Care recipients in Assisted Living (I-1, Condition 2) facilities quite often use mobility devices and/or have balance and gait issues that take them longer to move through door openings. Additionally, I-1, Condition 2 Assisted Living care recipients are often frail and quite often struggle to have enough strength to open doors with automatic closers. It is a constant challenge to adjust closers to be able to reduce the amount of force needed to open the door, plus keep it open long enough for occupants to move through the opening, and then create enough force for the door to close and latch properly. Often, the last bit of the door swing closes fast to provide the proper latching, but then the door often hits the care recipient causing injury or even knocking them over.

The intent of this proposal is to allow for Group I-2, Condition 2 facilities to not require self-closing or automatic-closing corridor doors. The Healthcare committee feels that this will improve patient safety on a daily basis. There is a good balance of passive and active fire protection that will still be in place, and the fire and safety plans can include closing doors.

This is not intended to allow for the removal of self-closers or automatic-closers on the fire barriers around stairways or on the cross-corridor doors for smoke compartment.

This proposal is submitted by the ICC Committee for Healthcare (CHC).
The Committee on Healthcare (CHC) was established by the ICC Board of Directors in 2011 to pursue opportunities to study and develop effective and efficient provisions for Hospital, Nursing Homes, Assisted Living and Ambulatory Care Facilities. This committee was formed in cooperation with the American Society for Healthcare Engineering (ASHE). In July of 2017, the ICC Board made CHC a standing committee. In 2023 the CHC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the CHC website at CHC webpage.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

The average cost of door closers, not including the cost of labor for installation, ranges from $150 to $600 dollars. The total decrease would depend on the number of sleeping room doors in the facility.

Estimated Immediate Cost Impact Justification (methodology and variables):

If a designer chooses to utilize this exception, closers would not be required on corridor doors.

FS65-24

FS66-24

IBC: 716.2.9, 716.2.9.1, 716.2.9.1.1, 716.2.9.4, 716.2.9.6

Proponents: Jonathan Roberts, UL Solutions, UL Solutions (jonathan.roberts@ul.com)

2024 International Building Code

Revise as follows:

716.2.9 Labeled protective assemblies.
Fire door assemblies shall be *listed* and *labeled* by an *approved agency*. The *labels* shall comply with NFPA 80, and shall be permanently affixed to the door or frame.

716.2.9.1 Fire door labeling requirements.
Fire doors shall be *labeled* showing the name of the manufacturer or other identification readily traceable back to the manufacturer, the name or trademark of the ~~third-party~~ *approved agency* ~~inspection agency~~, the *fire protection rating* and, where required for *fire doors* in *interior exit stairways and ramps* and *exit passageways* by Section 716.2.2.3, the maximum transmitted temperature end point. Smoke and draft control doors complying with UL 1784 shall be *labeled* as such and shall comply with Section 716.2.9.3. *Labels* shall be ~~*approved* and~~ permanently affixed. The *label* shall be applied at the factory or location where fabrication and assembly are performed.

716.2.9.1.1 Light kits, louvers and components.
Listed light kits and louvers and their required preparations shall be considered as part of the *labeled* door where such installations are done under the listing program of the *approved agency* ~~third-party agency~~. *Fire doors* and *fire door assemblies* shall be permitted to consist of components, including glazing, vision light kits and hardware that are *listed* or classified and *labeled* for such use by different *approved* ~~third-party~~ agencies.

716.2.9.4 Fire door frame labeling requirements.
Fire door frames shall be *labeled* showing the names of the manufacturer and the *approved agency* ~~third-party inspection agency~~.

716.2.9.6 Fire door operator labeling requirements.
Fire door operators for horizontal sliding doors shall be *listed* and *labeled* ~~and *listed*~~ for use with the assembly.

Reason: This proposal is essentially editorial and does not include any new technical requirements.

This proposal also follows standard IBC language for requirements for products to “listed and labeled” and changes “third-party” to “approved agency” as this term is defined in the IBC and is applicable to the intent of the existing reference to “third-party”.

It also revises the reference in 716.2.9.1 for the code official to approve the label itself.

IBC definition for easy reference:

APPROVED AGENCY. An established and recognized agency that is regularly engaged in conducting tests, furnishing inspection services or furnishing product certification where such agency has been approved by the building official.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is simply an editorial change within the section and therefore there are no new technical requirements being proposed so it does not add cost.

FS66-24

FS67-24

IBC: 716.4, 716.4.1, 716.4.2, 716.4.3, TABLE 716.1(2), 716.4 (New), 716.4.1 (New), 716.4.2 (New), 716.4.2.1 (New), 716.4.2.2 (New), 716.4.2.3 (New), 716.4.3 (New), 716.4.4 (New)

Proponents: Paul Armstrong, McKEON (paul@7arms.com); Doug Zachary, McKEON, McKEON (dzachary@mckeondoor.com); David Dodge, McKEON (ddodge@mckeondoor.com)

2024 International Building Code

Delete without substitution:

~~716.4 Fire protective curtain assembly~~.
~~*Approved fire protective curtain assemblies* shall be constructed of any materials or assembly of component materials tested without hose stream in accordance with UL 10D, and shall comply with the Sections 716.4.1 through 716.4.3.~~

~~716.4.1 Label~~.
~~*Fire protective curtain assemblies* used as opening protectives in fire-rated walls and *smoke partitions* shall be *labeled* in accordance with Section 716.2.9.~~

~~716.4.2 Smoke and draft control~~.
~~*Fire protective curtain assemblies* used to protect openings where smoke and draft control assemblies are required shall comply with Section 716.2.1.4.~~

~~716.4.3 Installation~~.
~~*Fire protective curtain assemblies* shall be installed in accordance with NFPA 80.~~

Revise as follows:

TABLE 716.1(2) OPENING FIRE PROTECTION ASSEMBLIES, RATINGS AND MARKINGS

Portions of table not shown remain unchanged.

TYPE OF ASSEMBLY	REQUIRED WALL ASSEMBLY RATING (hours)		MINIMUM FIRE DOOR AND FIRE SHUTTER ASSEMBLY RATING (hours)	DOOR VISION PANEL SIZE[a]	FIRE-RATED GLAZING MARKING DOOR VISION PANEL[b, c]	MINIMUM SIDELIGHT/TRANSOM ASSEMBLY RATING (hours)		FIRE-RATED GLAZING MARKING SIDE-LIGHT/TRANSOM PANEL	
						Fire protection	Fire resistance	Fire protection	Fire resistance
Fire walls and fire barriers having a required fire-resistance rating greater than 1 hour	4		3	See Note a	D-H-W-240	Not Permitted	4	Not Permitted	W-240
	3		3[d]	See Note a	D-H-W-180	Not Permitted	3	Not Permitted	W-180
	2		1 1/2	100 sq. in.	≤100 sq. in. = D-H-90 >100 sq. in.=D-H-W-90	Not Permitted	2	Not Permitted	W-120
	1 1/2		1 1/2	100 sq. in.	≤100 sq. in. = D-H-90 >100 sq. in.= D-H-W-90	Not Permitted	1 1/2	Not Permitted	W-90
Double fire walls constructed in accordance with NFPA 221	Single-wall assembly rating (hours)[e]	Each wall of the double-wall assembly (hours)[f]	—						
	4	3	3	See Note a	D-H-W-180	Not Permitted	3	Not Permitted	W-180
	3	2	1 1/2	100 sq. in.	≤ 100 sq. in. = D-H-90 >100 sq. in.= D-H-W-90	Not Permitted	2	Not Permitted	W-120

TYPE OF ASSEMBLY	REQUIRED WALL ASSEMBLY RATING (hours)	MINIMUM FIRE DOOR AND FIRE SHUTTER ASSEMBLY RATING (hours)	DOOR VISION PANEL SIZE	FIRE-RATED GLAZING MARKING DOOR VISION PANEL	MINIMUM SIDELIGHT/TRANSOM ASSEMBLY RATING (hours) Fire protection	MINIMUM SIDELIGHT/TRANSOM ASSEMBLY RATING (hours) Fire resistance	FIRE-RATED GLAZING MARKING SIDE-LIGHT/TRANSOM PANEL Fire protection	FIRE-RATED GLAZING MARKING SIDE-LIGHT/TRANSOM PANEL Fire resistance
	2 1	1	100 sq. in.	≤ 100 sq. in. = D-H-60 > 100 sq. in. = D-H-W-60	Not Permitted	1	Not Permitted	W-60
Enclosures for shafts, interior exit stairways and interior exit ramps.	2	1 1/2	100 sq. in.[b]	≤100 sq. in. = D-H-90 > 100 sq. in.= D-H-T-W-90	Not Permitted	2	Not Permitted	W-120
Horizontal exits in fire walls[g]	4	3	100 sq. in.	≤100 sq. in. = D-H-180 > 100 sq. in.=D-H-W-240	Not Permitted	4	Not Permitted	W-240
	3	3[d]	100 sq. in.	≤100 sq. in. = D-H-180 > 100 sq. in.=D-H-W-180	Not Permitted	3	Not Permitted	W-180
Fire barriers having a required fire-resistance rating of 1 hour: Enclosures for shafts, exit access stairways, exit access ramps, interior exit stairways and interior exit ramps; and exit passageway walls	1	1	100 sq. in.	≤100 sq. in. = D-H-60 >100 sq. in.=D-H-T-W-60	Not Permitted	1	Not Permitted	W-60
					Fire protection			
Other fire barriers	1	3/4	Maximum size tested	D-H-45	3/4[h]		D-H-45[h]	
Fire partitions: Corridor walls	1	1/3[a,i]	Maximum size tested	D-20	3/4[a]		D-H-OH-45	
	0.5	1/3[a,i]	Maximum size tested	D-20	1/3		D-H-OH-20	
Other fire partitions	1	3/4[i]	Maximum size tested	D-H-45	3/4		D-H-45	
	0.5	1/3	Maximum size tested	D-H-20	1/3		D-H-20	
Exterior walls	3	1 1/2	100 sq. in.[a]	≤100 sq. in. = D-H-90 > 100 sq. in = D-H-W-90	Not Permitted	3	Not Permitted	W-180
	2	1 1/2	Maximum size tested	D-H 90 or D-H-W-90	1 1/2[h]	2	D-H-OH-90[h]	W-120
					Fire protection			
	1	3/4	Maximum size tested	D-H-45	3/4[h]		D-H-45[h]	
Smoke barriers					**Fire protection**			
	1	1/3[i]	Maximum size tested	D-20	3/4		D-H-OH-45	

For SI: 1 square inch = 645.2 mm.

a. Fire-resistance-rated glazing tested to ASTM E119 in accordance with Section 716.1.2.3 shall be permitted, in the maximum size tested.

b. Under the column heading “Fire-rated glazing marking door vision panel,” W refers to the fire-resistance rating of the glazing, not the frame.

c. See Section 716.1.2.2.1 and Table 716.1(1) for additional permitted markings.

d. Two doors, each with a fire protection rating of 1 1/2 hours, installed on opposite sides of the same opening in a fire wall, shall be deemed equivalent in fire protection rating to one 3-hour fire door.

e. As required in Section 706.4.

f. As allowed in Section 4.6 of NFPA 221.

g. See Section 716.2.5.1.2.

h. Fire-protection-rated glazing is not permitted for fire barriers required by Section 1207 of the *International Fire Code* to enclose energy storage systems. Fire-resistance-rated glazing assemblies tested to ASTM E119 or UL 263, as specified in Section 716.1.2.3, shall be permitted.

i. Two doors, each with a fire rating of 20 minutes, installed on opposite sides of the same opening in a fire partition, shall be deemed equivalent in fire protection rating to one 45-minute fire door.

j. *Fire protective curtain assemblies* in accordance with Section 716.4 shall be deemed equivalent in *fire protection rating* to 20-minute fire doors in *fire-resistance rated corridor* walls and *smoke barrier* walls.

Add new text as follows:

716.4 Fire protective curtain assemblies in corridors and smoke barriers. *Fire protective curtain assemblies* shall have a minimum *fire protection rating* of 20 minutes without the hose stream test where located in *corridor* walls and *smoke barrier* walls having a *fire-resistance rating* in accordance with Table 716.1(2) and shall comply with the provisions of this section.

716.4.1 Testing requirements. Approved fire protective curtain assemblies shall be constructed of any materials or assembly of component materials that conforms to the following test requirements:

1. Fire protective curtain assemblies shall be tested without hose stream in accordance with UL 10D.
2. Fire protective curtain assemblies shall be tested without hose stream in accordance with UL 10D.

716.4.2 Labeled protective assemblies. *Fire protective curtain assemblies* shall be labeled by an *approved agency*. The *labels* shall comply with NFPA 80, and shall be permanently affixed to the bottom bar.

716.4.2.1 Fire protective curtain assembly labeling requirements. *Fire protective curtain assemblies* shall be *labeled* showing the name of the manufacturer or other identification readily traceable back to the manufacturer, the name or trademark of the third-party inspection agency and the *fire protection rating*. Smoke and draft control assemblies complying with UL 1784 shall be *labeled* as such and shall comply with Section 716.4.2.3. Labels shall be approved and permanently affixed. The label shall be applied at the factory or location where fabrication and assembly are performed.

716.4.2.2 Oversized assemblies. Oversized fire protective curtain assemblies shall bear an oversized label by an approved agency or shall be provided with a certificate of inspection furnished by an approved testing agency. Where a certificate of inspection is furnished by an approved testing agency, the certificate shall state that the fire protective curtain assembly conforms to the requirements of design, materials and construction, but has not been subjected to the fire test.

716.4.2.3 Smoke and draft control assembly labeling requirements. Smoke and draft control assemblies complying with UL 1784 shall be labeled in accordance with Section 716.4.2.1 and shall show the letter “S” on the fire-rating label of the assembly.

716.4.3 Installation. *Installation of fire protective curtain assemblies* in corridors and smoke barriers shall be in accordance with NFPA 105.

716.4.4 Means of egress. *Fire protective curtain assemblies* shall not be used as required *means of egress* doors in accordance with Section 1010.

Reason: The fire protective curtain assembly definition in Section 202 and the UL 10D test standard in Section 716.4 have been recognized by the IBC since they were added in the 2021 code cycle. However, the full inclusion of these opening protectives in the IBC is incomplete as there is no mention of fire protective curtain assemblies in Table 716.1(2) nor are there any references to Section 716.4 anywhere in the code. This code change connects those missing links and assigns fire protective curtain assemblies to their rightful place in the IBC.

UL 10D test criteria is essentially the same positive pressure fire endurance test criteria in UL 10C, but without the requirement for a hose stream integrity test at the end of the burn. Therefore, our current codes will only allow the use of UL 10D tested products where fire door assemblies are not required to meet hose stream performance. This condition only occurs in Section 716.2.2.1:

716.2.2.1 Door assemblies in corridors and smoke barriers.

Fire door assemblies required to have a minimum fire protection rating of 20 minutes where located in corridor walls or smoke barrier walls having a fire-resistance rating in accordance with Table 716.1(2) shall be tested in accordance with NFPA 252 or UL 10C without the hose stream test.

There were attempts in the 2024 code cycle to add the UL 10D test standard to Section 716.2.2.1. But these attempts were disapproved largely because it was determined that this section is not the correct location since Section 716.2 covers fire door assemblies and Section 716.2.2.1 specifically refers to Table 716.1(2) which does not currently contain a reference to fire protective curtain assemblies. Based on that feedback, this code change accomplishes the following:

First, since fire protective curtain assemblies are a separate category of opening protective in Section 716.4, they cannot simply be placed under the requirements for fire door assemblies in Section 716.2. The only place fire protective curtain assemblies and fire door assemblies can be linked is through Table 716.1(2), which encompasses opening protectives of all types. Actually adding fire protective curtain assemblies within Table 716.1(2) is a complex task and unnecessary due to the limited applications that a UL 10D tested product can be legitimately placed. The simpler and more effective approach is to add the proposed footnote “j.” to Table 716.1(2) where Section 716.4 is now referenced. This proposed note, in accordance with the applications described in Section 716.2.2.1, will only be applied to the minimum fire door and fire shutter assembly ratings for “Fire partitions: Corridor Walls” and “Smoke Barriers”.

Next, Section 716.4 requires a complete rewrite in order to align it specifically with these applications. Since fire protective curtain assemblies are only deemed equivalent in fire protection rating to 20 minute fire doors in fire-resistance rated corridor walls and smoke barrier walls, Section 716.4 is rewritten to include similar language and layout found in Section 716.2.2.1. Furthermore, the subsections have been reformatted to create consistency in the layout with fire door assemblies and fire window assemblies in Sections 716.2 and 716.3, respectively.

The fire testing requirements for fire protective curtain assemblies in corridors and smoke barriers remains unchanged from the previous edition of the IBC. Additionally, these assemblies shall also serve as smoke and draft control assemblies meeting the criteria for air leakage for fire door assemblies in corridors and smoke barriers in Section 716.2.2.1.1 and being tested in accordance UL 1784.

Labeling requirements for fire protective curtain assemblies in the previous edition of the code referred back to labeling requirements for fire door assemblies in Section 716.2.9 which do not all apply to these types of opening protectives. Fire protective curtain assemblies have their own dedicated chapter in NFPA 80 and have been recognized as a separate and distinct category of opening protective by the IBC. This code change acknowledges the labeling requirements specific to fire protective curtain assemblies and has been structured in a format that is consistent with fire door assemblies.

Installation of all rated opening protectives must comply with NFPA 80 as required by Section 716.1. It is redundant and unnecessary to repeat this requirement in Section 716.4 so it has been removed in this code change. However, it is necessary to require fire protective curtain assemblies in corridors and smoke barriers to additionally be installed in accordance with NFPA 105 because of the smoke and draft control requirements. These installation requirements are consistent with fire door assemblies in the same applications as required by Section 716.2.10.

Finally, this code change confirms these products shall not be used as required means of egress doors. Fire protective curtain assemblies currently available in the market include many different features or options to travel through the opening protectives. These options include swinging flaps, grab straps, pass-through slots, push-to-open buttons and delayed deployment. None of these options that currently exist in fire protective curtain assemblies comply with means of egress doors in Section 1010.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal recognizes the current practice of testing and use of these assemblies.

FS68-24

IBC: 717.1.1; IMC®: [BF] 607.1.1

Proponents: Tony Crimi, A.C. Consulting Solutions Inc., International Firestop Council (tcrimi@sympatico.ca)

2024 International Building Code

Revise as follows:

717.1.1 Ducts and air transfer openings.
Ducts transitioning horizontally between *shafts* shall not require a *shaft enclosure* provided that the duct penetration into each associated *shaft* is protected with *dampers* complying with this section.

> **Exception:** Ducts that transition horizontally between shafts that penetrate fire resistance-rated walls without dampers where the surface of the duct is continuously covered on all sides from a point at which the duct penetrates a ceiling, wall or floor to the outlet terminal with a classified, listed and labeled material, system, method of construction or product specifically evaluated for such purpose, in accordance with nationally recognized standards for such enclosure materials and have a fire resistance-rating equal to the fire-resistance rating of the assembly being penetrated.

2024 International Mechanical Code

Revise as follows:

[BF] 607.1.1 Ducts between shafts. Ducts transitioning horizontally between shafts shall not require a shaft enclosure provided that the duct penetration into each associated shaft is protected with dampers complying with this section.

> **Exception:** Ducts that transition horizontally between shafts that penetrate fire resistance-rated walls without dampers where the surface of the duct is continuously covered on all sides from a point at which the duct penetrates a ceiling, wall or floor to the outlet terminal with a classified, listed and labeled material, system, method of construction or product specifically evaluated for such purpose, in accordance with nationally recognized standards for such enclosure materials and have a fire resistance-rating equal to the fire-resistance rating of the assembly being penetrated.

Reason: This proposal provides an additional option for ducts that transition horizontally between shafts. Third-party certification organizations like UL and Intertek provide listing and labelling services for fire-resistant duct systems using a variety of nationally recognized Standards and applicable ICC-ES criteria. These Listings have been in the marketplace for many years and have proven their effectiveness. The many Listings for fire-resistant duct systems provide an alternate to required fire dampers when ducts pass through a fire separation. They also cover criteria to assess performance as shaft enclosures for vertical ducts.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal adds an additional option for protection of ducts. It does not remove any existing provisions or mandate additional costs.

FS68-24

FS69-24

IBC: TABLE 717.3.2.1; IMC®: [BF] TABLE 607.3.2.1

Proponents: Jeanne Rice, NYSDOS (jeanne.rice@dos.ny.gov); Chad Sievers, NYS, NYS DOS (chad.sievers@dos.ny.gov); Kevin Duerr-Clark, NYS DOS, NYS DOS (kevin.duerr-clark@dos.ny.gov); China Clarke, New York State Dept of State, Manager Technical Support Unit (china.clarke@dos.ny.gov)

2024 International Building Code

Revise as follows:

TABLE 717.3.2.1 FIRE DAMPER RATING[a]

TYPE OF PENETRATION	MINIMUM DAMPER RATING (hours)
Less than 3-hour fire-resistance-rated assemblies	1.5
3-hour or greater fire-resistance-rated assemblies	3

a. Corridor fire dampers shall also comply with the provisions of section 717.3.2.4.

2024 International Mechanical Code

Revise as follows:

[BF] TABLE 607.3.2.1 FIRE DAMPER RATING[a]

TYPE OF PENETRATION	MINIMUM DAMPER RATING (hour)
Less than 3-hour fire-resistance-rated assemblies	$1^1/_2$
3-hour or greater fire-resistance-rated assemblies	3

a. Corridor fire dampers shall also comply with the provisions of section 607.3.2.4.

Reason: When looking for the required rating for fire dampers, users may consult Table 717.3.2.1 and determine the rating based solely on the information in this table, without noticing the provisions for corridor fire dampers in Section 717.3.2.4. The proposed change adds a footnote to Table 717.3.2.1 which references Section 717.3.2.4, to ensure users are aware of the corridor fire damper provisions.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposed change adds a reference to an existing section into the footnotes for an existing table. This change is for clarification only and does not add any provisions.

FS69-24

FS70-24

IBC: 717.3.3.1; IMC®: [BF] 607.3.3.1

Proponents: Amanda Hickman, The Hickman Group, Air Movement and Control Association International, Inc. (AMCA) (amanda@thehickmangroup.com)

2024 International Building Code

Revise as follows:

717.3.3.1 Fire damper actuation.
The operating temperature of the primary heat responsive devices used to actuate a *fire damper~~s~~* shall meet one of the following requirements:

1. ~~The operating temperature~~ shall be approximately 50°F (10°C) above the maximum design~~normal~~ temperature of the air within the duct system~~,~~. Additionally, the primary heat responsive device temperature shall be a minimum of ~~but not less than~~ 160°F (71°C) and shall not exceed:~~.~~

   1.1. 212° F (100° C) for static rated dampers.

   1.2. 350° F (177° C) for dynamic rated dampers.

2. ~~The operating temperature~~ shall be not more than 350°F (177°C) where located in a smoke control system complying with Section 909.

2024 International Mechanical Code

Revise as follows:

[BF] 607.3.3.1 Fire damper actuation. The operating temperature of the ~~P~~ primary heat-responsive devices used to actuate a fire damper~~s~~ shall meet one of the following requirements:

1. ~~The operating temperature s~~ Shall be approximately 50°F (28°C) above the maximum design ~~normal~~ temperature of the air within the duct system~~,~~. Additionally, the primary heat responsive device temperature shall be a minimum of ~~but not less than~~ 160°F (71°C) and shall not exceed:.

   1.1 212° F (100° C) for static rated dampers.

   1.2 350° F (177° C) for dynamic rated dampers.

2. ~~The operating temperature s~~Shall be not more than 350°F (177°C) where located in a smoke control system complying with Section 909 of the International Building Code.

Reason:

The proposed modifications add technical clarity to this section. The current language states that the damper's operating temperature shall be 50 ° F above the "normal temperature within the duct system". However, since the temperature within many ducts will vary significantly between heating and cooling seasons it is unclear what the "normal temperature" is. The intent of this section is to set the operating temperature of the damper to 50 ° F above the "maximum design temperature of the air within the duct system" to avoid nuisance trips of the damper's operating device. The proposal also includes maximum limits to the operating temperature which are already required by section 717.3.1. The limits of 212 ° F (100 ° C) on static rated dampers and 350 ° F (177 ° C) on dynamic rated dampers come from the limits established in UL 555. Thus, these are the limits at which listings for dampers can be obtained.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposal is editorial. The cost will not be impacted by clarifying that "normal temperature" should read maximum design temperature and by adding temperature limits to primary heat responsive devices.

FS70-24

FS71-24

IBC: 717.3.3.4; IMC®: [BF] 607.3.3.4

Proponents: Amanda Hickman, The Hickman Group, Air Movement and Control Association International, Inc. (AMCA) (amanda@thehickmangroup.com)

2024 International Building Code

Revise as follows:

717.3.3.4 Ceiling radiation damper actuation.
The operating temperature of a *ceiling radiation damper* actuation device shall be 50°F (27.8°C) above the ~~normal~~ maximum design temperature of the air within the duct system, but not less than 160°F (71°C).

2024 International Mechanical Code

Revise as follows:

[BF] 607.3.3.4 Ceiling radiation damper actuation. The operating temperature of a *ceiling radiation damper* actuation device shall be 50°F (28°C) above the ~~normal~~ maximum design temperature of the air within the duct system, but not less than 160°F (71°C).

Reason:

The proposed modifications add technical clarity to this section. The current language states that the damper's operating temperature shall be 50 º F above the "normal temperature within the duct system". However, since the temperature within many ducts will vary significantly between heating and cooling seasons it is unclear what the "normal temperature" is. The intent of this section is to set the operating temperature of the damper to 50 º F above the "maximum design temperature of the air within the duct system" to avoid nuisance trips of the damper's operating device.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is editorial. The cost will not be impacted by clarifying that "normal temperature" should read maximum design temperature.

FS71-24

FS72-24

IBC: 717.5.2; IMC®: [BF] 607.5.2

Proponents: Jeffrey Grove, Southern Nevada ICC Chapter (jeff.grove@coffman.com)

2024 International Building Code

Revise as follows:

717.5.2 Fire barriers.
Ducts and air transfer openings of *fire barriers* shall be protected with *listed fire dampers* installed in accordance with their listing. Ducts and air transfer openings shall not penetrate enclosures for *interior exit stairways* and *ramps* and *exit passageways*, except as permitted by Sections 1023.5 and 1024.6, respectively.

Exceptions: *Fire dampers* are not required at penetrations of *fire barriers* where any of the following apply:

1. Penetrations are tested in accordance with ASTM E119 or UL 263 as part of the fire-resistance-rated assembly.
2. Ducts are used as part of an *approved* smoke control system in accordance with Section 909 and where the use of a *fire damper* would interfere with the operation of a smoke control system.
3. Such walls are penetrated by fully ducted HVAC systems, have a required *fire-resistance rating* of 1 hour or less, are in areas of other than Group H and are in *buildings* equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2. For the purposes of this exception, a fully ducted HVAC system shall be a duct system for conveying supply, return or exhaust air as part of the *structure*'s HVAC system. Such a duct system shall be constructed of sheet steel not less than No. 26 gage thickness and shall be continuous from the air-handling appliance or equipment to the air outlet and inlet terminals. <u>The duct shall not terminate at a wall register in a fire resistance-rated wall. The terminal shall be separated from terminals on the opposite side of the fire barrier by a minimum of 24”.</u> Nonmetal flexible air connectors shall be permitted in the following locations:
   3.1. At the duct connection to the air handling unit or equipment located within the mechanical room in accordance with Section 603.9 of the *International Mechanical Code.*
   3.2. From an overhead metal duct to a ceiling diffuser within the same room in accordance with Section 603.6.2 of the *International Mechanical Code.*

2024 International Mechanical Code

Revise as follows:

[BF] 607.5.2 Fire barriers. Ducts and air transfer openings that penetrate fire barriers shall be protected with *listed* fire dampers installed in accordance with their listing. Ducts and air transfer openings shall not penetrate enclosures for interior exit stairways and ramps and exit passageways except as permitted by Sections 1023.5 and 1024.6, respectively, of the International Building Code.

Exception: Fire dampers are not required at penetrations of fire barriers where any of the following apply:

1. Penetrations are tested in accordance with ASTM E119 or UL 263 as part of the fire-resistance-rated assembly.
2. Ducts are used as part of an *approved* smoke control system in accordance with Section 512 and where the fire damper would interfere with the operation of the smoke control system.

3. Such walls are penetrated by fully ducted HVAC systems, have a required fire-resistance rating of 1 hour or less, are in areas of other than Group H and are in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 of the International Building Code. For the purposes of this exception, a fully ducted HVAC system shall be a duct system for the structure's HVAC system. Such a duct system shall be constructed of sheet steel not less than 26 gage [0.0217 inch (0.55 mm)] thickness and shall be continuous from the air-handling *appliance* or *equipment* to the air outlet and inlet terminals. <u>The duct shall not terminate at a wall register in a fire resistance-rated wall. The terminal shall be separated from terminals on the opposite side of the fire barrier by a minimum of 24".</u> Flexible air connectors shall be permitted in a fully ducted system, limited to the following installations:
   3.1. Nonmetallic flexible connections that connect a duct to an air handling unit or *equipment* located within a mechanical room in accordance with Section 603.9.
   3.2. Nonmetallic flexible air connectors in accordance with Section 603.6.2 that connect an overhead metal duct to a ceiling diffuser where the metal duct and ceiling diffuser are located within the same room.

Reason: The code language as currently written would allow for a duct to have openings on either side of a fire-resistant wall with no limitations. If duct openings were directly adjacent the wall on both sides of the assembly, fire could potentially use this path to ignite materials on the opposite side of the assembly negating its ability to resist the passage of fire. Requiring a minimum separation of duct terminals would limit the ability of fire to use the terminal openings to transfer from one side of the fire-resistant wall to the other.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The code change proposal is a clarification and will only impact the location of the terminals. The materials and labor to perform the installation should not be affected therefore no cost impact is anticipated.

FS72-24

FS73-24

IBC: 717.5.4; IMC®: [BF] 607.5.3

Proponents: Jeffrey Grove, Southern Nevada ICC Chapter (jeff.grove@coffman.com)

2024 International Building Code

Revise as follows:

717.5.4 Fire partitions.
Ducts and air transfer openings that penetrate *fire partitions* shall be protected with *listed fire dampers* installed in accordance with their listing.

Exceptions: In occupancies other than Group H, *fire dampers* are not required where any of the following apply:

1. *Corridor* walls in *buildings* equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2 and the duct is protected as a *through penetration* in accordance with Section 714.
2. Tenant partitions in *covered and open mall buildings* where the walls are not required by provisions elsewhere in the code to extend to the underside of the floor or roof sheathing, slab or deck above.
3. The duct system is constructed of *approved* materials in accordance with the *International Mechanical Code* and the duct penetrating the wall complies with all of the following requirements:
   - 3.1. The duct shall not exceed 100 square inches (0.06 m^2).
   - 3.2. The duct shall be constructed of steel not less than 0.0217 inch (0.55 mm) in thickness.
   - 3.3. The duct shall not have openings that communicate the *corridor* with adjacent spaces or rooms.
   - 3.4. The duct shall be installed above a ceiling.
   - 3.5. The duct shall not terminate at a wall register in the fire-resistance-rated wall.
   - 3.6. A minimum 12-inch-long (305 mm) by 0.060-inch-thick (1.52 mm) steel sleeve shall be centered in each duct opening. The sleeve shall be secured to both sides of the wall and all four sides of the sleeve with minimum $1^1/_2$-inch by $1^1/_2$-inch by 0.060-inch (38 mm by 38 mm by 1.52 mm) steel retaining angles. The retaining angles shall be secured to the sleeve and the wall with No. 10 (M5) screws. The *annular space* between the steel sleeve and the wall opening shall be filled with mineral wool batting on all sides.
4. Such walls are penetrated by ducted HVAC systems, have a required *fire-resistance rating* of 1 hour or less, <u>are in areas of other than Group H</u>, and are in *buildings* equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2. For the purposes of this exception, a ducted HVAC system shall be a duct system for conveying supply, return or exhaust air as part of the *structure*'s HVAC system. Such a duct system shall be constructed of sheet steel not less than No. 26 gage thickness and shall be continuous from the air-handling appliance or equipment to the air outlet and inlet terminals. <u>The duct shall not terminate at a wall register in a fire resistance-rated wall. The terminal shall be separated from terminals on the opposite side of the fire barrier by a minimum of 24".</u>

2024 International Mechanical Code

Revise as follows:

[BF] 607.5.3 Fire partitions. Ducts and air transfer openings that penetrate fire partitions shall be protected with *listed* fire dampers installed in accordance with their listing.

Exception: In *occupancies* other than Group H, fire dampers are not required where any of the following apply:

1. Corridor walls in *buildings* equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 of the International Building Code and the duct is protected as a through penetration in accordance with Section 714 of the International Building Code.
2. The partitions are tenant partitions in covered and open mall *buildings* where the walls are not required by provisions elsewhere in the *International Building Code* to extend to the underside of the floor or roof sheathing, slab or deck above.
3. The duct system is constructed of *approved* materials in accordance with Section 603 and the duct penetrating the wall complies with all of the following requirements:
   3.1. The duct shall not exceed 100 square inches (0.06 m^2).

   3.2. The duct shall be constructed of steel not less than 0.0217 inch (0.55 mm) in thickness.

   3.3. The duct shall not have openings that communicate the corridor with adjacent spaces or rooms.

   3.4. The duct shall be installed above a ceiling.

   3.5. The duct shall not terminate at a wall register in the fire-resistance-rated wall.

   3.6. A minimum 12-inch-long (305 mm) by 0.060-inch-thick (1.52 mm) steel sleeve shall be centered in each duct opening. The sleeve shall be secured to both sides of the wall and all four sides of the sleeve with minimum $1^1/_2$-inch by $1^1/_2$-inch by 0.060-inch (38 mm by 38 mm by 1.52 mm) steel retaining angles. The retaining angles shall be secured to the sleeve and the wall with No. 10 (M5) screws. The annular space between the steel sleeve and the wall opening shall be filled with rock (mineral) wool batting on all sides.

4. Such walls are penetrated by ducted HVAC systems, have a required fire-resistance rating of 1 hour or less<u>, are in areas of other than Group H,</u> and are in areas of other than Group H and are in *buildings* equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 of the International Building Code. For the purposes of this exception, a ducted HVAC system shall be a duct system for conveying supply, return or *exhaust air* as part of the structure's HVAC system. Such a duct system shall be constructed of sheet steel not less than 26 gage in thickness and shall be continuous from the air-handling *appliance* or *equipment* to the air outlet and inlet terminals.<u> The duct shall not terminate at a wall register in a fire resistance-rated wall. The terminal shall be separated from terminals on the opposite side of the fire barrier by a minimum of 24".</u>

Reason: The code language as currently written would allow for a duct to have openings on either side of a fire-resistant wall with no limitations. If duct openings were directly adjacent the wall on both sides of the assembly, fire could potentially use this path to ignite materials on the opposite side of the assembly negating its ability to resist the passage of fire. Requiring a minimum separation of duct terminals would limit the ability of fire to use the terminal openings to transfer from one side of the fire-resistant wall to the other.

Excluding Group H occupancies from the exemption maintains the higher level of protection necessary to support the higher risk associated with the Group H occupancies. This language would also make the requirement consistent with requirements for fire barriers in section 717.5.2 exception 3.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The code change proposal is a clarification and will only impact the location of the terminals. The materials and labor to perform the installation should not be affected therefore no cost impact is anticipated.

FS73-24

FS74-24

IBC: 717.5.4

Proponents: Jeffrey Grove, Southern Nevada ICC Chapter (jeff.grove@coffman.com)

2024 International Building Code

Revise as follows:

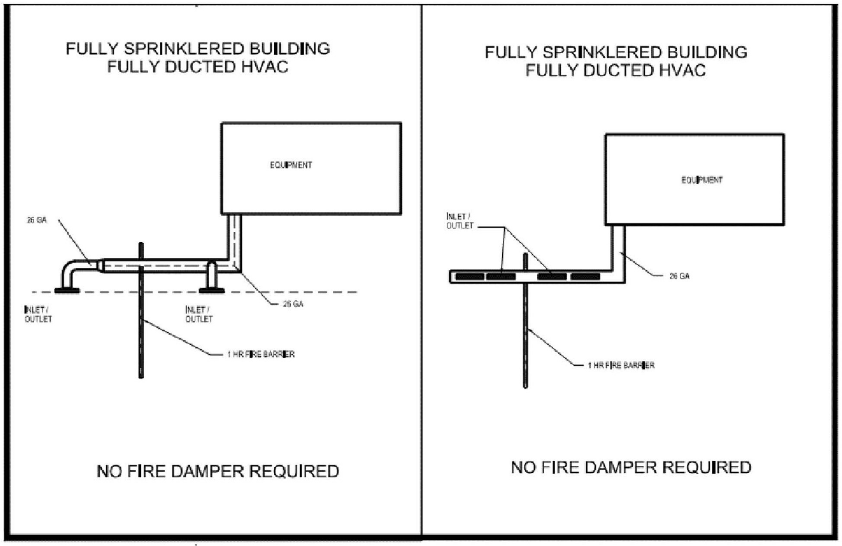
717.5.4 Fire partitions.
Ducts and air transfer openings that penetrate *fire partitions* shall be protected with *listed fire dampers* installed in accordance with their listing.

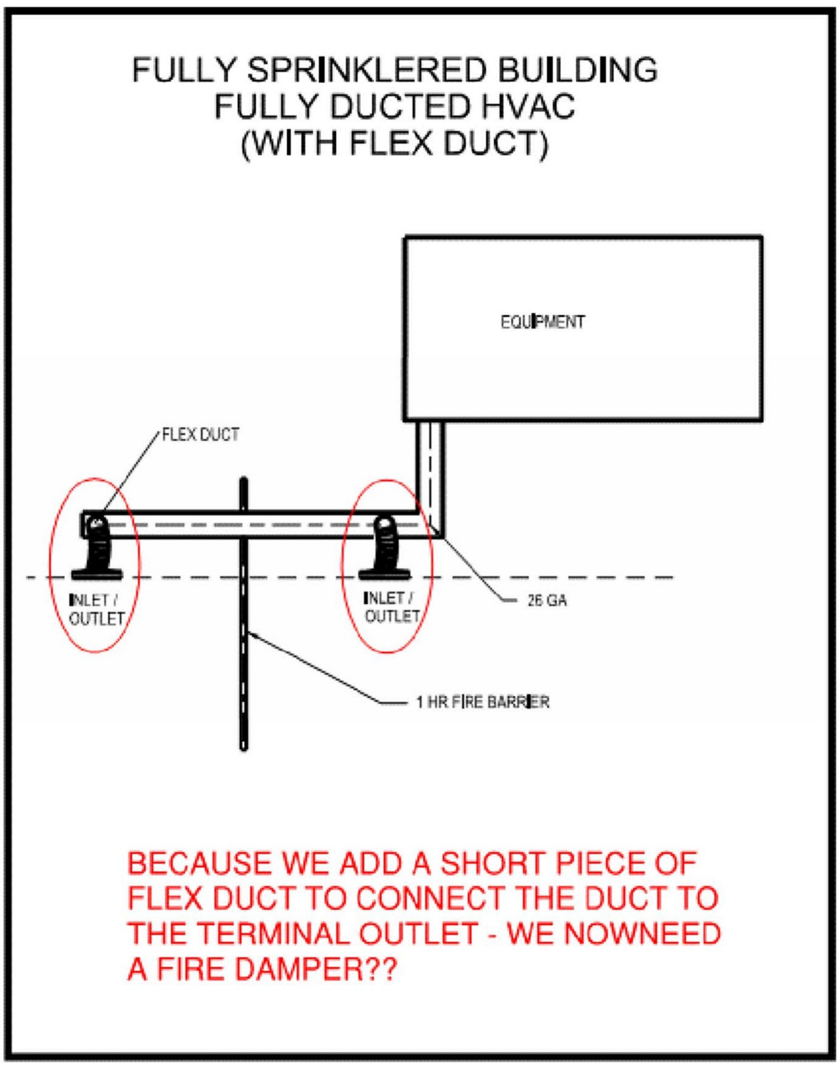
Exceptions: In occupancies other than Group H, *fire dampers* are not required where any of the following apply:

1. *Corridor* walls in *buildings* equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2 and the duct is protected as a *through penetration* in accordance with Section 714.
2. Tenant partitions in *covered and open mall buildings* where the walls are not required by provisions elsewhere in the code to extend to the underside of the floor or roof sheathing, slab or deck above.
3. The duct system is constructed of *approved* materials in accordance with the *International Mechanical Code* and the duct penetrating the wall complies with all of the following requirements:
   3.1. The duct shall not exceed 100 square inches (0.06 m^2).
   3.2. The duct shall be constructed of steel not less than 0.0217 inch (0.55 mm) in thickness.
   3.3. The duct shall not have openings that communicate the *corridor* with adjacent spaces or rooms.
   3.4. The duct shall be installed above a ceiling.
   3.5. The duct shall not terminate at a wall register in the fire-resistance-rated wall.
   3.6. A minimum 12-inch-long (305 mm) by 0.060-inch-thick (1.52 mm) steel sleeve shall be centered in each duct opening. The sleeve shall be secured to both sides of the wall and all four sides of the sleeve with minimum 1$^1/_2$-inch by 1$^1/_2$-inch by 0.060-inch (38 mm by 38 mm by 1.52 mm) steel retaining angles. The retaining angles shall be secured to the sleeve and the wall with No. 10 (M5) screws. The *annular space* between the steel sleeve and the wall opening shall be filled with mineral wool batting on all sides.
4. Such walls are penetrated by ducted HVAC systems, have a required *fire-resistance rating* of 1 hour or less, and are in *buildings* equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2. For the purposes of this exception, a ducted HVAC system shall be a duct system for conveying supply, return or exhaust air as part of the *structure*'s HVAC system. Such a duct system shall be constructed of sheet steel not less than No. 26 gage thickness and shall be continuous from the air-handling appliance or equipment to the air outlet and inlet terminals. <u>Nonmetal flexible air connectors shall be permitted in the following locations:</u>
   <u>4.1 At the duct connection to the air handling unit or equipment located within the mechanical room in accordance with Section 603.9 of the *International Mechanical Code.*</u>
   <u>4.2 From an overhead metal duct to a ceiling diffuser within the same room in accordance with Section 603.6.2 of the *International Mechanical Code.*</u>

Reason: The inclusion of the non-metal flexible air connectors is to accurately reflect the typical installation. As currently written, the code allows for duct terminals on the metal duct without having to require fire dampers. The addition of a flexible duct connector to go from the metal duct to the ceiling terminal would require the use of a fire damper at the fire partition. Addition of a flexible duct connector in this case does not add to the fire risk of the assembly and should not require additional protection. This language is consistent with the language for fire barriers in Section 717.5.2 exception 3 that was adopted to the 2021 IBC under item FS67-18.

The attached exhibits show what is currently allowed per the code. As shown in the first exhibit, there is no limit in the location of the openings in the duct for terminals where no fire damper is required. The second exhibit shows that adding the flexible connector, no matter how far from the fire resistant wall it is, would require a damper to be added.





Cost Impact: Decrease

Estimated Immediate Cost Impact:

The code change proposal will decrease the construction cost by approximately $1200 per wall penetration. This cost savings would come from eliminating the cost to use a hard duct as the final connection and eliminating the fire damper. There is also a decrease in labor required. The average labor for a flexible duct connector is 15 minutes. The average to fabricate a 90 degree elbow and install a solid connector is approximately 2 hours. The cost of the fire damper could be $5,000 or more if it needs to be tied into the smoke control system.

Estimated Immediate Cost Impact Justification (methodology and variables):

Cost information was obtained from mechanical vendors and contractors.

FS74-24

FS75-24

IBC: 717.6.1; IMC®: [BF] 607.6.1

Proponents: Tony Crimi, A.C. Consulting Solutions Inc., International Firestop Council (tcrimi@sympatico.ca)

2024 International Building Code

Revise as follows:

717.6.1 Through penetrations.
A duct constructed of *approved* materials in accordance with the *International Mechanical Code* that penetrates a fire-resistance-rated floor/ceiling assembly that connects not more than two *stories*is permitted without *shaft enclosure* protection, provided that a *listed fire damper* is installed at the floor line or the duct is protected in accordance with Section 714.5. For air transfer openings, see Section 712.1.9.

Exceptions:

1. In occupancies other than Groups I-2 and I-3, a duct is permitted to penetrate three floors or less without a *fire damper* at each floor, provided that such duct meets all of the following requirements:
   - ~~1~~ 1.1. The duct shall be contained and located within the cavity of a wall and shall be constructed of steel having a minimum wall thickness of 0.0187 inches (0.4712 mm) (No. 26 gage).
   - ~~2~~ 1.2. The duct shall open into only one *dwelling unit* or *sleeping unit* and the duct system shall be continuous from the unit to the exterior of the *building*.
   - ~~3~~ 1.3. The duct shall not exceed 4-inch (102 mm) nominal diameter and the total area of such ducts shall not exceed 100 square inches (0.065 m^2) in any 100 square feet (9.3 m^2) of floor area.
   - ~~4~~ 1.4. The *annular space* around the duct is protected with materials that prevent the passage of flame and hot gases sufficient to ignite cotton waste where subjected to ASTM E119 or UL 263 time-temperature conditions under a minimum positive pressure differential of 0.01 inch of water (2.49 Pa) at the location of the penetration for the time period equivalent to the *fire-resistance rating* of the construction penetrated.
   - ~~5~~ 1.5. Grille openings located in a ceiling of a fire-resistance-rated floor/ceiling or roof/ceiling assembly shall be protected with a *listed ceiling radiation damper* installed in accordance with Section 717.6.2.1.2

2. A duct is permitted to penetrate three floors or less without a fire damper at each floor provided the surface of the duct is continuously covered on all sides from a point at which the duct penetrates a ceiling or floor to the outlet terminal with a classified, listed and labeled system specifically evaluated for such purpose in accordance with nationally recognized standards for such enclosure materials, and penetrations comply with the requirements of Section 714.5 of the International Building Code.

2024 International Mechanical Code

Revise as follows:

[BF] 607.6.1 Through penetrations. A duct constructed of *approved* materials in accordance with Section 603 that penetrates a fire-resistance-rated floor/ceiling assembly that connects not more than two stories is permitted without shaft enclosure protection provided that a *listed* fire damper is installed at the floor line or the duct is protected in accordance with Section 714.5 of the International Building Code. For air transfer openings, see Item 6, Section 712.1.9 of the International Building Code.

~~Exception~~ Exceptions:

1. In occupancies other than Groups I-2 and I-3, a duct is permitted to penetrate three floors or less without a fire damper at each floor provided that it meets all of the following requirements:
   ~~1.~~ 1.1. The duct shall be contained and located within the cavity of a wall and shall be constructed of steel having a minimum thickness of 0.0187 inch (0.4712 mm) (No. 26 gage).

   ~~2.~~ 1.2. The duct shall open into only one *dwelling unit* or *sleeping unit* and the duct system shall be continuous from the unit to the exterior of the *building*.

   ~~3.~~ 1.3. The duct shall not exceed a 4-inch (102 mm) nominal diameter and the total area of such ducts shall not exceed 100 square inches for any 100 square feet (64 516 mm^2 per 9.3 m^2) of the floor area.

   ~~4.~~ 1.4. The annular space around the duct is protected with materials that prevent the passage of flame and hot gases sufficient to ignite cotton waste when subjected to ASTM E119 or UL 263 time-temperature conditions under a minimum positive pressure differential of 0.01 inch (2.49 Pa) of water at the location of the penetration for the time period equivalent to the fire-resistance rating of the construction penetrated.

   ~~5.~~ 1.5. Grille openings located in a ceiling of a fire-resistance-rated floor/ceiling or roof/ceiling assembly shall be protected with a *listed ceiling radiation damper* installed in accordance with Section 607.6.2.1.

2. A duct is permitted to penetrate three floors or less without a fire damper at each floor provided the surface of the duct is continuously covered on all sides from a point at which the duct penetrates a ceiling or floor to the outlet terminal with a classified, listed and labeled system specifically evaluated for such purpose in accordance with nationally recognized standards for such enclosure materials, and penetrations comply with the requirements of Section 714.5 of the International Building Code.

Reason: This proposal provides an additional option for ducts that penetrate three or less floors. Third-party certification organizations like UL and Intertek provide listing and labelling services for fire-resistant duct systems using a variety of nationally recognized Standards and applicable ICC-ES criteria. These Listings have been in the marketplace for many years and have proven their effectiveness.

The many Listings for fire-resistant duct systems provide an alternate to required fire dampers when ducts pass through a fire separation. They also cover criteria to assess performance as shaft enclosures for vertical ducts.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal adds an additional option for protection of ducts. It does not remove any existing provisions or mandate additional costs.

FS75-24

FS76-24

IBC: 717.6.2.1.1, 717.6.2.1.2

Proponents: Amanda Hickman, The Hickman Group, Air Movement and Control Association International, Inc. (AMCA) (amanda@thehickmangroup.com)

2024 International Building Code

Revise as follows:

717.6.2.1.1 Dynamic systems.
Only *ceiling radiation dampers labeled* for use in dynamic systems shall be installed in heating, *ventilation* and air-conditioning systems that do not automatically shut down~~designed to operate with fans on~~ during a fire.

717.6.2.1.2 Static systems.
Static *ceiling radiation dampers* shall only be installed in ~~provided with~~ systems that ~~are~~ automatically shut down in the event of~~not designed to operate during~~ a fire.

~~**Exceptions:**~~

1. ~~Where a static *ceiling radiation damper* is installed at the opening of a duct, a *smoke detector* shall be installed inside the duct or outside the duct with sampling tubes protruding into the duct. The detector or tubes in the duct shall be within 5 feet (1524 mm) of the damper. Air outlets and inlets shall not be located between the detector or tubes and the damper. The detector shall be *listed* for the air velocity, temperature and humidity anticipated at the point where it is installed. Other than in mechanical smoke control systems, dampers shall be closed upon fan shutdown where local *smoke detectors* require a minimum velocity to operate.~~
2. ~~Where a static *ceiling radiation damper* is installed in a ceiling, the *ceiling radiation damper* shall be permitted to be controlled by a smoke detection system installed in the same room or area as the *ceiling radiation damper*.~~
3. ~~A static *ceiling radiation damper* shall be permitted to be installed in a room where an occupant sensor is provided within the room that will shut down the system.~~

Reason:

The changes to Sections 717.6.2.1.1 and 717.6.2.1.2 are editorial and align the description of dynamic and static systems with the code language already used in IBC section 717.2.3 outlining static dampers.

Exception 1 and Exception 2 are not exceptions to the charging language, but rather are specific methods for automatically shutting down a system in the event of a fire. Additionally, exception 2 as written, allows a static rated ceiling radiation damper to be controlled by a smoke detector without shutting down the system. This would result in the static damper having to close under airflow, which it is not listed to do.

Exception 3 does outline a true exception to the charging language as it describes a method for shutting down the system other than in the event of a fire. However, using an occupancy sensor to shut down the system could still result in the static rated damper having to close under airflow because many occupancy sensors utilize a delay prior to shutting the system down.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposed changes will not impact the cost of construction as they are only editorial and align system definitions with existing code language.

FS76-24

FS77-24

IBC: 717.6.2.1.1, 717.6.2.1.2; IMC®: [BF] 607.6.2.1.1, [BF] 607.6.2.1.2

Proponents: Eirene Knott, BRR Architecture, Metropolitan Kansas City Chapter of the ICC (eirene.knott@brrarch.com)

2024 International Building Code

Revise as follows:

717.6.2.1.1 Dynamic systems.
Only *ceiling radiation dampers labeled* for use in dynamic systems shall be installed in heating, *ventilation* and air-conditioning systems that do not automatically shut down ~~designed to operate with fans on~~ during a fire.

Exceptions:

1. Where a static ceiling radiation damper is installed at the opening of a duct, a smoke detector shall be installed inside the duct or outside the duct with sampling tubes protruding into the duct. The detector or tubes in the duct shall be within 5 feet (1524 mm) of each static ceiling radiation damper installed in the system. Air outlets and inlets shall not be located between the detector or tubes and the damper. Each detector shall be listed for the air velocity, temperature and humidity anticipated at the point where it is installed. Other than in mechanical smoke control systems, dampers shall be closed upon fan shutdown where local smoke detectors require a minimum velocity to operate.
2. A static ceiling radiation damper shall be permitted to be installed in a room where an occupant sensor is provided within the room that will shut down the system when the room is vacant.

717.6.2.1.2 Static systems.
Static *ceiling radiation dampers* shall only be provided in ~~with~~ systems that ~~are not designed to operate during~~ automatically shut down in the event of a fire.

~~**Exceptions:**~~

1. ~~Where a static *ceiling radiation damper* is installed at the opening of a duct, a *smoke detector* shall be installed inside the duct or outside the duct with sampling tubes protruding into the duct. The detector or tubes in the duct shall be within 5 feet (1524 mm) of the damper. Air outlets and inlets shall not be located between the detector or tubes and the damper. The detector shall be *listed* for the air velocity, temperature and humidity anticipated at the point where it is installed. Other than in mechanical smoke control systems, dampers shall be closed upon fan shutdown where local *smoke detectors* require a minimum velocity to operate.~~
2. ~~Where a static *ceiling radiation damper* is installed in a ceiling, the *ceiling radiation damper* shall be permitted to be controlled by a smoke detection system installed in the same room or area as the *ceiling radiation damper*.~~
3. ~~A static *ceiling radiation damper* shall be permitted to be installed in a room where an occupant sensor is provided within the room that will shut down the system.~~

2024 International Mechanical Code

Revise as follows:

[BF] 607.6.2.1.1 Dynamic systems. *Ceiling radiation dampers* installed in heating, ventilation and air-conditioning systems that do not automatically shut down ~~designed to operate with fans on~~ during a fire shall be labeled for use in dynamic systems.

Exceptions:

1. Where a static ceiling radiation damper is installed at the opening of a duct, a smoke detector shall be installed inside the duct or outside the duct with sampling tubes protruding into the duct. The detector or tubes in the duct shall be within 5 feet (1524 mm) of each static ceiling radiation damper installed in the system. Air outlets and inlets shall not be located between the detector or tubes and the damper. Each detector shall be listed for the air velocity, temperature and humidity anticipated at the point where it is installed. Other than in mechanical smoke control systems, dampers shall be closed upon fan shutdown where local smoke detectors require a minimum velocity to operate
2. A static ceiling radiation damper shall be permitted to be installed in a room where an occupant sensor is provided within the room that will shut down the system when the room is vacant.

[BF] 607.6.2.1.2 Static systems. Static *ceiling radiation dampers* only shall be installed only in systems that ~~are not designed to operate during~~ automatically shut down in the event of a fire.

~~**Exceptions:**~~

1. ~~Where a static *ceiling radiation damper* is installed at the opening of a duct, a smoke detector shall be installed inside the duct or outside the duct with sampling tubes protruding into the duct. The detector or tubes within the duct shall be within 5 feet (1524 mm) of the damper. Air outlets and inlets shall not be located between the detector or tubes and the damper. The detector shall be *listed* for the air velocity, temperature and humidity anticipated at the point where it is installed. Other than in mechanical smoke control systems, dampers shall be closed upon fan shutdown where local smoke detectors require a minimum velocity to operate.~~
2. ~~Where a static *ceiling radiation damper* is installed in a ceiling, the *ceiling radiation damper* shall be permitted to be controlled by a smoke detection system installed within the same room or area as the *ceiling radiation damper*.~~
3. ~~A static *ceiling radiation damper* shall be permitted to be installed within a room where an occupant sensor is provided within the room that will shut down the system.~~

Reason: As the original proponent of the language regarding the exceptions, it has been pointed out to me that perhaps the exceptions should be with the dynamic systems rather than the static systems as these exceptions are meant to allow some exceptions to the dynamic systems rather than the static systems. By moving the language from the static to the dynamic, it would make the code language more consistent with the intent. The current exception #2 is removed as it implies the static damper is motor driven and it is not. So they cannot be controlled by a smoke detection system.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is only moving language from one section of the code to the more appropriate section.

FS77-24

FS78-24

IBC: 718.2.1

Proponents: Edward Lisinski, American Wood Council (elisinski@awc.org)

2024 International Building Code

Revise as follows:

718.2.1 Fireblocking materials.
Fireblocking shall consist of the following materials:

1. One layer of ~~Two~~2-inch (51 mm) nominal lumber.
2. Two ~~thicknesses~~ layers of 1-inch (25 mm) nominal lumber with broken lap joints.
3. One ~~thickness~~ layer of ~~0.719~~23/32-inch (18.3 mm) *wood structural panels* with joints backed by ~~0.719~~23/32-inch (18.3 mm) *wood structural panels.*
4. One ~~thickness~~ layer of ~~0.75~~3/4-inch (19.1 mm) *particleboard* with joints backed by ~~0.75~~3/4-inch (19.1 mm) *particleboard.*
5. One layer of ~~One-half~~1/2-inch (12.7 mm) *gypsum board.*
6. One layer of ~~One-fourth~~1/4-inch (6.4 mm) cement-based millboard.
7. Batts or blankets of *mineral wool*, *mineral fiber* or other *approved* materials installed in such a manner as to be securely retained in place.
8. Cellulose insulation tested in the form and manner intended for use to demonstrate its ability to remain in place and to retard the spread of fire and hot gases.
9. *Mass timber* complying with Section 2304.11.
10. One ~~thickness~~ layer of $^{19}/_{32}$-inch (15.1 mm) *fire-retardant-treated wood* structural panel complying with Section 2303.2.

Reason: This change is for consistency only; no technical changes were intended to be made to this section. This change accomplishes three things for consistency:

- There were four items that described the number of layers of the material used but three did not. As a result of this change, all items would be described in number of layers where appropriate.
- There were three items that described the thickness of the material numerically using decimals, one item that described it numerically using fractions, and three items that described the thickness spelled out with words. As a result of this change, all material thicknesses would be described numerically, and by using fractions where appropriate.
- The term "thickness" was used to refer to the number of layers of each material. As a result of this change, any material that is to be installed in layers would use the term, "layers."

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal was made to create consistency for the materials permitted as fireblocking. No technical changes were intended to be made to this section.

FS78-24

FS79-24

IBC: 718.2.1, AWC Chapter 35 (New)

Proponents: Edward Lisinski, American Wood Council (elisinski@awc.org)

2024 International Building Code

Revise as follows:

718.2.1 Fireblocking materials.
Fireblocking shall consist of the following materials:

1. Two-inch (51 mm) nominal lumber.
2. Two thicknesses of 1-inch (25 mm) nominal lumber with broken lap joints.
3. One thickness of 0.719-inch (18.3 mm) *wood structural panels* with joints backed by 0.719-inch (18.3 mm) *wood structural panels.*
4. One thickness of 0.75-inch (19.1 mm) *particleboard* with joints backed by 0.75-inch (19 mm) *particleboard.*
5. One-half-inch (12.7 mm) *gypsum board.*
6. One-fourth-inch (6.4 mm) cement-based millboard.
7. Batts or blankets of *mineral wool*, *mineral fiber* or other *approved* materials installed in such a manner as to be securely retained in place.
8. Cellulose insulation tested in the form and manner intended for use to demonstrate its ability to remain in place and to retard the spread of fire and hot gases.
9. *Mass timber* complying with Section 2304.11.
10. One thickness of $^{19}/_{32}$-inch (15.1 mm) *fire-retardant-treated wood* structural panel complying with Section 2303.2.
11. Fireblocking materials in accordance with ANSI/AWC FDS.

Add new standard(s) as follows:

AWC

American Wood Council
222 Catoctin Circle SE, Suite 201
Leesburg, VA 20175

ANSI/AWC FDS-2024: Fire Design Specification (FDS) for Wood Construction

Staff Analysis: A review of the standard proposed for inclusion in the code, ANSI/AWC FDS-2024 Fire Design Specification (FDS) for Wood Construction, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: This proposal recognizes fireblocking materials in accordance with ANSI/AWC *2024 Fire Design Specification (FDS) for Wood Construction* Section 2.5.2 and adds a new reference to that standard in the code. The FDS includes prescriptive options for wood fireblocking of structural composite lumber and engineered wood rim board and for use of other wood members and wood protection materials designed in accordance with Chapter 3 of ANSI/AWC FDS to limit the passage of flames for at least 15 minutes. The minimum performance time of 15 minutes is based on performance associated with ½" gypsum board in Item 5 of IBC Section 718.2.1.

The FDS was developed as an American National Standard through the AWC ANSI-approved consensus standards development process, and is available on the AWC website at the following location: https://awc.org/wp-content/uploads/2023/11/AWC_FDS2024_20231103_AWCWEBSITE.pdf

Bibliography: ANSI/AWC *2024 Fire Design Specification (FDS) for Wood Construction*. View this document online: https://awc.org/wp-content/uploads/2023/11/AWC_FDS2024_20231103_AWCWEBSITE.pdf

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0

Estimated Immediate Cost Impact Justification (methodology and variables):

The proposal provides a reference to the FDS, which contains additional options for fireblocking materials which are not currently listed in Section 718.2.1, such as structural composite lumber and engineered wood rim board. The inclusion of this additional option does not in and of itself increase or decrease the overall cost impact of the code, because this option may or may not be chosen. The existing options are still relevant, and if chosen, have no cost impact on the actual code requirements.

FS79-24

FS80-24

IBC: TABLE 721.1(1)

Proponents: Stephen Szoke, American Concrete Institute, American Concrete Institute (steve.szoke@concrete.org); Amy Trygestad, Concrete Reinforcing Steel Institute, Concrete Reinforcing Steel Institute (atrygestad@crsi.org); Shamim Rashid-Sumar, National Ready Mixed Concrete Association, National Ready Mixed Concrete Association (ssumar@nrmca.org)

2024 International Building Code

Revise as follows:

TABLE 721.1(1) MINIMUM PROTECTION OF STRUCTURAL PARTS BASED ON TIME PERIODS FOR VARIOUS NONCOMBUSTIBLE INSULATING MATERIALS[m]

Portions of table not shown remain unchanged.

STRUCTURAL PARTS TO BE PROTECTED	ITEM NUMBER	INSULATING MATERIAL USED	MINIMUM THICKNESS OF INSULATING MATERIAL FOR THE FOLLOWING FIRE-RESISTANCE PERIODS (inches)			
			4 hours	3 hours	2 hours	1 hour
5. Reinforcing steel in reinforced concrete columns, beams girders and trusses	5-1.1	Carbonate, lightweight and sand-lightweight aggregate concrete, members 12" or larger, square or round. (Size limit does not apply to beams and girders monolithic with floors.)	1 $^1/_2$	1 $^1/_2$	1 $^1/_2$	1 $^1/_2$
		Siliceous aggregate concrete, members 12" or larger, square or round. (Size limit does not apply to beams and girders monolithic with floors.)	2	1 $^1/_2$	1 $^1/_2$	1 $^1/_2$
6. Reinforcing steel in reinforced concrete joists[l]	6-1.1	Carbonate, lightweight and sand-lightweight aggregate concrete	1 $^1/_4$	1 $^1/_4$	1	$^3/_4$
	6-1.2	Siliceous aggregate concrete	1 $^3/_4$	1 $^1/_2$	1	$^3/_4$
7. Reinforcing steel and tie rods in floor and roof slabs[l]	7-1.1	Carbonate, lightweight and sand-lightweight aggregate concrete	1	1	$^3/_4$	$^3/_4$
	7-1.2	Siliceous aggregate concrete	1 $^1/_4$	1	1	$^3/_4$

For SI: 1 inch = 25.4 mm, 1 square inch = 645.2 mm^2, 1 cubic foot = 0.0283 m^3, 1 pound per cubic foot = 16.02 kg/m^3.

a. Reentrant parts of protected members to be filled solidly.

b. Two layers of equal thickness with a $^3/_4$-inch airspace between.

c. For all of the construction with *gypsum wallboard* described in Table 721.1(1), gypsum base for veneer plaster of the same size, thickness and core type shall be permitted to be substituted for *gypsum wallboard*, provided that attachment is identical to that specified for the wallboard and the joints on the face layer are reinforced, and the entire surface is covered with not less than $^1/_{16}$-inch *gypsum veneer plaster*.

d. An *approved* adhesive qualified under ASTM E119 or UL 263.

e. Where lightweight or sand-lightweight concrete having an oven-dry weight of 110 pounds per cubic foot or less is used, the tabulated minimum cover shall be permitted to be reduced 25 percent, except that the reduced cover shall be not less than $^3/_4$ inch in slabs or 1 $^1/_2$ inches in beams or girders.

f. For solid slabs of *siliceous aggregate* concrete, increase tendon cover 20 percent.

g. Adequate provisions against spalling shall be provided by U-shaped or hooped stirrups spaced not to exceed the depth of the member with a clear cover of 1 inch.

h. Prestressed slabs shall have a thickness not less than that required in Table 721.1(3) for the respective fire-resistance time period.

i. Fire coverage and end anchorages shall be as follows: Cover to the prestressing steel at the anchor shall be $^1/_2$ inch greater than that required away from the anchor. Minimum cover to steel-bearing plate shall be 1 inch in beams and $^3/_4$ inch in slabs.

j. For beam widths between 8 inches and 12 inches, cover thickness shall be permitted to be determined by interpolation.

k. Interior spans of continuous slabs, beams and girders shall be permitted to be considered restrained.

l. For use with concrete slabs having a comparable fire endurance where members are framed into the *structure* in such a manner as to provide equivalent performance to that of monolithic concrete construction.

m. Generic fire-resistance ratings (those not designated as PROPRIETARY* in the listing) in GA-600 shall be accepted as if herein specified.

n. Additional insulating material is not required on the exposed outside face of the column flange to achieve a 1-hour fire-resistance rating.

Reason: This code change adds the word “steel” to item 7 thereby aligning with items 5 and 6. This code change clarifies the provisions are only applicable to concrete reinforced with steel and are not applicable to concrete reinforced with glass fiber renforced polymer (GFRP) reinforcement in concrete.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This code change only adds the word “steel” to items 3, 4 and 7 thereby aligning with items 5 and 6 and providing needed clarify now that GFRP reinforced concrete is permitted in the IBC

FS80-24

FS81-24

IBC: TABLE 721.1(1)

Proponents: Bonnie Manley, AISC, AISC (manley@aisc.org); Jon-Paul Cardin, The CFSteel Group, The CFSteel Group (jp@cfsteelgroup.org)

2024 International Building Code

Revise as follows:

TABLE 721.1(1) MINIMUM PROTECTION OF STRUCTURAL PARTS BASED ON TIME PERIODS FOR VARIOUS NONCOMBUSTIBLE INSULATING MATERIALS[m]

STRUCTURAL PARTS TO BE PROTECTED	ITEM NUMBER	INSULATING MATERIAL USED	MINIMUM THICKNESS OF INSULATING MATERIAL FOR THE FOLLOWING FIRE-RESISTANCE PERIODS (inches)			
			4 hours	3 hours	2 hours	1 hour
1. Steel columns and all of primary trusses	1-1.1	Carbonate, lightweight and sand-lightweight aggregate concrete, members 6" × 6" or greater (not including sandstone, granite and siliceous gravel).[a]	$2\frac{1}{2}$	2	$1\frac{1}{2}$	1
	1-1.2	Carbonate, lightweight and sand-lightweight aggregate concrete, members 8" × 8" or greater (not including sandstone, granite and siliceous gravel).[a]	2	$1\frac{1}{2}$	1	1
	1-1.3	Carbonate, lightweight and sand-lightweight aggregate concrete, members 12" × 12" or greater (not including sandstone, granite and siliceous gravel).[a]	$1\frac{1}{2}$	1	1	1
	1-1.4	Siliceous aggregate concrete and concrete excluded in Item 1-1.1, members 6" × 6" or greater.[a]	3	2	$1\frac{1}{2}$	1
	1-1.5	Siliceous aggregate concrete and concrete excluded in Item 1-1.1, members 8" × 8" or greater.[a]	$2\frac{1}{2}$	2	1	1
	1-1.6	Siliceous aggregate concrete and concrete excluded in Item 1-1.1, members 12" × 12" or greater.[a]	2	1	1	1
	1-2.1	Clay or shale brick with brick and mortar fill.[a]	$3\frac{3}{4}$	—	—	$2\frac{1}{4}$
	~~1-3.1~~	~~4" hollow clay tile in two 2" layers; $\frac{1}{2}$" mortar between tile and column; $\frac{3}{8}$" metal mesh 0.046" wire diameter in horizontal joints; tile fill.[a]~~	~~4~~	~~—~~	~~—~~	~~—~~
	~~1-3.2~~	~~2" hollow clay tile; $\frac{3}{4}$" mortar between tile and column; $\frac{3}{8}$" metal mesh 0.046" wire diameter in horizontal joints; limestone concrete fill[a]; plastered with $\frac{3}{4}$" gypsum plaster.~~	~~3~~	~~—~~	~~—~~	~~—~~
	~~1-3.3~~	~~2" hollow clay tile with outside wire ties 0.08" diameter at each course of tile or $\frac{3}{8}$" metal mesh 0.046" diameter wire in horizontal joints; limestone or trap-rock concrete fill[a] extending 1" outside column on all sides.~~	~~—~~	~~—~~	~~3~~	~~—~~
	~~1-3.4~~	~~2" hollow clay tile with outside wire ties 0.08" diameter at each course of tile with or without concrete fill; $\frac{3}{4}$" mortar between tile and column.~~	~~—~~	~~—~~	~~—~~	~~2~~
	1-4.1	Cement plaster over metal lath wire tied to $\frac{3}{4}$" cold-rolled vertical channels with 0.049" (No. 18 B.W. gage) wire ties spaced 3" to 6" on center. Plaster mixed 1: $2\frac{1}{2}$ by volume, cement to sand.	—	—	$2\frac{1}{2}$[b]	$\frac{7}{8}$
	1-5.1	Vermiculite concrete, 1:4 mix by volume over paper-backed wire fabric lath wrapped directly around column with additional 2" × 2" 0.065"/0.065" (No. 16/16 B.W. gage) wire fabric placed $\frac{3}{4}$" from outer concrete surface. Wire fabric tied with 0.049" (No. 18B.W. gage) wire spaced 6" on center for inner layer and 2" on center for outer layer.	2	—	—	—
	1-6.1	Perlite or vermiculite gypsum plaster over metal lath wrapped around column and furred $1\frac{1}{4}$" from column flanges. Sheets lapped at ends and tied at 6" intervals with 0.049" (No. 18 B.W. gage) tie wire. Plaster pushed through to flanges.	$1\frac{1}{2}$	1	—	—
	1-6.2	Perlite or vermiculite gypsum plaster over self-furring metal lath wrapped directly around column, lapped 1" and tied at 6" intervals with 0.049" (No. 18 B.W. gage) wire.	$1\frac{3}{4}$	$1\frac{3}{8}$	1	—
	1-6.3	Perlite or vermiculite gypsum plaster on metal lath applied to $\frac{3}{4}$" cold-rolled channels spaced 24" apart vertically and wrapped flatwise around column.	$1\frac{1}{2}$	—	—	—
	1-6.4	Perlite or vermiculite gypsum plaster over two layers of $\frac{1}{2}$" plain full-length gypsum lath applied tight to column flanges. Lath wrapped with 1" hexagonal mesh of No. 20-gage wire and tied with doubled 0.035" diameter (No. 18 B.W. gage) wire ties spaced 23" on center. For three-coat work, the plaster mix for the second coat shall not exceed 100 pounds of gypsum to $2\frac{1}{2}$ cubic feet of aggregate for the 3-hour system.	$2\frac{1}{2}$	2	—	—
	1-6.5	Perlite or vermiculite gypsum plaster over one layer of $\frac{1}{2}$" plain full-length gypsum lath applied tight to column flanges. Lath tied with doubled 0.049" (No. 18 B.W. gage) wire ties spaced 23" on center and scratch coat wrapped with 1" hexagonal mesh 0.035" (No. 20 B.W. gage) wire fabric. For three-coat work, the plaster mix for the second coat shall not exceed 100 pounds of gypsum to $2\frac{1}{2}$ cubic feet of aggregate.	—	2	—	—
	1-7.1	Multiple layers of $\frac{1}{2}$" gypsum wallboard[c] adhesively[d] secured to column flanges and successive layers. Wallboard applied without horizontal joints. Corner edges of each layer staggered. Wallboard layer below outer layer secured to column with doubled 0.049" (No. 18 B.W. gage) steel wire ties spaced 15" on center. Exposed corners taped and treated.	—	—	2	1
	1-7.2	Three layers of $\frac{5}{8}$" Type X gypsum wallboard.[c] First and second layer held in place by $\frac{1}{8}$" diameter by $1\frac{3}{8}$" long ring shank nails with $\frac{5}{16}$" diameter heads spaced 24" on center at corners. Middle layer also secured with metal straps at mid-height and 18" from each end, and by metal corner bead at each corner held by the metal straps. Third layer attached to corner bead with 1" long gypsum wallboard screws spaced 12" on center.	—	—	$1\frac{7}{8}$	—
	1-7.3	Three layers of $\frac{5}{8}$" Type X gypsum wallboard,[c] each layer screw attached to $1\frac{5}{8}$" steel studs 0.018" thick (No. 25 carbon sheet steel gage) at each corner of column. Middle layer also secured with 0.049" (No. 18 B.W. gage) double-strand steel wire ties, 24" on center. Screws are No. 6 by 1" spaced 24" on center for inner layer, No. 6 by $1\frac{5}{8}$" spaced 12" on center for middle layer and No. 8 by $2\frac{1}{4}$" spaced 12" on center for outer layer.	—	$1\frac{7}{8}$	—	—
	~~1-8.1~~	~~Wood-fibered gypsum plaster mixed 1:1 by weight gypsum-to-sand aggregate applied over metal lath. Lath lapped 1" and tied 6" on center at all end, edges and spacers with 0.049" (No. 18 B.W. gage) steel tie wires. Lath applied over $\frac{1}{2}$" spacers made of $\frac{3}{4}$" furring channel with 2" legs bent around each corner. Spacers located 1" from top and bottom of member and not greater than 40" on center and wire tied with a single strand of 0.049" (No. 18 B.W. gage) steel tie wires. Corner bead tied to the lath at 6" on center along each corner to provide plaster thickness.~~	~~—~~	~~—~~	~~$1\frac{5}{8}$~~	~~—~~
	1-9.1	Minimum W8x35 wide flange steel column (w/d ≥ 0.75) with each web cavity filled even with the flange tip with normal weight carbonate or siliceous aggregate concrete (3,000 psi minimum compressive strength with 145 pcf ± 3 pcf unit weight). Reinforce the concrete in each web cavity with a minimum No. 4 deformed reinforcing bar installed vertically and centered in the cavity, and secured to the column web with a minimum No. 2 horizontal deformed reinforcing bar welded to the web every 18" on center vertically. As an alternative to the No. 4 rebar, $\frac{3}{4}$" diameter by 3" long headed studs, spaced at 12" on center vertically, shall be welded on each side of the web mid-way between the column flanges.	—	—	—	See Note n
2. Webs or flanges of steel	2-1.1	Carbonate, lightweight and sand-lightweight aggregate concrete (not including sandstone, granite and siliceous gravel) with 3" or finer metal mesh placed 1" from the finished surface anchored to the top flange and providing not less than 0.025 square inch of steel area per foot in each direction.	2	$1\frac{1}{2}$	1	1

STRUCTURAL PARTS TO BE PROTECTED	ITEM NUMBER	INSULATING MATERIAL USED	MINIMUM THICKNESS OF INSULATING MATERIAL FOR THE FOLLOWING FIRE-RESISTANCE PERIODS (inches) 4 hours	3 hours	2 hours	1 hour
beams and girders	2-1.2	Siliceous aggregate concrete and concrete excluded in Item 2-1.1 with 3" or finer metal mesh placed 1" from the finished surface anchored to the top flange and providing not less than 0.025 square inch of steel area per foot in each direction.	2 1/2	2	1 1/2	1
	2-2.1	Cement plaster on metal lath attached to 3/4" cold-rolled channels with 0.04" (No. 18 B.W. gage) wire ties spaced 3" to 6" on center. Plaster mixed 1: 2 1/2 by volume, cement to sand.	—	—	2 1/2[b]	7/8
	2-3.1	Vermiculite gypsum plaster on a metal lath cage, wire tied to 0.165" diameter (No. 8 B.W. gage) steel wire hangers wrapped around beam and spaced 16" on center. Metal lath ties spaced approximately 5" on center at cage sides and bottom.	—	7/8	—	—
	2-4.1	Two layers of 5/8" Type X gypsum wallboard[c] are attached to U-shaped brackets spaced 24" on center. 0.018" thick (No. 25 carbon sheet steel gage) 1 5/8" deep by 1" galvanized steel runner channels are first installed parallel to and on each side of the top beam flange to provide a 1/2" clearance to the flange. The channel runners are attached to steel deck or concrete floor construction with approved fasteners spaced 12" on center. U-shaped brackets are formed from members identical to the channel runners. At the bent portion of the U-shaped bracket, the flanges of the channel are cut out so that 1 5/8"-deep corner channels can be inserted without attachment parallel to each side of the lower flange. As an alternative, 0.021" thick (No. 24 carbon sheet steel gage) 1" × 2" runner and corner angles shall be used in lieu of channels, and the web cutouts in the U-shaped brackets shall not be required. Each angle is attached to the bracket with 1/2"-long No. 8 self-drilling screws. The vertical legs of the U-shaped bracket are attached to the runners with one 1/2"-long No. 8 self-drilling screw. The completed steel framing provides a 2 1/8" and 1 1/2" space between the inner layer of wallboard and the sides and bottom of the steel beam, respectively. The inner layer of wallboard is attached to the top runners and bottom corner channels or corner angles with 1 1/4"-long No. 6 self-drilling screws spaced 16" on center. The outer layer of wallboard is applied with 1 3/4"-long No. 6 self-drilling screws spaced 8" on center. The bottom corners are reinforced with metal corner beads.	—	—	1 1/4	—
	2-4.2	Three layers of 5/8" Type X gypsum wallboard[c] attached to a steel suspension system as described immediately above utilizing the 0.018" thick (No. 25 carbon sheet steel gage) 1" × 2" lower corner angles. The framing is located so that a 2 1/8" and 2" space is provided between the inner layer of wallboard and the sides and bottom of the beam, respectively. The first two layers of wallboard are attached as described immediately above. A layer of 0.035" thick (No. 20 B.W. gage) 1" hexagonal galvanized wire mesh is applied under the soffit of the middle layer and up the sides approximately 2". The mesh is held in position with the No. 6 1 5/8"-long screws installed in the vertical leg of the bottom corner angles. The outer layer of wallboard is attached with No. 6 2 1/4"-long screws spaced 8" on center. One screw is installed at the mid-depth of the bracket in each layer. Bottom corners are finished as described above.	—	1 7/8	—	—
3. Bonded pretensioned reinforcement in prestressed concrete[e]	3-1.1	Carbonate, lightweight, sand-lightweight and siliceous[f] aggregate concrete				
		Beams or girders	4[g]	3[g]	2 1/2	1 1/2
		Solid[h]	2	1 1/2	1	
4. Bonded or unbonded post-tensioned tendons in prestressed concrete[e, i]	4-1.1	Carbonate, lightweight, sand-lightweight and siliceous[f] aggregate concrete Unrestrained members:				
		Solid slabs[h]	—	2	1 1/2	—
		Beams and girders[j]				
		8" wide	4 1/2	2 1/2	1 3/4	
		greater than 12" wide	3	2 1/2	2	1 1/2
	4-1.2	Carbonate, lightweight, sand-lightweight and siliceous aggregate Restrained members:[k]				
		Solid slabs[h]	1 1/4	1	3/4	—
		Beams and girders[j]				
		8" wide	2 1/2	2	1 3/4	—
		greater than 12" wide	2	1 3/4	1 1/2	—
5. Reinforcing steel in reinforced concrete columns, beams girders and trusses	5-1.1	Carbonate, lightweight and sand-lightweight aggregate concrete, members 12" or larger, square or round. (Size limit does not apply to beams and girders monolithic with floors.)	1 1/2	1 1/2	1 1/2	1 1/2
		Siliceous aggregate concrete, members 12" or larger, square or round. (Size limit does not apply to beams and girders monolithic with floors.)	2	1 1/2	1 1/2	1 1/2
6. Reinforcing steel in reinforced concrete joists[l]	6-1.1	Carbonate, lightweight and sand-lightweight aggregate concrete	1 1/4	1 1/4	1	3/4
	6-1.2	Siliceous aggregate concrete	1 3/4	1 1/2	1	3/4
7. Reinforcing and tie rods in floor and roof slabs[l]	7-1.1	Carbonate, lightweight and sand-lightweight aggregate concrete	1	1	3/4	3/4
	7-1.2	Siliceous aggregate concrete	1 1/4	1	1	3/4

For SI: 1 inch = 25.4 mm, 1 square inch = 645.2 mm^2, 1 cubic foot = 0.0283 m^3, 1 pound per cubic foot = 16.02 kg/m^3.

a. Reentrant parts of protected members to be filled solidly.

b. Two layers of equal thickness with a 3/4-inch airspace between.

c. For all of the construction with *gypsum wallboard* described in Table 721.1(1), gypsum base for veneer plaster of the same size, thickness and core type shall be permitted to be substituted for *gypsum wallboard*, provided that attachment is identical to that specified for the wallboard and the joints on the face layer are reinforced, and the entire surface is covered with not less than $^{1}/_{16}$-inch *gypsum veneer plaster*.

d. An *approved* adhesive qualified under ASTM E119 or UL 263.

e. Where lightweight or sand-lightweight concrete having an oven-dry weight of 110 pounds per cubic foot or less is used, the tabulated minimum cover shall be permitted to be reduced 25 percent, except that the reduced cover shall be not less than $^{3}/_{4}$ inch in slabs or $1^{1}/_{2}$ inches in beams or girders.

f. For solid slabs of *siliceous aggregate* concrete, increase tendon cover 20 percent.

g. Adequate provisions against spalling shall be provided by U-shaped or hooped stirrups spaced not to exceed the depth of the member with a clear cover of 1 inch.

h. Prestressed slabs shall have a thickness not less than that required in Table 721.1(3) for the respective fire-resistance time period.

i. Fire coverage and end anchorages shall be as follows: Cover to the prestressing steel at the anchor shall be $^{1}/_{2}$ inch greater than that required away from the anchor. Minimum cover to steel-bearing plate shall be 1 inch in beams and $^{3}/_{4}$ inch in slabs.

j. For beam widths between 8 inches and 12 inches, cover thickness shall be permitted to be determined by interpolation.

k. Interior spans of continuous slabs, beams and girders shall be permitted to be considered restrained.

l. For use with concrete slabs having a comparable fire endurance where members are framed into the *structure* in such a manner as to provide equivalent performance to that of monolithic concrete construction.

m. Generic fire-resistance ratings (those not designated as PROPRIETARY* in the listing) in GA-600 shall be accepted as if herein specified.

n. Additional insulating material is not required on the exposed outside face of the column flange to achieve a 1-hour fire-resistance rating.

Reason: This proposal is one of three that fully update Chapter 7 provisions of the IBC to reflect current structural steel industry standards. The 2024 edition of the IBC has already adopted the 2022 edition of AISC 360, *Specification for Structural Steel Buildings*, in Chapter 35 and elsewhere (Sections 722.5.2.2.1, 1604.3.3, 1705.2.1, 2202.1, and 2202.2.1.1). The purpose of this proposal is to delete five archaic systems that are no longer included for new building applications in AISC 360-22's mandatory Appendix 4, Structural Design for Fire Conditions, (specifically Appendix 4, Section 4.3). These entries have been retained in AISC 360 Appendix 4 commentary for historical purposes.

AISC makes its standards available to all free of charge. AISC 360-22 can be downloaded for free from https://www.aisc.org/publications/steel-standards/.

Bibliography: AISC (2022), *Specification for Structural Steel Buildings*, ANSI/AISC 360-22, American Institute of Steel Construction, Chicago, Ill., August 1, 2022.
Available at: https://www.aisc.org/publications/steel-standards/.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal clarifies the application of a standard already adopted in the 2024 IBC.

FS81-24

FS82-24

IBC: TABLE 721.1(2), AWC Chapter 35 (New)

Proponents: Edward Lisinski, American Wood Council (elisinski@awc.org)

2024 International Building Code

Revise as follows:

TABLE 721.1(2) RATED FIRE-RESISTANCE PERIODS FOR VARIOUS WALLS AND PARTITIONS[a, o, p, r]
Portions of table not shown remain unchanged.

–

For SI: 1 inch = 25.4 mm, 1 square inch = 645.2 mm^2, 1 cubic foot = 0.0283 m^3.

a. Staples with equivalent holding power and penetration shall be permitted to be used as alternate fasteners to nails for attachment to wood framing.

b. Thickness shown for brick and clay tile is nominal thicknesses unless plastered, in which case thicknesses are net. Thickness shown for concrete masonry and clay masonry is equivalent thickness defined in Section 722.3.1 for concrete masonry and Section 722.4.1.1 for clay masonry. Where all cells are solid grouted or filled with silicone-treated perlite loose-fill insulation; vermiculite loose-fill insulation; or expanded clay, shale or slate lightweight aggregate, the equivalent thickness shall be the thickness of the block or brick using specified dimensions as defined in Chapter 21. Equivalent thickness shall include the thickness of applied plaster and lath or gypsum wallboard, where specified.

c. For units in which the net cross-sectional area of cored brick in any plane parallel to the surface containing the cores is not less than 75 percent of the gross cross-sectional area measured in the same plane.

d. Shall be used for nonbearing purposes only.

e. For all of the construction with gypsum wallboard described in this table, gypsum base for veneer plaster of the same size, thickness and core type shall be permitted to be substituted for gypsum wallboard, provided that attachment is identical to that specified for the wallboard, and the joints on the face layer are reinforced and the entire surface is covered with not less than $^1/_{16}$-inch gypsum veneer plaster.

f. The fire-resistance time period for concrete masonry units meeting the equivalent thicknesses required for a 2-hour fire-resistance rating in Item 3, and having a thickness of not less than 7 $^5/_8$ inches is 4 hours where cores that are not grouted are filled with silicone-treated perlite loose-fill insulation; vermiculite loose-fill insulation; or expanded clay, shale or slate lightweight aggregate, sand or slag having a maximum particle size of $^3/_8$ inch.

g. The fire-resistance rating of concrete masonry units composed of a combination of aggregate types or where plaster is applied directly to the concrete masonry shall be determined in accordance with ACI 216.1/TMS 216. Lightweight aggregates shall have a maximum combined density of 65 pounds per cubic foot.

h. See Note b. The equivalent thickness shall be permitted to include the thickness of cement plaster or 1.5 times the thickness of gypsum plaster applied in accordance with the requirements of Chapter 25.

i. Concrete walls shall be reinforced with horizontal and vertical temperature reinforcement as required by Chapter 19.

j. Studs are welded truss wire studs with 0.18 inch (No. 7 B.W. gage) flange wire and 0.18 inch (No. 7 B.W. gage) truss wires.

k. Nailable metal studs consist of two channel studs spot welded back to back with a crimped web forming a nailing groove.

l. Wood structural panels shall be permitted to be installed between the fire protection and the wood studs on either the interior or exterior side of the wood frame assemblies in this table, provided that the length of the fasteners used to attach the fire protection is increased by an amount not less than the thickness of the wood structural panel.

m. For studs with a slenderness ratio, l_e/d, greater than 33, the design stress shall be reduced to 78 percent of allowable F'_c. For studs with a slenderness ratio, l_e/d, not exceeding 33, the design stress shall be reduced to 78 percent of the adjusted stress F'_c calculated for studs having a slenderness ratio l_e/d of 33.

n. For properties of cooler or wallboard nails, see ASTM C514, ASTM C547 or ASTM F1667.

o. Generic fire-resistance ratings (those not designated as PROPRIETARY* in the listing) in the GA-600 shall be accepted as if herein specified.

p. NCMA TEK 5-8A shall be permitted for the design of fire walls.

q. The studs in this assembly can be designed without fire-related capacity reductions.

r. Fire-resistance-rated assemblies, as prescribed in the ANSI/AWC FDS, shall be permitted.

Add new standard(s) as follows:

AWC

American Wood Council
222 Catoctin Circle SE, Suite 201
Leesburg, VA 20175

ANSI/AWC FDS-2024: Fire Design Specification (FDS) for Wood Construction

Staff Analysis: A review of the standard proposed for inclusion in the code, ANSI/AWC FDS-2024 Fire Design Specification (FDS) for Wood Construction, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: This proposal adds reference to ANSI/AWC *2024 Fire Design Specification (FDS) for Wood Construction* in footnote "r" for tested fire-resistance-rated assemblies in the FDS and adds it as a reference standard. There is significant overlap between FDS and Table 721.1(2), however additional tested assemblies are provided in FDS Section 3.8. For cases where there is overlap, reference to the FDS provides additional construction details and figures. The use of a reference to provide additional tested fire-resistance-rated assemblies in the FDS in footnote "r" is consistent with the existing reference to GA-600 in footnote "o".

The FDS was developed as an American National Standard through the AWC ANSI-approved consensus standards development process, and is available on the AWC website at the following location: https://awc.org/wp-content/uploads/2023/11/AWC_FDS2024_20231103_AWCWEBSITE.pdf

Bibliography: ANSI/AWC *2024 Fire Design Specification (FDS) for Wood Construction.* View this document online: https://awc.org/wp-content/uploads/2023/11/AWC_FDS2024_20231103_AWCWEBSITE.pdf

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0

Estimated Immediate Cost Impact Justification (methodology and variables):

The proposal provides a reference to the FDS, which contains detailed requirements for tested fire-resistance-rated assembles to facilitate proper use and additional tested assemblies not appearing in Table 721.1(2) to provide more options to meet fire-resistance requirements. The inclusion of this additional option does not in and of itself increase or decrease the overall cost impact of the code, because this option may or may not be chosen. The existing options are still relevant, and if chosen, have no cost impact on the actual code requirements.

FS82-24

FS83-24

IBC: TABLE 721.1(3), AWC Chapter 35 (New)

Proponents: Edward Lisinski, American Wood Council (elisinski@awc.org)

2024 International Building Code

Revise as follows:

TABLE 721.1(3) MINIMUM PROTECTION FOR FLOOR AND ROOF SYSTEMS [a, q, r]

Portions of table not shown remain unchanged.

_

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound = 0.454 kg, 1 cubic foot = 0.0283 m^3,

1 pound per square inch = 6.895 kPa, 1 pound per linear foot = 1.4882 kg/m.

a. Staples with equivalent holding power and penetration shall be permitted to be used as alternate fasteners to nails for attachment to wood framing.

b. Where the slab is in an unrestrained condition, minimum reinforcement cover shall be not less than $1^5/_8$ inches for 4 hours (siliceous aggregate only); $1^1/_4$ inches for 4 and 3 hours; 1 inch for 2 hours (siliceous aggregate only); and $^3/_4$ inch for all other restrained and unrestrained conditions.

c. For all of the construction with gypsum wallboard described in this table, gypsum base for veneer plaster of the same size, thickness and core type shall be permitted to be substituted for gypsum wallboard, provided that attachment is identical to that specified for the wallboard, and the joints on the face layer are reinforced and the entire surface is covered with not less than $^1/_{16}$-inch gypsum veneer plaster.

d. Slab thickness over steel joists measured at the joists for metal lath form and at the top of the form for steel form units.

e. (a) The maximum allowable stress level for H-Series joists shall not exceed 22,000 psi.

   (b) The allowable stress for K-Series joists shall not exceed 26,000 psi, the nominal depth of such joist shall be not less than 10 inches and the nominal joist weight shall be not less than 5 pounds per linear foot.

f. Cement plaster with 15 pounds of hydrated lime and 3 pounds of approved additives or admixtures per bag of cement.

g. Gypsum wallboard ceilings attached to steel framing shall be permitted to be suspended with $1^1/_2$-inch cold-formed carrying channels spaced 48 inches on center, that are suspended with No. 8 SWG galvanized wire hangers spaced 48 inches on center. Cross-furring channels are tied to the carrying channels with No. 18 SWG galvanized wire hangers spaced 48 inches on center. Cross-furring channels are tied to the carrying channels with No. 18 SWG galvanized wire (double strand) and spaced as required for direct attachment to the framing. This alternative is applicable to those steel framing assemblies recognized under Note q.

h. Six-inch hollow clay tile with 2-inch concrete slab above.

i. Four-inch hollow clay tile with $1\ ^1/_2$-inch concrete slab above.

j. Thickness measured to bottom of steel form units.

k. Five-eighths inch of vermiculite gypsum plaster plus $^1/_2$ inch of approved vermiculite acoustical plastic.

l. Furring channels spaced 12 inches on center.

m. Double wood floor shall be permitted to be either of the following:

(a) Subfloor of 1-inch nominal boarding, a layer of asbestos paper weighing not less than 14 pounds per 100 square feet and a layer of 1-inch nominal tongue-and-groove finished flooring.

(b) Subfloor of 1-inch nominal tongue-and-groove boarding or $^{15}/_{32}$-inch wood structural panels with exterior glue and a layer of 1-inch nominal tongue-and-groove finished flooring or $^{19}/_{32}$-inch wood structural panel finish flooring or a layer of Type I Grade M-1 particleboard not less than $^{5}/_{8}$-inch thick.

n. The ceiling shall be permitted to be omitted over unusable space, and flooring shall be permitted to be omitted where unusable space occurs above.

o. For properties of cooler or wallboard nails, see ASTM C514, ASTM C547 or ASTM F1667.

p. Thickness measured on top of steel deck unit.

q. Generic fire-resistance ratings (those not designated as PROPRIETARY* in the listing) in the GA-600 shall be accepted as if herein specified.

r. Fire-resistance-rated assemblies, as prescribed in the ANSI/AWC FDS, shall be permitted.

Add new standard(s) as follows:

AWC

American Wood Council
222 Catoctin Circle SE, Suite 201
Leesburg, VA 20175

ANSI/AWC FDS-2024: Fire Design Specification (FDS) for Wood Construction

Staff Analysis: A review of the standard proposed for inclusion in the code, ANSI/AWC FDS-2024 Fire Design Specification (FDS) for Wood Construction, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: This proposal adds reference to ANSI/AWC 2024 *Fire Design Specification (FDS) for Wood Construction* in footnote “r” for tested fire-resistance-rated assemblies in the FDS and adds it as a reference standard. There is significant overlap between FDS and Table 721.1(3), however additional tested assemblies are provided in FDS Section 3.8. For cases where there is overlap, reference to the FDS provides additional construction details and figures. The use of a reference to provide additional tested fire-resistance rated assemblies in the FDS in footnote "r" is consistent with the existing reference to GA-600 in footnote "q".

The FDS was developed as an American National Standard through the AWC ANSI-approved consensus standards development process, and is available on the AWC website at the following location: https://awc.org/wp-content/uploads/2023/11/AWC_FDS2024_20231103_AWCWEBSITE.pdf

Bibliography: ANSI/AWC *2024 Fire Design Specification (FDS) for Wood Construction.* View this document online: https://awc.org/wp-content/uploads/2023/11/AWC_FDS2024_20231103_AWCWEBSITE.pdf

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0

Estimated Immediate Cost Impact Justification (methodology and variables):

The proposal provides a reference to the FDS, which contains detailed requirements for tested fire-resistance-rated assembles to facilitate proper use and additional tested assemblies not appearing in Table 721.1(3) to provide more options to meet fire-resistance requirements. The inclusion of this additional option does not in and of itself increase or decrease the overall cost impact of the code, because this option may or may not be chosen. The existing options are still relevant, and if chosen, have no cost impact on the actual code requirements.

FS84-24

IBC: 721.1, 721.1.1 (New), 721.1.2 (New)

Proponents: Stephen Szoke, American Concrete Institute, American Concrete Institute (steve.szoke@concrete.org); Shamim Rashid-Sumar, National Ready Mixed Concrete Association, National Ready Mixed Concrete Association (ssumar@nrmca.org); Nicholas Lang, Concrete Masonry & Hardscapes Association, Masonry Alliance for Codes & Standards (nlang@ncma.org)

2024 International Building Code

Revise as follows:

721.1 General.
The provisions of this section contain prescriptive details of fire-resistance-rated *building elements*, components or assemblies. The materials of construction specified in Tables 721.1(1), 721.1(2) and 721.1(3) shall be assumed to have the *fire-resistance ratings* prescribed therein. Where materials that change the capacity for heat dissipation are incorporated into a fire-resistance-rated assembly, fire test results or other substantiating data shall be made available to the *building official* to show that the required *fire-resistance-rating* time period is not reduced.

Add new text as follows:

721.1.1 Concrete. Prescriptive details of fire resistance-rated concrete building components shall comply with Section 721.1, ACI/TMS 216.1, or PCI 124.

721.1.2 Masonry. Prescriptive details of fire resistance-rated masonry building components shall comply with Section 721.1 or ACI/TMS 216.1.

Reason: This change adds the prescriptive fire resistance ratings for concrete and masonry assemblies compliant with ACI/TMS 216.1 Code Requirements for Determining the Fire Resistance Rating of Concrete and Masonry Construction Assemblies. ACI/TMS 216.1 provides prescriptive requirements for fire resistance-rated concrete and masonry and thus, is a viable alternative compliance path for Section 721. ACI/TMS 216.1 is already referenced in Section 722 Calculated Fire Resistance. The prescriptive requirements are in addition to those of Section 721.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

No technical changes. Proposal cites an existing referenced standard that provides additional prescriptive options.

FS84-24

FS85-24

IBC: SECTION 722, 722.1

Proponents: Bonnie Manley, AISC, AISC (manley@aisc.org); Jon-Paul Cardin, The CFSteel Group, The CFSteel Group (jp@cfsteelgroup.org)

2024 International Building Code

SECTION 722
CALCULATED FIRE RESISTANCE

Revise as follows:

722.1 General.
The provisions of this section contain procedures by which the *fire resistance* of specific materials or combinations of materials is established by calculations. These procedures apply only to the information contained in this section and shall not be otherwise used. The calculated *fire resistance* of specific materials or combinations of materials shall be established by one of the following:

1. *Concrete,*concrete *masonry* and clay*masonry* assemblies shall be permitted in accordance with ACI 216.1/TMS 0216.
2. Precast and precast, prestressed *concrete* assemblies shall be permitted in accordance with PCI 124.
3. Steel assemblies and composite steel and concrete assemblies shall be permitted in accordance with AISC 360 Appendix 4, Section 4.3~~Chapter 5 of ASCE 29~~.
4. Exposed wood members and wood decking shall be permitted in accordance with Chapter 16 of ANSI/AWC NDS.

Reason: This proposal is one of three that fully update Chapter 7 provisions of the IBC to reflect current structural steel industry standards. The 2024 edition of the IBC has already adopted the 2022 edition of AISC 360, *Specification for Structural Steel Buildings*, in Chapter 35 and elsewhere (Sections 722.5.2.2.1, 1604.3.3, 1705.2.1, 2202.1, and 2202.2.1.1). The purpose of this proposal is to update the methodology for the calculation of fire resistance for structural steel assemblies to recognize the applicable portion of AISC 360-22's mandatory Appendix 4, Structural Design for Fire Conditions (specifically Appendix 4, Section 4.3). The proposal also expands the reference to include composite steel and concrete assemblies, which are newly added in the 2022 edition of AISC 360, Appendix 4, Section 4.3.

Since the 2003 edition, the IBC has included ASCE 29, *Standard Calculation Methods for Structural Fire Protection,* as the only means to calculate the fire resistance of steel assemblies. The first edition of ASCE 29 referenced in the 2003 IBC was the 1999 edition; today, the 2024 IBC references the 2005 edition (although the 11/1/23 IBC-24 errata notes a 2017 edition; however, it is not available on the ASCE website for purchase as of 1/8/24). Since the 2006 edition of the IBC, the IBC has mandated AISC 360 as the basis for the design, fabrication, and erection of structural steel buildings. The first edition of AISC 360 referenced in the 2006 IBC was the 2005 edition, and today, the 2024 IBC references the 2022 edition.

In 2005, the committee charged with the development of AISC 360 created a new AISC 360 Appendix 4, Section 4.3 to provide calculation methods for establishing fire-resistance ratings of steel assemblies that would otherwise be determined by standard testing. AISC 360-05, Appendix 4, Section 4.3 also included a direct reference to the ASCE 29-05 calculation procedures for determining the fire-resistance ratings of steel assemblies. While intervening editions of AISC 360 Appendix 4, Section 4.3 have included this reference to ASCE 29-05, for the 2022 edition of AISC 360, the committee chose to extract the applicable calculation procedures directly from ASCE 29-05 and combine them with newly developed provisions. So, the 2024 IBC now effectively includes references to two (2) documents containing the same material on the prescriptive calculation of fire resistance for steel assemblies. However, while ASCE 29 has remained static, the methodology now found in Appendix 4, Section 4.3 of AISC 360-22 has been enhanced to reflect the latest requirements based on research, analysis, and testing. By deleting the direct reference to ASCE 29 and, instead, referencing AISC 360, this proposal streamlines the IBC by citing only one (1) document with the most complete and up-to-date provisions for determining the fire resistance of steel assemblies and composite steel and concrete assemblies.

AISC makes its standards available to all free of charge. AISC 360-22 can be downloaded for free from https://www.aisc.org/publications/steel-standards/. Please refer to the full AISC 360-22 commentary for technical background and guidance on applying the provisions.

From the AISC-360 Commentary on Appendix 4, Section 4.3: “The primary source of accepted fire-resistance calculations for structural steel has been AISI and its ASTM E119 fire research conducted throughout the 1970s and 1980s. These industry-sponsored developments were originally captured in three AISI design guide publications (AISI, 1980, 1981, 1984), which were subsequently included in the preceding and current editions of Section 5 of SEI/ASCE/SFPE Standard 29, Standard Calculation Methods for Structural Fire Protection (ASCE, 2005) and in the U.S. model building codes. More recently, all of this information was summarized and well illustrated in AISC Design Guide 19. The standard fire protection and fire-resistance calculation methods for structural steel have now also been consistently transferred into the current National Fire Protection Association (NFPA) and International Code Council (ICC) model building codes. The inclusion of provisions for fire-resistance calculations in this Specification was motivated by AISC’s and the steel industry’s interest in duly maintaining this important content and contributing to its future progress. In this manner, AISC desires to parallel the development of prescriptive fire-resistive criteria for the concrete, masonry, and timber industries that are embodied in separate standards authored by the respective committees.”

Bibliography: AISC (2022), *Specification for Structural Steel Buildings*, ANSI/AISC 360-22, American Institute of Steel Construction, Chicago, Ill., August 1, 2022.

Available at: https://www.aisc.org/publications/steel-standards/.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal the application of a standard already adopted in the 2024 IBC.

FS85-24

FS86-24

IBC: 722.1

Proponents: Stephen Szoke, American Concrete Institute, American Concrete Institute (steve.szoke@concrete.org); Shamim Rashid-Sumar, National Ready Mixed Concrete Association, National Ready Mixed Concrete Association (ssumar@nrmca.org); Nicholas Lang, Concrete Masonry & Hardscapes Association, Representing Masonry Alliance for Codes and Standards, Masonry Alliance for Codes & Standards (nlang@ncma.org)

2024 International Building Code

Revise as follows:

722.1 General.
The provisions of this section contain procedures by which the *fire resistance* of specific materials or combinations of materials is established by calculations. These procedures apply only to the information contained in this section and shall not be otherwise used. The calculated *fire resistance* of specific materials or combinations of materials shall be established by one of the following:

1. *Concrete,*concrete *masonry* and clay*masonry* assemblies shall be permitted in accordance with ACI 216.1/TMS 0216.
2. Precast and precast, prestressed *concrete* assemblies shall be permitted in accordance with PCI 124.
3. Steel assemblies shall be permitted in accordance with Chapter 5 of ASCE 29.
4. Exposed wood members and wood decking shall be permitted in accordance with Chapter 16 of ANSI/AWC NDS.
5. <u>Steel columns protected with concrete or masonry and hollow steel tubes filled with concrete shall be permitted in accordance with ACI/TMS 216.1</u>

Reason: This code change proposal adds ACI/TMS 216.1 as a compliance path for structural steel columns protected with concrete or masonry and hollow structural steel columns filled with concrete. ACI/TMS 216.1 continues to provide the methods to provide fire protection for structural steel columns using concrete or masonry and fire resistance ratings for hollow steel columns filled with concrete. This adds an alternative to ASCE 29 as an additional resource for determining compliance.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This changes does not increase cost as it provides an alternative compliance method to those already permitted in the code.

FS86-24

FS87-24

IBC: 722.1

Proponents: Stephen Szoke, American Concrete Institute, American Concrete Institute (steve.szoke@concrete.org); Shamim Rashid-Sumar, National Ready Mixed Concrete Association, National Ready Mixed Concrete Association (ssumar@nrmca.org)

2024 International Building Code

Revise as follows:

722.1 General.
The provisions of this section contain procedures by which the *fire resistance* of specific materials or combinations of materials is established by calculations. These procedures apply only to the information contained in this section and shall not be otherwise used. The calculated *fire resistance* of specific materials or combinations of materials shall be established by one of the following:

1. *Concrete,*concrete *masonry* and clay*masonry* assemblies shall be permitted in accordance with ACI 216.1/TMS 0216.
2. Precast and precast, prestressed *concrete* assemblies shall be permitted in accordance with PCI 124 <u>or ACI/TMS 216.1</u>.
3. Steel assemblies shall be permitted in accordance with Chapter 5 of ASCE 29.
4. Exposed wood members and wood decking shall be permitted in accordance with Chapter 16 of ANSI/AWC NDS.

Reason: This proposal clarifies that ACI/TMS 216.1 is a appropriate for determining the fire resistance ratings of precast, prestressed concrete assemblies. Item 1, does not distinguish between prestressed and non-prestressed assemblies and both are covered in ACI/TMS 216.1. By reading Item 2 as currently written implies that only compliance with PCI 124 is acceptable precast, prestressed concrete assemblies. Prior to the addition of PCI 124 to the IBC, the user was directed to ACI/TMS 216.1 for all concrete assemblies including precast, prestressed concrete. This change provides clarity that ACI/TMS 216.1 remains an appropriate compliance path for precast, prestressed concrete assemblies.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

No technical change, simply clarifies that ACI/TMS 216.1 remains applicable for precast, prestressed concrete, per Item 1

FS87-24

FS88-24

IBC: 722.1, AWC Chapter 35 (New)

Proponents: Edward Lisinski, American Wood Council (elisinski@awc.org)

2024 International Building Code

Revise as follows:

722.1 General.
The provisions of this section contain procedures by which the *fire resistance* of specific materials or combinations of materials is established by calculations. These procedures apply only to the information contained in this section and shall not be otherwise used. The calculated *fire resistance* of specific materials or combinations of materials shall be established by one of the following:

1. *Concrete,*concrete *masonry* and clay*masonry* assemblies shall be permitted in accordance with ACI 216.1/TMS 0216.
2. Precast and precast, prestressed *concrete* assemblies shall be permitted in accordance with PCI 124.
3. Steel assemblies shall be permitted in accordance with Chapter 5 of ASCE 29.
4. Exposed wood members and wood decking shall be permitted in accordance with Chapter 16 of ANSI/AWC NDS.
5. <u>Wood members and assemblies shall be permitted in accordance with ANSI/AWC FDS.</u>

Add new standard(s) as follows:

AWC

American Wood Council
222 Catoctin Circle SE, Suite 201
Leesburg, VA 20175

<u>ANSI/AWC FDS-2024:</u> <u>Fire Design Specification (FDS) for Wood Construction</u>

Staff Analysis: A review of the standard proposed for inclusion in the code, ANSI/AWC FDS-2024 Fire Design Specification (FDS) for Wood Construction, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: A reference is added in Section 722.1 to the ANSI/AWC *2024 Fire Design Specification (FDS) for Wood Construction*, which includes provisions for fire design of wood members (both protected and unprotected), wood assemblies including calculation of structural fire resistance, thermal separation and burn-through prevention, and protection of connections that are not addressed in the AWC 2024 *National Design Specification (NDS) for Wood Construction* (ANSI/AWC NDS-2024).

The FDS was developed as an American National Standard through the AWC ANSI-approved consensus standards development process, and is available on the AWC website at the following location: https://awc.org/wp-content/uploads/2023/11/AWC_FDS2024_20231103_AWCWEBSITE.pdf

Bibliography: ANSI/AWC *2024 Fire Design Specification (FDS) for Wood Construction.* View this document online: https://awc.org/wp-content/uploads/2023/11/AWC_FDS2024_20231103_AWCWEBSITE.pdf

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0

Estimated Immediate Cost Impact Justification (methodology and variables):

The proposal provides a reference to the ANSI/AWC FDS, which contains provisions that provide acceptable means by which the fire design of wood members, assemblies and connections may be performed, while not precluding the use of other analysis methods. The inclusion of this additional option does not in and of itself increase or decrease the overall cost impact of the code, because this option may or may not be chosen. The existing options are still relevant, and if chosen, have no cost impact on the actual code requirements.

FS89-24

IBC: 722.1, 722.1.1 (New)

Proponents: Edward Lisinski, American Wood Council (elisinski@awc.org)

2024 International Building Code

Revise as follows:

722.1 General.
The provisions of this section contain procedures by which the *fire resistance* of specific materials or combinations of materials is established by calculations. ~~These procedure~~ Procedures found in Section 722.2 through Section 722.7 apply only to the information contained in ~~this~~ those ~~section~~ sections and shall not be otherwise used.
~~The calculated *fire resistance* of specific materials or combinations of materials shall be established by one of the following:~~

1. ~~*Concrete,* concrete *masonry* and clay *masonry* assemblies shall be permitted in accordance with ACI 216.1/TMS 0216.~~
2. ~~Precast and precast, prestressed *concrete* assemblies shall be permitted in accordance with PCI 124.~~
3. ~~Steel assemblies shall be permitted in accordance with Chapter 5 of ASCE 29.~~
4. ~~Exposed wood members and wood decking shall be permitted in accordance with Chapter 16 of ANSI/AWC NDS.~~

Add new text as follows:

722.1.1 Reference standards.. The calculated *fire resistance* of specific materials or combinations of materials shall be in accordance with one of the following:

1. *Concrete*, concrete *masonry* and clay *masonry* assemblies shall be permitted in accordance with ACI 216.1/TMS 0216
2. Precast and precast, prestressed *concrete* assemblies shall be permitted in accordance with PCI 124
3. Steel assemblies shall be permitted in accordance with Chapter 5 of ASCE 29.
4. Exposed wood members and wood decking shall be permitted in accordance with Chapter 16 of ANSI/AWC NDS.

Reason: The intent of this proposal is to clarify language without proposing any technical change.

Section 722.1 provides two separate options for calculated fire resistance, provisions of Sections 722.2 though Section 722.7 and reference standards, but they were always found in the same section. This created some confusion as to whether limitations of Section 722.2 though Section 722.7 applied to the reference standards.

Section 722.1 is revised to indicate calculations in Section 722.2 through Section 722.7 are limited to the information provided therein. This is done to remove an unintended interpretation that use of reference standards is also limited to only the information in Section 722.2 though Section 722.7. Additionally, the reference standards have been separated into a subsection to further clarify that they stand alone. Use of “in accordance with" replaces "established by” and is considered editorial.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposal clarifies existing requirements by adding language pointing directly to the applicable sections and breaking the reference standards into a separate subsection, to eliminate confusion.

FS89-24

FS90-24

IBC: 722.5, 722.5.1, 722.5.2, 722.5.3 (New), 722.5.4 (New), 722.5.5 (New), 722.5.6 (New)

Proponents: Bonnie Manley, AISC, AISC (manley@aisc.org); Jon-Paul Cardin, The CFSteel Group, The CFSteel Group (jp@cfsteelgroup.org)

2024 International Building Code

Revise as follows:

722.5 Steel assemblies <u>and composite steel and concrete assemblies</u>.
The provisions of this section contain procedures by which the *fire-resistance ratings* of steel assemblies <u>and composite steel and concrete assemblies</u> are established by calculations.

722.5.1 Structural steel columns.
The *fire-resistance ratings* of structural steel columns shall be based on the size of the element and the type of protection provided in accordance with this section.

722.5.2 Structural steel beams and girders.
The *fire-resistance ratings* of structural steel beams and girders shall be based on the size of the element and the type of protection provided in accordance with this section.

Add new text as follows:

<u>**722.5.3 Composite Structural Steel and Concrete Columns.** The fire-resistance rating of structural steel columns acting compositely with concrete (filled or encased) shall be permitted to be based on the size of the composite member and concrete protection in accordance with AISC 360, Appendix 4, Section 4.3.2b.</u>

<u>**722.5.4 Composite and Noncomposite Structural Steel I-shaped Beams and Girders.** The fire-resistance rating of composite or noncomposite structural steel I-shaped beams and girders shall be permitted to be based on the size of the element and the type of protection provided in accordance with AISC 360, Appendix 4, Section 4.3.2c.</u>

<u>**722.5.5 Concrete Floor Slabs on Steel Deck.** The fire-resistance rating of composite concrete floor slabs on steel deck shall be permitted to be determined in accordance with AISC 360, Appendix 4, Section 4.3.2f.</u>

<u>**722.5.6 Composite Plate Shear Walls.** The fire-resistance rating for unprotected composite plate shear walls shall be permitted to be determined in accordance with AISC 360, Appendix 4, Section 4.3.2g.</u>

Reason: This proposal is one of three that fully update Chapter 7 provisions of the IBC to reflect current structural steel industry standards. The 2024 edition of the IBC has already adopted the 2022 edition of AISC 360, *Specification for Structural Steel Buildings*, in Chapter 35 and elsewhere (Sections 722.5.2.2.1, 1604.3.3, 1705.2.1, 2202.1, and 2202.2.1.1). The purpose of this proposal is to recognize AISC 360's mandatory Appendix 4, Structural Design for Fire Conditions (specifically applicable portions of Appendix 4, Section 4.3), for calculating the fire resistance ratings of composite structural steel and concrete assemblies. Rather than extract these sections from AISC 360 and reprint them here, these new sections provide direct references to the applicable sections. The composite steel and concrete provisions are new for the 2022 edition of AISC 360.

AISC makes its standards available to all free of charge. AISC 360-22 can be downloaded for free from https://www.aisc.org/publications/steel-standards/. Please refer to the full AISC 360-22 commentary for technical background and guidance on applying the provisions.

Relevant extracts from the AISC-360 Commentary on Appendix 4, Section 4.3 summarize the technical basis for the requirements as follows:

Filled composite steel-concrete columns (Appendix 4, Section 4.3.2b(a)): “Research conducted at the National Research Council of Canada (Kodur and MacKinnon, 2000) has provided a basis for establishing an empirical equation to predict the standard fire resistance of filled round and square HSS for commonly used story heights and steel sections. This empirical equation was derived from and can only be used within the allowable range of design variables, as given, and is not applicable to lightweight concrete infill.”

Encased composite steel-concrete columns (Appendix 4, Section 4.3.2b(b)): “The fire-resistance ratings and requirements … were directly adapted from the ACI 216.1 (ACI, 2014) provisions for conventional steel bar reinforced concrete columns.”

Composite and noncomposite steel I-shaped beams and girders (Appendix 4, Section 4.3.2c): “The origins and example usage of this approach may be found in AISI (1984) … [and] is the result of an analysis of data from nine restrained beam specimens tested in accordance with ASTM E119 Standard UL 263 (ASTM, 2020d). The analysis is contained in UL Report NC505-11 (UL, 1984). Additional background and examples for this are provided in AISC Design Guide 19. This general equation is only applicable to sprayed fire resistance materials and not to intumescent or mastic coatings.”

Concrete floor slabs on steel deck (Appendix 4, Section 4.3.2f): “The development of …[provisions] for composite slabs with trapezoidal steel decking is described in Jiang et al. (2019)…[and]… is based on the thermal insulation criterion, which is specified as the time required for an average temperature rise of 284°F (140°C) or a maximum temperature rise of 356°F (180°C), whichever governs, to be reached at the unexposed surface of the slab when the slab is subjected to a standard fire from below. For this application, the steel deck is limited to trapezoidal profiles wherein the upper width of the deck rib is greater than or equal to the bottom width of the deck rib. … The finite element analyses were validated against experimental data from composite slabs tested under ASTM E119 fires. Jiang et al. (2019) show that the ... [provision] presents an improvement over the method provided in Annex D of Eurocode 4 (CEN, 2005d).”

Composite plate shear walls (Appendix 4, Section 4.3.2g): The provision “for determining the fire-resistance rating of composite plate shear walls is based on research conducted by Anvari et al. (2020b). The equation provides conservative failure times for walls subjected to standard ISO or ASTM fire scenarios. The equations are based on data obtained from experiments and benchmarked numerical models. The equation can be used for composite plate shear walls that meet the detailing and design requirements of Specification Chapter I, namely the steel plate slenderness and tie spacing requirements.”

Bibliography: AISC (2022), Specification for Structural Steel Buildings, ANSI/AISC 360-22, American Institute of Steel Construction, Chicago, Ill., August 1, 2022.

Available at: https://www.aisc.org/publications/steel-standards/.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal clarifies the application of a standard already adopted in the 2024 IBC.

FS90-24

FS91-24

IBC: TABLE 722.7.1(1)

Proponents: Edward Lisinski, American Wood Council (elisinski@awc.org)

2024 International Building Code

Revise as follows:

TABLE 722.7.1(1) PROTECTION REQUIRED FROM NONCOMBUSTIBLE COVERING MATERIAL

REQUIRED FIRE-RESISTANCE RATING OF BUILDING ELEMENT PER TABLE 601 AND TABLE 705.5 (hours)	MINIMUM PROTECTION REQUIRED FROM NONCOMBUSTIBLE PROTECTION (minutes)
1	40
1-1/2	60
2	80
3 or more	120

Reason: Table 601 requires a 1-1/2 hour fire-resistance rating on roofs in Type IV-A buildings. However, that option was not originally provided in this table, nor was a footnote provided to the table permitting interpolation between rows. Because of that, there could be confusion as to how much non-combustible protection was required in these situations. The minimum non-combustible protection required in Table 722.7.1(1) is based on 2/3 of the required fire-resistance rating in Table 601 and Table 705.5.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This code proposal adds a row which prescribes a minimum noncombustible protection of 60 minutes for a 1-1/2 hour fire-resistance rated building element.

FS91-24

FS92-24

IBC: 803.1, 803.2 (New), 803.1.2, 803.2.1.1 (New), 803.2.1.1.1 (New), 803.2.1.1.2 (New), 803.2.1.2 (New), 803.5.2, 803.1.1, 803.1.1.1, 803.2.2.2 (New), 803.5.1, 803.5.1.1, 803.4, 803.14, 803.2, 803.3, 803.5, 803.6, 803.7, 803.8, 803.9, 803.10, 803.11, 803.12

Proponents: Paul Naprstek, PEN Architectural Consulting, PEN Architectural Consulting (info@pen-architecture.com)

2024 International Building Code

Revise as follows:

803.1 General.
Interior wall and ceiling finish materials shall be ~~classified~~ accepted as compliant for fire performance and smoke development in accordance with either Section ~~803.1.1~~ 803.2.2 or ~~803.1.2~~ 803.2.1,~~except as shown in Sections 803.1.3 through 803.15.~~ and installed in accordance with the criteria therein, as well as Sections 803.4 and 803.5 ~~Materials tested in accordance with Section 803.1.1 shall not be required to be tested in accordance with Section 803.1.2.~~

Exceptions:

1. Foam plastics shall not be used as *interior finish* except as provided i Section 2603.9. This section shall apply both to exposed foam plastics and to foam plastics used in conjunction with a textile or vinyl facing or cover.
2. Materials having a thickness less than 0.036 inch (0.9 mm) applied directly to the surface of walls or ceilings shall not be required to be tested.
3. Exposed portions of structural members complying with the requirements for buildings of Type IV construction in Section 602.4 shall not be subject to *interior finish* requirements.
4. Where used as interior wall finish materials, textile wall coverings, including materials having woven or nonwoven, napped, tufted, looped or similar surface and carpet and similar textile materials, shall be tested in the manner intended for use, using the product mounting system, including adhesive, and shall comply with the requirements of one of the following: Section 803.2.2, 803.2.3, or 803.2.1.3.
5. Where used as interior ceiling finish materials, textile ceiling coverings, including materials having woven or nonwoven, napped, tufted, looped or similar surface and carpet and similar textile materials, shall be tested in the manner intended for use, using the product mounting system, including adhesive, and shall comply with the requirements of Section 803.2.2 or 803.2.1.
6. Where used as interior wall finish materials, *expanded vinyl wall coverings* shall be tested in the manner intended for use, using the product mounting system, including adhesive, and shall comply with the requirements of one of the following: Section 803.2.2, 803.2.3, or 803.2.1.1.3.
7. Where used as interior ceiling finish materials, expanded vinyl ceiling coverings shall be tested in the manner intended for use, using the product mounting system, including adhesive, and shall comply with the requirements of Section 803.2.2 or 803.2.1.
8. Where high-density polyethylene or polypropylene is used as an *interior finish*, it shall comply with the requirements of Section 803.2.2.
9. Where used as interior wall or interior ceiling finish materials, *site-fabricated stretch systems* shall be tested in the manner intended for use, and shall comply with the requirements of Section 803.2.2 or 803.2.1. If the materials are tested in accordance with ASTM E 84 or UL 723, specimen preparation and mounting shall be in accordance with ASTM E 2573.
10. Laminated products factory-produced with a wood substrate shall comply with one of the following:
    10.1. The laminated product shall meet the acceptance criteria of Section 803.2.2 when tested in using the product mounting system, including adhesive, as described in Section 5.8 of NFPA 286.
    10.2. The laminated product shall meet the flame-spread criteria of Section 803.2.1.1.2 and the smoke-development criteria of Section 803.2.1.2. when tested -in accordance with ASTM E84 or UL 723. Test specimen preparation and mounting shall be in accordance with ASTM E2579.

11. Facings or veneers intended to be applied on site over a wood substrate shall comply with one of the following:
    11.1. The facing or veneer shall meet the criteria of 803.2.2 when tested in using the product mounting system, including adhesive, as described in Section 5.8 of NFPA 286.
    11.2. The laminated product shall meet the flame-spread criteria of Secton 803.2.1.1.2 and the smoke-development criteria of Section 803.2.1.2. when tested ~~-~~in accordance with ASTM E84 or UL 723. Test specimen preparation and mounting shall be in accordance with ASTM E2579.

Add new text as follows:

803.2 Interior wall, ceiling, and textile wall covering tests. Interior materials shall comply with criteria of Section 803.2.1, 803.2.2, or 803.2.3 in accordance with the limitations and exceptions set forth in Section 803.1.

Revise as follows:

~~803.1.2~~ 803.2.1 ASTM E84/UL 723 test of ~~Interior~~ interior wall and ceiling finish materials and textile wall coverings ~~tested in accordance with ASTM E84 or UL 723~~. *Interior wall* ~~and~~ or *ceiling finish* materials shall be ~~classified~~tested and assigned indices for flame spread and smoke development in accordance with ASTM E84 or UL 723. ~~Such *interior finish* materials shall be grouped in the following classes in accordance with their *flame spread* and *smoke-developed indices*.~~

~~Class A = *Flame spread index* 0–25; *smoke-developed index* 0–450.~~

~~Class B = *Flame spread index* 26–75; *smoke-developed index* 0–450.~~

~~Class C = *Flame spread index* 76–200; *smoke-developed index* 0–450.~~

~~**Exception:** Materials tested in accordance with Section 803.1.1 and as indicated in Sections 803.1.3 through 803.13.~~

Add new text as follows:

803.2.1.1 Interior flame-spread requirements for walls and ceilings. *Interior wall and ceiling finish* materials shall comply with 803.2.1.1.

803.2.1.1.1 Classification of flame spread indices. *Interior wall and ceiling finish* materials shall be grouped in the following flame spread classes in accordance with their flame spread index:

Class A: Flame spread index 0-25

Class B: Flame spread index 26-75

Class C: Flame spread index 76-200

803.2.1.1.2 Flame spread index requirements based on occupancy group. Interior wall and ceiling finish shall be of a flame spread class whose index is not greater than that for the class rating specified in Table 803.13 for the group and location designated.

803.2.1.2 Interior smoke development index requirements for walls and ceilings. *Interior wall and ceiling finish* materials with a smoke-developed index greater than 450 are prohibited.

Revise as follows:

~~803.5.2~~ 803.2.1.3 Acceptance criteria for textile and expanded vinyl wall or ceiling coverings tested to ASTM E84 or UL 723. Textile wall and ceiling coverings and expanded vinyl wall and ceiling coverings shall have a Class A *flame spread index* in accordance with ~~ASTM E84 or UL 723~~ Section 803.2.1.1.1; shall meet the smoke-developed index requirements of 803.2.1.1.2; and shall be protected by an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2. Test specimen preparation and mounting shall be in accordance with ASTM E2404.

~~803.1.1~~ 803.2.2 NFPA 286 test of ~~Interior~~ interior wall and ceiling finish materials and textile wall coverings tested in accordance with NFPA 286.

Interior wall ~~and~~ or ceiling finish materials shall be ~~classified~~ tested in accordance with NFPA 286 and comply with Section 803.1.1.1. Materials complying with Section 803.1.1.1 shall be considered to also comply with the requirements of Class A.

~~803.1.1.1~~ 803.2.2.1 Acceptance criteria for NFPA 286.

The *interior finish* shall comply with the following:

1. During the 40 kW exposure, flames shall not spread to the ceiling.
2. The flame shall not spread to the outer extremity of the sample on any wall or ceiling throughout the entire test.
3. Flashover, as defined in NFPA 286, shall not occur throughout the entire test.
4. The peak ~~heat release~~ rate of heat release throughout the entire test shall not exceed 800 kW.
5. The total smoke released throughout the entire test shall not exceed 1,000 m^2.

Add new text as follows:

803.2.2.2 Interior flame-spread and smoke-developed requirements per NFPA 286. A material meeting the acceptance criteria of 803.1.1.1 shall be deemed to satisfy the requirements for a Class A, B, or C materials as required by Table 803.13.

Revise as follows:

~~803.5.1~~ 803.2.3 NFPA 265 ~~Room~~ room corner test for textile wall coverings and expanded vinyl wall coverings.

Textile wall coverings and *expanded vinyl wall coverings* shall meet the criteria of Section ~~803.5.1.1~~ 803.2.3.1 when tested in the manner intended for use in accordance with the Method B protocol of NFPA 265 using the product-mounting system, including adhesive.

~~803.5.1.1~~ 803.2.3.1 Acceptance criteria for NFPA 265.

The *interior finish* shall comply with the following:

1. During the 40 kW exposure, flames shall not spread to the ceiling.
2. The flame shall not spread to the outer extremities of the samples on the 8-foot by 12-foot ~~(203 by 305 mm)~~ (2438.4 mm by 3657.6 mm) walls.
3. Flashover, as defined in NFPA 265, shall not occur.
4. The total smoke release throughout the test shall not exceed 10,763.91 sf 1,000 m^2.

~~803.4 Foam plastics.~~

~~Foam plastics shall not be used as *interior finish* except as provided in Section 2603.9. This section shall apply both to exposed foam plastics and to foam plastics used in conjunction with a textile or vinyl facing or cover.~~

~~803.14~~ 803.3 Stability.

Interior finish materials regulated by this chapter shall be applied or otherwise fastened in such a manner that such materials will not readily become detached where subjected to room temperatures of 200°F (93°C) for not less than 30 minutes.

Delete without substitution:

~~803.2 Thickness exemption.~~

~~Materials having a thickness less than 0.036 inch (0.9 mm) applied directly to the surface of walls or ceilings shall not be required to be tested.~~

~~803.3 Heavy timber exemption.~~

~~Exposed portions of *building elements* complying with the requirements for *buildings* of heavy timber construction in Section 602.4 or Section 2304.11 shall not be subject to *interior finish* requirements except in *interior exit stairways*, interior exit *ramps*, and exit passageways.~~

~~803.5 Textile wall coverings~~.

~~Where used as interior wall finish materials, textile wall coverings, including materials having woven or nonwoven, napped, tufted, looped or similar surface and carpet and similar textile materials, shall be tested in the manner intended for use, using the product mounting system, including adhesive, and shall comply with the requirements of one of the following: Section 803.1.1, 803.5.1 or 803.5.2.~~

~~803.6 Textile ceiling coverings~~.

~~Where used as interior ceiling finish materials, textile ceiling coverings, including materials having woven or nonwoven, napped, tufted, looped or similar surface and carpet and similar textile materials, shall be tested in the manner intended for use, using the product mounting system, including adhesive, and shall comply with the requirements of Section 803.1.1 or 803.5.2.~~

~~803.7 Expanded vinyl wall coverings~~.

~~Where used as interior wall finish materials, *expanded vinyl wall coverings* shall be tested in the manner intended for use, using the product mounting system, including adhesive, and shall comply with the requirements of one of the following: Section 803.1.1, 803.5.1 or 803.5.2.~~

~~803.8 Expanded vinyl ceiling coverings~~.

~~Where used as interior ceiling finish materials, expanded vinyl ceiling coverings shall be tested in the manner intended for use, using the product mounting system, including adhesive, and shall comply with the requirements of Section 803.1.1 or 803.5.2.~~

~~803.9 High-density polyethylene (HDPE) and polypropylene (PP)~~.

~~Where high-density polyethylene or polypropylene is used as an *interior finish*, it shall comply with Section 803.1.1.~~

~~803.10 Site-fabricated stretch systems~~.

~~Where used as interior wall or interior ceiling finish materials, *site-fabricated stretch systems* containing all three components described in the definition in Chapter 2 shall be tested in the manner intended for use, and shall comply with the requirements of Section 803.1.1 or with the requirements of Class A in accordance with Section 803.1.2. If the materials are tested in accordance with ASTM E84 or UL 723, specimen preparation and mounting shall be in accordance with ASTM E2573.~~

~~803.11 Laminated products factory produced with a wood substrate~~.

~~Laminated products factory produced with a wood substrate shall comply with one of the following:~~

1. ~~The laminated product shall meet the criteria of Section 803.1.1.1 when tested in accordance with NFPA 286 using the product mounting system, including adhesive, as described in Section 5.8 of NFPA 286.~~
2. ~~The laminated product shall have a Class A, B, or C *flame spread index* and *smoke-developed index*, based on the requirements of Table 803.13, in accordance with ASTM E84 or UL 723. Test specimen preparation and mounting shall be in accordance with ASTM E2579.~~

~~803.12 Facings or wood veneers intended to be applied on site over a wood substrate~~.

~~Facings or *veneers* intended to be applied on site over a wood substrate shall comply with one of the following:~~

1. ~~The facing or *veneer* shall meet the criteria of Section 803.1.1.1 when tested in accordance with NFPA 286 using the product mounting system, including adhesive, as described in Section 5.9 of NFPA 286.~~

2. ~~The facing or *veneer* shall have a Class A, B or C *flame spread index* and *smoke-developed index*, based on the requirements of Table 803.13, in accordance with ASTM E84 or UL 723. Test specimen preparation and mounting shall be in accordance with ASTM E2404.~~

Attached Files

- **Final-Proposed revision to 2027 IBC Section 803 (4).doc**
  https://www.cdpaccess.com/proposal/10623/30738/files/download/4756/

Reason: Since major revisions were made to Section 803 in the 2009 IBC, this section has proven to be nearly unreadable—a maze of overlapping and seemingly contradictory requirements and exceptions that tries any reader's ability to understand its requirements and options. As a member of the Technical Committee on Fire Protection for the development of the 2014 New York City Building Code (based on the 2009 IBC) I was tasked with re-arranging the content of this section to make it easier to understand. This proposed revision is based on that edit (which appeared in the 2014 BCNYC), modified to incorporate changes that have been made to the five editions of the IBC which have followed.

<u>None of the content of this section has been altered</u>. This is strictly an editorial revision.

Each of the various subsections of IBC 803 (2024 edition) fits into one of the following categories:

a. Citations to incorporate four referenced standards, and the tests (four in total) for flame spread and smoke development that they describe, into the Code. (The four referenced standards are NFPA 286, ASTM E84, UL 723, and NFPA 265.)

b. Acceptance criteria for materials based on their performance in one of the above-cited tests.

c. In the case of ASTM E84 and UL 723 only, a further classification of materials based on their numerical indices for flame spread obtained when they are tested per the referenced standard.

d. Text indicating which of the tests are acceptable for use based on the properties of the material concerned.

e. Text indicating the applicability of certain flame-spread classifications based on the occupancy (use) of the space involved.

f. Exemptions from testing for certain materials based on their thickness.

g. A prohibition on the use of one material (803.4, "Foam plastics").

h. A section regarding the manner of installation of certain materials (803.14, "Stability.")

However, as published, these sections are all mixed up:

a. Three of the tests are incorporated by adjacent sections (803.1.1 and 803.1.2), but the fourth is buried several paragraphs later (at 803.5.1).

b. Acceptance criteria for these various tests is similarly scattered (see 803.1.1.1, 803.5.1.1, 803.5.1.2).

c. No application or purpose is provided for the classification system imposed on ASTM E84 and UL 723 (at 803.1.2) until we reach Section 803.13.

d. The exemptions based on thickness (803.2, 803.3) are buried between two of the test citations and the requirements based on material qualities.

My re-arrangement of the section's content proposes that the material be simply presented in the following order:

a. Presentation of the basic requirement (803.1) for all materials not otherwise covered in this sections Exceptions.

b. Exemptions to this requirement, presented as Exceptions 1 and 2.

c. Specific requirements based on a material's property, presented as Exceptions 3-10.

d. Citation of each of all four the four test standards in three sections (ASTM E84 and UL 723 share the same criteria and so continue to be listed in the same section).

e. Acceptance criteria for each respective test. For ASTM E84 and UL 723 this incorporates the classification system and the flame spread index requirements based on occupancy.

f. Prohibition of one material (foam plastics). Alternatively, this could be presented as another Exception to 803.1.

g. The "Stability" section, which is the one paragraph dealing specifically with execution.

This organization is much more user friendly because it permits the user to (a) determine which tests are acceptable for the material in question, (b) read the citation describing the test standard selected, and (c) determine the acceptance criteria based on the selected standard, material, and room occupancy, all in the order that the material is presented.

Below are some other things I find problematic with the text as currently published, and how I propose to improve it:

1. Section 803 cites four (4) different tests for flame spread and smoke development: NFPA 286, ASTM E84, UL 723, and NFPA 265. However, NFPA 265 is an acceptable test only for textile wall coverings or expanded vinyl wall coverings. NFPA 286 is the only acceptable standard for HDPE and PP wall or ceiling coverings.ASTM E84 and UL 723 may be used for textile or vinyl wall or ceiling coverings, but using different acceptance criteria than that used for site-fabricated stretch systems, laminate products with a wood substrate, or site-applied facings on a wood substrate. These requirements have a mix-and-match quality that current presentation makes even more confusing.

2. Section 803 opens by stating that "interior wall and ceiling finish materials shall be classified [emphasis added] in accordance with Section 803.1.1 or 803.1.2 (i.e., NFPA 286, ASTM E84, or UL 723). However, both of the sections cited refer to referenced standards for testing, not classifying, interior materials. The classification process is a grouping imposed by the IBC itself, in Section 803.1.2, based on the flame spread indices obtained when materials are tested in accordance with ASTM E84 or UL 723 only (i.e., the referenced standards cited in 803.1.2), which make no reference to these three "classes" in their own text.

The third standard, NFPA 286, has no classification function at all. It is a "pass-fail" test based on the criteria listed in IBC 803.1.1.1. (A note in 803.1.1 states that any material that meets the criteria in 803.1.1.1 is granted a "Class A" classification by fiat; otherwise the material is not permitted for use—there is no "Class B" or "Class C" when using NFPA 286. (By definition, a "classification" system must have more than one class.) Mis-use of the term "classified" for "tested" continues in Sections 803.1.1 and 803.1.2.3.

3. While the three classes assigned to ASTM E84 or UL 723 are based on different ranges of flame-spread indices, all three have the same acceptable range of smoke-developed indices (0-450). In other words, this is a distinction without a difference. Moreover, there is no instance where a product with a smoke-developed index above 450 is permitted for interior use. Therefore I have simplified this requirement by simply stating (at my 803.2.1.2) that "interior wall and ceiling finish materials with a smoke-developed index greater than 450 are prohibited. Isn't that what we are really trying to say?

All in all, I believe that this re-arrangement will greatly improve compliance by making the requirements for compliance less inscrutable.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Editorial change, with no revision to code content.

FS92-24

FS93-24

IBC: 803.13

Proponents: Marcelo Hirschler, GBH International, GBH International (mmh@gbhint.com)

2024 International Building Code

Revise as follows:

803.13 Interior finish requirements based on occupancy.
Interior wall and ceiling finish shall have a classification such that the *flame spread index* and *smoke-developed index* values are not higher than those corresponding to the classification specified in Table 803.13 for the group and location designated. *Interior wall and ceiling finish* materials tested in accordance with NFPA 286 and meeting the acceptance criteria of Section 803.1.1.1, shall be permitted to be used where a Class A , B, or C classification in accordance with ASTM E84 or UL 723 is required.

Reason: There have been cases where it has been questioned whether a report detailing compliance with the requirements of NFPA 286 in Section 803.1.1.1 is acceptable only when the requirements are for a Class A in accordance with ASTM E84. It should be clear (but is not explicit) that complying with 803.1.1.1 exempts from the requirement for testing any place where there is a requirement for a Class A, a Class B, or a Class C in accordance with ASTM E84. This proposal is simply clarification.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Simple clarification.

FS93-24

FS94-24

IBC: 803.13, TABLE 803.13

Proponents: Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org)

2024 International Building Code

803.13 Interior finish requirements based on occupancy.

Interior wall and ceiling finish shall have a classification such that the *flame spread index* and *smoke-developed index* values are not higher than those corresponding to the classification specified in Table 803.13 for the group and location designated. *Interior wall and ceiling finish* materials tested in accordance with NFPA 286 and meeting the acceptance criteria of Section 803.1.1.1, shall be permitted to be used where a Class A classification in accordance with ASTM E84 or UL 723 is required.

Revise as follows:

TABLE 803.13 INTERIOR WALL AND CEILING FINISH REQUIREMENTS BY OCCUPANCY[k]

GROUP	SPRINKLERED~~[i]~~ S, S13R, S13D			NONSPRINKLERED - NS		
	Interior exit stairways and ramps and exit passageways[a, b]	Corridors and enclosure for exit access stairways and ramps	Rooms and enclosed spaces[c]	Interior exit stairways and ramps and exit passageways[a, b]	Corridors and enclosure for exit access stairways and ramps	Rooms and enclosed spaces[c]
A-1 & A-2	B	B	C	A	A[d]	B[e]
A-3[f], A-4, A-5	B	B	C	A	A[d]	C
B, E, M, R-1	B	C~~[l, m]~~	C	A	B	C
R-4	B	C	C	A	B	B
F	C	C	C	B	C	C
H	B	B	C[g]	A	A	B
I-1	B	C	C	A	B	B
I-2	B	B	B[h, i]	A	A	B
I-3	A	A[j]	C	A	A	B
I-4	B	B	B[h, i]	A	A	B
R-2	C	C	C	B	B	C
R-3	C	C	C	C	C	C
S	C	C	C	B	B	C
U	No restrictions			No restrictions		

For SI: 1 inch = 25.4 mm, 1 square foot = 0.0929 m^2.

NS = Buildings not equipped throughout with an automatic sprinkler system; S = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1; S13R = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.2; S13D = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Sections 903.2.8 and 903.3.1.3.

a. Class C interior finish materials shall be permitted for wainscotting or paneling of not more than 1,000 square feet of applied surface area in the grade lobby where applied directly to a noncombustible base or over furring strips applied to a noncombustible base and fireblocked as required by Section 803.15.1.

b. In other than Group I-3 occupancies in buildings less than three stories above grade plane, Class B interior finish for nonsprinklered buildings and Class C interior finish for sprinklered buildings shall be permitted in interior exit stairways and ramps.

c. Requirements for rooms and enclosed spaces shall be based on spaces enclosed by partitions. Where a fire-resistance rating is required for structural elements, the enclosing partitions shall extend from the floor to the ceiling. Partitions that do not comply with this shall be considered to be enclosing spaces and the rooms or spaces on both sides shall be considered to be one room or space. In determining the applicable requirements for rooms and enclosed spaces, the specific occupancy thereof shall be the governing factor regardless of the group classification of the building or structure.

d. Lobby areas in Group A-1, A-2 and A-3 occupancies shall be not less than Class B materials.

e. Class C interior finish materials shall be permitted in places of assembly with an occupant load of 300 persons or less.

f. For places of religious worship, wood used for ornamental purposes, trusses, paneling or chancel furnishing shall be permitted.

g. Class B material is required where the building exceeds two stories.

h. Class C interior finish materials shall be permitted in administrative spaces.

i. Class C interior finish materials shall be permitted in rooms with a capacity of four persons or less.

j. Class B materials shall be permitted as wainscotting extending not more than 48 inches above the finished floor in corridors and exit access stairways and ramps.

k. Finish materials as provided for in other sections of this code.

~~l. Applies when protected by an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.~~

l~~m~~. Corridors in ambulatory care facilities shall be provided with Class A or B materials.

Reason: The intent of this group of proposal is to make the tables in Chapter 8 and 10 consistent with the revisions to Table 504.3, 504.4, 506.2 – using S13, S13R, S13D and NP for sprinkler requirements. This would clarify what happens when an NFPA 13D sprinkler system is used. This is not intent to change current allowances; just to clarify what requirements are applicable for an NFPA13D system.

Discussion during the BCAC calls has indicated that it is needed to identifying specific code sections so that everyone has the same understanding.

Group R-4 requirements do not always have to be stated as Section 310.5 states "Group R-4 occupancies shall meet the requirements for construction as defined for Group R-3, except as otherwise provided for in this code." However, since a lot of people miss that, we are including R-4 in the proposed applicable footnotes.

Townhouses are defined as attached dwelling units that extend from foundation to grade and are open on at least two sides. If a townhouse is 3 stories or less, it can choose to comply with the IBC or IRC (Section 101.2). The IRC Section P2904 is similar to an NFPA 13D system. If the IBC is used, townhouses subdivided by firewalls into 1 or 2 units per building is a Group R-3 (Section 310.4) and townhouses subdivided by fire partitions (Section 420.2) are a Group R-2 (Section 310.3). This is important to clarify because all townhouses can use a 13D sprinkler system: Section 903.2.8 references 903.3, and 903.1.3.3 specifically stating that "Automatic sprinkler systems installed in … and townhouses shall be permitted to be installed throughout in accordance with NFPA 13D." To make this obvious in the tables, a reference to 903.2.8 and 903.1.3.3 are added in the footnote.

Specifics for this change –

· adds the S13, S13R, S13D and NS in the table titles and footnotes with the section references for sprinklers.· Footnote l with the sprinkler reference is redundant and deleted.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).
BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC webpage.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is a clarification of requirements for Group R where an NFPA13D system is permitted. There are no changes to construction requirements.

FS94-24

FS95-24

IBC: 804.2

Proponents: Tim Earl, GBH International, Self (tearl@gbhint.com)

2024 International Building Code

Revise as follows:

804.2 Classification.
Interior floor finish and floor covering materials required by Section 804.4.2 to be of Class I or II materials shall be tested to ~~classified in accordance with~~ ASTM E648 or NFPA 253. Such materials shall be grouped in the following classes in accordance with their critical radiant flux.~~The classification referred to herein corresponds to the classifications determined by ASTM E648 or NFPA 253 as follows: Class I, 0.45 watts/cm^2 or greater; Class II, 0.22 watts/cm^2 or greater.~~

Class I = Critical radiant flux 0.45 watts/cm^2 or greater.

Class II = Critical radiant flux 0.22-0.44 watts/cm^2

Reason: This is just a simple reformat to a more readable format.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

No technical change. No cost impact.

FS95-24

FS96-24

IBC: [F] 806.2

Proponents: Jeffrey Grove, Southern Nevada ICC Chapter (jeff.grove@coffman.com)

THIS CODE CHANGE WILL BE HEARD BY THE FIRE CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEE.

2024 International Building Code

Revise as follows:

[F] 806.2 Combustible decorative materials.
In Groups A, B, E, I, M and R-1 and in *dormitories* in Group R-2, curtains, draperies, fabric hangings and similar combustible *decorative materials* suspended from walls or ceilings shall comply with Section 806.4 ~~and shall not exceed~~ . Where exceeding 10 percent of the specific wall or ceiling area to which such materials are attached~~.~~, they shall comply with Section 803.
Fixed or movable walls and partitions, paneling, wall pads and crash pads applied structurally or for decoration, acoustical correction, surface insulation or other purposes shall be considered to be *interior finish*, shall comply with Section 803 and shall not be considered to be *decorative materials* or furnishings.

Exceptions:

1. In auditoriums in Group A, the permissible amount of curtains, draperies, fabric hangings and similar combustible *decorative materials* suspended from walls or ceilings shall not exceed 75 percent of the aggregate wall area where the *building* is equipped throughout with an *approved automatic sprinkler system* in accordance with Section 903.3.1.1, and where the material is installed in accordance with Section 803.15 of this code.
2. In Group R-2 *dormitories*, within *sleeping units* and *dwelling units*, the permissible amount of curtains, draperies, fabric hangings and similar *decorative materials* suspended from walls or ceiling shall not exceed 50 percent of the aggregate wall areas where the *building* is equipped throughout with an *approved automatic sprinkler system* installed in accordance with Section 903.3.1.
3. In Group B and M occupancies, the amount of combustible *fabric partitions* suspended from the ceiling and not supported by the floor shall comply with Section 806.4 and shall not be limited.
4. The 10-percent limit shall not apply to curtains, draperies, fabric hangings and similar combustible *decorative materials* used as window coverings.

Reason: This code change is proposing to add language to clarify that, when exceeding the 10 percent area threshold, combustible decorative materials shall be permitted, so long as they comply with Section 803 provisions for wall and ceiling finishes.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The code change proposal will not increase or decrease the cost of construction. This code change proposal is to clarify the permitted use of combustible decorative material in excess of 10 percent of the specific wall or ceiling area to which such materials are attached.

FS96-24

FS97-24

IBC: [F] 806.2

Proponents: Jeffrey Grove, Southern Nevada ICC Chapter (jeff.grove@coffman.com)

THIS CODE CHANGE WILL BE HEARD BY THE FIRE CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEE.

2024 International Building Code

Revise as follows:

[F] 806.2 Textiles, Fabrics and combustible ~~Combustible~~ decorative materials.
In Groups A, B, E, I, M and R-1 and in *dormitories* in Group R-2, textiles and fabrics such as curtains, draperies, fabric hangings and similar combustible *decorative materials* suspended from walls or ceilings shall comply with Section 806.4 and shall not exceed 10 percent of the specific wall or ceiling area to which such materials are attached.
Fixed or movable walls and partitions, paneling, wall pads and crash pads applied structurally or for decoration, acoustical correction, surface insulation or other purposes shall be considered to be *interior finish*, shall comply with Section 803 and shall not be considered to be *decorative materials* or furnishings.

Exceptions:

1. ~~In auditoriums in Group A, the~~ The permissible amount of curtains, draperies, and fabric hangings, and combustible fabric partitions ~~and similar combustible *decorative materials*~~ suspended from walls or ceilings and not supported by the floor, shall not be limited ~~exceed 75 percent of the aggregate wall area~~ where the *building* is equipped throughout with an *approved automatic sprinkler system* in accordance with Section 903.3.1.1, and where the material is installed in accordance with Section 806.4 ~~803.15~~ of this code.

2. The permissible amount of combustible decorative materials shall not exceed 75 percent of the aggregate wall area where the building is equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1, and where the material is installed in accordance with Section 803.15 of this code.

~~2.~~3. In Group R-2 *dormitories*, within *sleeping units* and *dwelling units*, the permissible amount of curtains, draperies, fabric hangings and similar *decorative materials* suspended from walls or ceiling shall not exceed 50 percent of the aggregate wall areas where the *building* is equipped throughout with an *approved automatic sprinkler system* installed in accordance with Section 903.3.1.

~~3.~~4. In Group B and M occupancies, the amount of combustible *fabric partitions* suspended from the ceiling and not supported by the floor shall comply with Section 806.4 and shall not be limited.

~~4.~~5. The 10-percent limit shall not apply to curtains, draperies, fabric hangings and similar combustible *decorative materials* used as window coverings.

Reason: The tendency for an initial ignition of the materials covered by the exception is reduced by their required compliance with the Standard Methods of Fire Tests for Flame-propagation of Textile Films, NFPA 701-23. Automatic sprinklers are effective in extinguishing these materials.

The code section covers several types of combustible and therefore the words “textiles and fabrics” as used in the Standard Methods of Fire Tests for Flame-propagation of Textiles and Films, NFPA 701 are added to the heading to address these types of materials. Some of the materials regulated will be textiles and fabrics as well as combustible decorative elements materials.

Limiting the allowable amount of textiles and fabrics to Group A auditoriums is inconsistent with the relative risk as compared to all other occupancies. Fire loss data associated with curtains, draperies, fabric hangings and similar combustible decorative materials are not apparent or forthcoming. The 10 percent limitation is not readily enforceable and is a needless hardship to the exhibit and tradeshow industry.

Hanging materials such as curtains and draperies are much different than combustible decorative materials and therefore it is proposed that they be addressed in a separate exception. Thus, exception 1 addressed these separately.

Decorative materials are much different than hanging fabric as they can include elements that are not flat, thinner materials and in different geometries and often plastic.

Exception 4 addresses the case where the building is not sprinklered. It allows for changing rooms and other small booths.

Exception 5 retains the current allowance for window treatments.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Code change proposal will not increase the cost of construction as it clarifies the amount of materials textiles, fabrics and combustible materials that can be reasonably utilized.

FS97-24

FS98-24

IBC: 1402.2, 1402.3 (New), [BS] 1402.3, FIGURE 1402.3 (New), TABLE 1402.3 (New)

Proponents: Jay Crandell, P.E., ABTG / ARES Consulting, myself (jcrandell@aresconsulting.biz); Art DeGaetano, Northeast Regional Climate Center, Cornell, self (atd2@cornell.edu)

2024 International Building Code

Revise as follows:

1402.2 Weather protection.
Buildings shall be provided with a weather-resistant *exterior wall assembly* . The *exterior wall assembly* shall include flashing, as described in Section 1404.4. The *exterior wall assembly* shall be designed and constructed in such a manner as to prevent the accumulation of water within the exterior wall assembly by providing a *water-resistive barrier* behind the exterior *veneer*, as described in Section 1403.2, and a means for draining water that enters the assembly to the exterior. Where not otherwise addressed by the materials and methods for weather protection prescribed by this code, rainwater resistance shall be permitted to be demonstrated in accordance with Section 1402.3. Protection against condensation in the *exterior wall* assembly shall be provided in accordance with Section 1404.3.

Exceptions:

1. A weather-resistant *exterior wall assembly* shall not be required over concrete or *masonry* walls designed in accordance with Chapters 19 and 21, respectively.
2. Compliance with the requirements for a means of drainage, and the requirements of Sections 1403.2 and 1404.4, shall not be required for an *exterior wall assembly* that has been demonstrated through testing to resist wind-driven rain, including joints, penetrations and intersections with dissimilar materials, in accordance with ASTM E331 under the following conditions:
The *exterior wall* design shall be considered to resist wind-driven rain where the results of testing, in accordance with ASTM E331, indicate that water did not penetrate control joints in the *exterior wall* , joints at the perimeter of openings or intersections of terminations with dissimilar materials.
   - 2.1. *Exterior wall* test assemblies shall include not fewer than one opening, one control joint, one wall/eave interface and one wall sill. Tested openings and penetrations shall be representative of the intended end-use configuration.
   - 2.2. *Exterior wall* test assemblies shall be not less than 4 feet by 8 feet (1219 mm by 2438 mm) in size.
   - 2.3. *Exterior wall* test assemblies shall be tested at a minimum differential pressure of 6.24 pounds per square foot (0.297 kN/m^2).
   - 2.4. *Exterior wall* test assemblies shall be subjected to a minimum test exposure duration of 2 hours.
3. *Exterior insulation and finish systems* (EIFS) complying with Section 1407.4.1.

Add new text as follows:

1402.3 Rainwater resistance.. The rainwater resistance of *exterior wall* assemblies, including the *exterior wall covering* assembly or only the *water-resistive barrier* system, shall be permitted to be tested in accordance with ASTM E331 to demonstrate compliance with the weather protection requirements of Section 1402.2. The following test conditions shall apply:

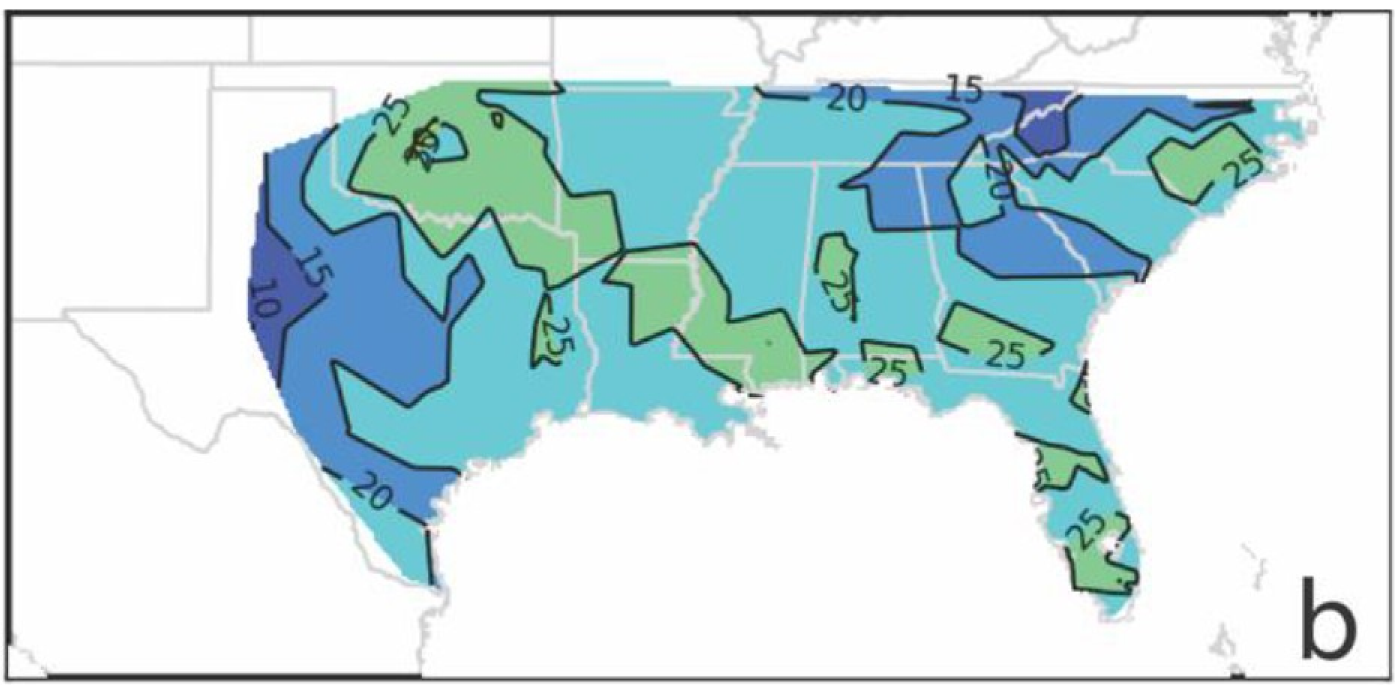
1. The ASTM E331 test pressure shall be determined in accordance with Table 1402.3 and Figure 1402.3 or by calculations in accordance with ASCE 7 using a design wind-driven rain wind speed in accordance with Figure 1402.3. The test pressure shall not be less than 2.86 psf (137 Pa) and shall not be required to exceed 12.0 psf (575 Pa).
2. The duration of test shall not be less than 15 minutes. Subsequent tests with increased test pressure shall be permitted with leakage assessment after each test.
3. The tested assembly shall be considered to resist wind-driven rain at the greatest test pressure increment where water did not penetrate the innermost layer intended to provide water resistance protection of the remainder of the wall assembly.

4. Test assemblies shall be constructed in accordance with the applicable manufacturer's installation instructions for each component and shall comply with the following minimum assembly configuration requirements:
   4.1. Not fewer than one opening element or blank, and flashing condition.
   4.2. Not fewer than one vertical and horizontal joint in the *water-resistive barrier* assembly where representative of installed conditions
   4.3. Where exterior *veneer* or cladding is included on the test assembly, it shall include not fewer than one control joint or transition joint as applicable and the results shall be limited to the type of *veneer* or cladding used.
   4.4. Test assemblies shall not be less than 4 feet by 8 feet (1.2 m by 2.4 m) in size.

Revise as follows:

[BS] 1402.4 ~~1402.3~~ Wind resistance.
Exterior walls, exterior wall coverings, exterior soffits and fascias, and the associated openings, shall be designed and constructed to resist safely the superimposed *loads* required by Chapter 16.

Add new text as follows:



Source: Cornell University / NOAA - ***to be replaced with full U.S. map with smoothed wind speed contours and units of MPH instead of m/s.***

FIGURE 1402.3 Wind-driven rain wind speed (m/s) hazard map to determine ASTM E331 test pressure criteria [1 m/s = 2.24 mph]

TABLE 1402.3 Pre-calculated Wind-Driven Rain ASTM E331 Test Pressure (PSF)

Wind Exposure	Mean Roof Height (ft)	Wind-driven Rain Wind Speed, m/s (MPH)						
		10	15	20	25	30	35	40
		(22.4)	(33.6)	(44.8)	(56.0)	(67.2)	(78.4)	(89.6)

B	15	2.86	2.86	3.46	5.40	7.78	10.6	12.0
	20	2.86	2.86	3.76	5.87	8.46	11.5	12.0
	25	2.86	2.86	4.00	6.25	9.00	12.0	12.0
	30	2.86	2.86	4.24	6.63	9.55	12.0	12.0
	40	2.86	2.86	4.61	7.20	10.4	12.0	12.0
	50	2.86	2.86	4.91	7.67	11.0	12.0	12.0
	60	2.86	2.90	5.15	8.05	11.6	12.0	12.0
C	15	2.86	2.90	5.15	8.05	11.6	12.0	12.0
	20	2.86	3.07	5.46	8.53	12.0	12.0	12.0
	25	2.86	3.21	5.70	8.90	12.0	12.0	12.0
	30	2.86	3.34	5.94	9.28	12.0	12.0	12.0
	40	2.86	3.55	6.31	9.85	12.0	12.0	12.0
	50	2.86	3.72	6.61	10.3	12.0	12.0	12.0
	60	2.86	3.85	6.85	10.7	12.0	12.0	12.0
D	15	2.86	3.51	6.24	9.8	12.0	12.0	12.0
	20	2.86	3.68	6.55	10.2	12.0	12.0	12.0
	25	2.86	3.82	6.79	10.6	12.0	12.0	12.0
	30	2.86	3.96	7.03	11.0	12.0	12.0	12.0
	40	2.86	4.16	7.40	11.6	12.0	12.0	12.0
	50	2.86	4.33	7.70	12.0	12.0	12.0	12.0
	60	2.86	4.47	7.94	12.0	12.0	12.0	12.0

For SI: 1 psf = 47.9 Pa

Reason: The code lacks a risk-consistent basis for addressing wind-driven rain and resistance to water intrusion. This proposal provides a wind-driven rain hazard map (Figure 1402.3) that properly characterizes the hazard as it varies across wind-driven rain climatology of the U.S. This map of the southeastern U.S. is a placeholder until a map of the entire U.S. becomes available in 2024.

The proposal “permits” and does not mandate use of proposed Section 1402.3, the wind-driven rain map of Figure 1402.3, or the associated ASTM E331 test pressures of Table 1402.3. Instead, the reference to Section 1402.3 in Section 1402.2 uses permissive language (“shall be permitted”) to allow for current practice to continue unchanged for existing materials and methods recognized in the code. This optional or voluntary approach will allow time for various stake-holders and standards developers to align their standards with this new risk-based approach without changing requirements for materials and methods currently recognized in the code at this time.

Various portions and details of this proposal are further explained below.

Figure 1402.3

– As reported in the Bibliography reference, the climatology of wind-driven rain is developed from recently available 1-min weather observations from National Weather Service Automated Surface Observing Systems (ASOS). One-minute data better represent the joint occurrence of the extremes that define wind-driven rain occurrence than hourly data, which previously was the shortest available temporal resolution. After adjusting the winds speeds to standardize for exposure and anemometer type, the wind data corresponding to specific rainfall thresholds were fit to a statistical distribution to obtain estimates of the recurrence of wind speeds associated with different rainfall intensities. The values serve as the basis for a wind-driven rain climatology for the United States that is analogous to climatologies that exist and inform building codes in Europe and Canada. The wind-driven rain map shown in Figure 1402.3 is based on the currently completed research for the southeastern U.S. and represents a 3-sec gust wind speed (meters per second) for a 10-yr mean recurrence interval with a threshold coincidental rainfall rate of 2.54 mm/min (see JAMC article referenced in Bibliography). It is anticipated that research to complete a similar map for the entire U.S. (at an appropriate return period wind speed and threshold for coincidental rainfall rate) will be completed prior to the second committee hearing in 2024.

Section 1402.3 & Table 1402.3

– The test procedure and requirements used in proposed new Section 1402.3 rely on a standard test method commonly used for assessing wind-driven rain resistance, ASTM E331. While similar to testing requirements in Exception 2 of Section 1402.2, the application of Section 1402.3 is not limited to evaluation of “barrier claddings” that lack a means of drainage. The main purpose of the mapped wind-driven rain hazard (Figure 1402.3) is to provide a wind-driven rain wind speed from which an appropriate, risk-consistent test pressure can be used to evaluate the water-resistance of wall assemblies and exterior wall covering assemblies or components using ASTM E331. The test pressure may be determined in two ways. One way is to use the prescriptive (pre-calculated) test pressures in Table 1402.3. The other way is to calculate the test pressure using the ASCE 7 provisions for wind loads, but substituting the appropriate wind-driven rain wind speed from Figure 1402.3 for the basic wind speed used for structural design purposes in ASCE 7. The latter method was how Table 1402.3 was generated. An example of calculating the test pressure using Figure 1402.3 and the wind load provisions of ASCE 7 is as follows:

Wind-driven rain wind speed: 44.8 mph (20 m/s – Figure 1402.3)

Wind Exposure: B (suburban/wooded)

Building Height: 30 feet

Wall Pressure coefficients – GCp = 1.0 (positive); GCpi = -0.18 (negative internal pressure)

Kz = 0.7 (exposure B, 30’ height)

Kd = 1.0 (directionality not considered)

Kzt = 1.0 (no topographic wind speed up effects considered)

Ke = 1.0 (no elevation effects considered w/r to lower density of air at higher elevations)

p = $[0.00256 \text{ Kz Kzt Kd Ke } V^2] \times [\text{GCp} - \text{GCpi}]$

$= 0.00256(0.7)(1.0)(1.0)(1.0)(44.8)^2 \times [1.0 + 0.18]$

= (3.6 psf) x [1.18] = **4.24 psf** test pressure

The above calculation method was used to develop Table 1402.3 as shown also in the table below. This table is provided for transparency and informational purposes.

	Mean	WDR Wind Speed, m/s (MPH)									
Wind	Roof	10	15	20	25	30	35	40	45	50	60
Exposure	Height (ft)	22.4	33.6	44.8	56	67.2	78.4	89.6	100.8	112	134.4
	15	0.86	1.94	3.46	5.40	7.78	10.58	13.82	17.50	21.60	31.10
	20	0.94	2.11	3.76	5.87	8.46	11.51	15.04	19.03	23.49	33.83
	25	1.00	2.25	4.00	6.25	9.00	12.25	16.01	20.26	25.01	36.01
B	30	1.06	2.39	4.24	6.63	9.55	13.00	16.98	21.49	26.53	38.20
	40	1.15	2.59	4.61	7.20	10.37	14.11	18.43	23.33	28.80	41.47
	50	1.23	2.76	4.91	7.67	11.05	15.04	19.64	24.86	30.69	44.20
	60	1.29	2.90	5.15	8.05	11.60	15.78	20.61	26.09	32.21	46.38
	15	1.29	2.90	5.15	8.05	11.60	15.78	20.61	26.09	32.21	46.38
	20	1.36	3.07	5.46	8.53	12.28	16.71	21.83	27.62	34.10	49.11
	25	1.42	3.21	5.70	8.90	12.82	17.45	22.80	28.85	35.62	51.29
C	30	1.49	3.34	5.94	9.28	13.37	18.20	23.77	30.08	37.14	53.47
	40	1.58	3.55	6.31	9.85	14.19	19.31	25.22	31.92	39.41	56.75
	50	1.65	3.72	6.61	10.33	14.87	20.24	26.43	33.46	41.30	59.48
	60	1.71	3.85	6.85	10.70	15.41	20.98	27.40	34.68	42.82	61.66
	15	1.56	3.51	6.24	9.76	14.05	19.12	24.98	31.61	39.03	56.20
	20	1.64	3.68	6.55	10.23	14.73	20.05	26.19	33.15	40.92	58.93
	25	1.70	3.82	6.79	10.61	15.28	20.80	27.16	34.38	42.44	61.11
D	30	1.76	3.96	7.03	10.99	15.82	21.54	28.13	35.60	43.96	63.30
	40	1.85	4.16	7.40	11.56	16.64	22.65	29.59	37.45	46.23	66.57
	50	1.92	4.33	7.70	12.03	17.32	23.58	30.80	38.98	48.12	69.30
	60	1.99	4.47	7.94	12.41	17.87	24.32	31.77	40.21	49.64	71.48

It is important to note that the failure mode that this proposal addresses is the initiation of a leak (water intrusion) at a specified extreme event level. Therefore, it provides protection for routine and lesser extreme events that have equal or lower wind-driven rain wind speed (even if the rainfall rate is substantially greater than the threshold used to develop Figure 1402.3). Events that exceed the wind-driven rain wind speed and given recurrence interval (return period or annual extreme probability) tend to have lower coincidental rainfall rates as based on the natural tendency in the climatological data (see JAMC article referenced in Bibliography).

Finally, as indicated in Section 1402.3 (Item 1) and shown in Table 1402.3, the lower limit of 2.86 psf (137 Pa) for test pressure is used to correspond with the minimum test pressure specified in ASTM E331 (despite the table above showing that lower pressure could be justified in regions of low wind-driven rain hazard). The upper limit of 12.0 psf (575 Pa) in Table 1402.3 also is based on current accepted practice for worst-case wind-driven rain climate conditions in the U.S. and ensures the availability of solutions (it also ensures equivalency with current accepted practices for regions or conditions considered to have high wind-driven rain hazard). These limits ensure that this new approach is "calibrated" to accepted practice and that solutions are available while also better aligning solutions with actual variation in U.S. wind-driven rain hazard. Even so, the 12 psf cap will provide substantial protection against significant water-intrusion and contents damage in greater wind-driven rain hazard conditions or events (higher wind speed at greater return periods) up to the point where structural failures begin to occur and the general integrity of the building envelope is compromised. Such extreme structural safety-level events are beyond the scope of a serviceability concern underlying the current and proposed approach to water resistance. Regardless, the proposed approach deals with the matter of wind-driven rain water resistance in a much more risk-consistent fashion based on the variation in hazard across the U.S. (wind-driven rain wind speed) and for different building conditions (e.g., wind exposure and building height).

Bibliography: Belcher, B.N., DeGaetano, A.T., Masters, F.J., Crandell, J., and Morrison, M.J. (2023). Development of an Extreme Wind-Driven Rain Climatology for the Southeastern United States Using 1-Min Rainfall and Peak Wind Speed Data. *Journal of Applied Meteorology and Climatology*, American Meteorological Society, DOI: https://doi.org/10.1175/JAMC-D-22-0156.1

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0.00

While the cost impact indicates "increased cost" (there was no suitable default answer in cdpACCESS), the proposal does not mandate any new requirements. It provides a new means or option to evaluate building wall assemblies and components for water resistance using an improved methodology based on actual wind-driven rain hazard. If voluntarily used, it could result in an increase or decrease cost for material or assembly qualification purposes relative to existing practices. But, the increase or decrease in cost to the end user may be very small. This proposal also does not require any existing materials or methods recognized in the code to alter current requirements, methods, or standards. So, it should be considered cost neutral.

Estimated Immediate Cost Impact Justification (methodology and variables):

Zero

Estimated Life Cycle Cost Impact:

Zero

Estimated Life Cycle Cost Impact Justification (methodology and variables):

See cost impact statement.

FS98-24

FS99-24

IBC: 1402.5, 1402.5.1, 1402.5.2, 1402.5.3, 1402.5.4, 1402.5.5, 1402.6

Proponents: Brendan Smith, CannonDesign, CannonDesign (bsmith@cannondesign.com); Joseph ONeill, CannonDesign, Self - Senior Vice President (jponeill@cannondesign.com)

2024 International Building Code

Revise as follows:

1402.5 Vertical and lateral flame propagation.
Exterior walls on *buildings* of Type I, II, III and IV construction that contain a combustible *exterior wall covering*, combustible insulation or a combustible *water-resistive barrier* shall comply with Sections 1402.5.1 through 1402.5.5, as applicable. For the purposes of this section, combustibility shall be determined by the definition in NFPA 285. Where compliance with NFPA 285 and associated acceptance criteria is required in Sections 1402.5.1 through 1402.5.5, the *exterior wall assembly* shall be tested in accordance with and comply with the acceptance criteria of NFPA 285.

1402.5.1 Combustible water-resistive barrier.
Exterior walls containing a combustible *water-resistive barrier* shall comply with Section 1402.6.

1402.5.2 Metal composite material (MCM) .
Exterior walls containing metal composite material (MCM) systems shall comply with Section 1406.

1402.5.3 Exterior insulation and finish system (EIFS) .
Exterior walls containing an exterior insulation and finish system (EIFS) shall comply with Section 1407.

1402.5.4 High-pressure decorative exterior-grade compact laminate (HPL) system .
Exterior walls containing a high-pressure decorative exterior-grade compact laminate (HPL) system shall comply with Section 1408.

1402.5.5 Foam plastic insulation.
Exterior walls containing *foam plastic insulation* shall comply with Section 2603.

Revise as follows:

1402.6 Water-resistive barriers.
Exterior walls on *buildings* of Type I, II, III or IV construction that are greater than 40 feet (12 192 mm) in height above *grade plane* and contain a combustible *water-resistive barrier* shall be tested in accordance with and comply with the acceptance criteria of NFPA 285. For the purposes of this section, c~~C~~ombustibility shall be determined ~~in accordance with Section 703.3~~ by the definition in NFPA 285. For the purposes of this section, *fenestration* products, flashing of *fenestration* products and *water-resistive-barrier* flashing and accessories at other locations, including through wall flashings, shall not be considered part of the *water-resistive barrier*.

Exceptions:

1. *Exterior walls* in which the *water-resistive barrier* is the only combustible component and the *exterior wall* has an *exterior wall* covering of brick, concrete, stone, terra cotta, stucco or steel with minimum thicknesses in accordance with Table 1404.2.
2. *Exterior walls* in which the *water-resistive barrier* is the only combustible component and the *water-resistive barrier* complies with the following:
   2.1 A peak heat release rate of less than 150 kW/m^2, a total heat release of less than 20 MJ/m^2 and an effective heat of combustion of less than 18 MJ/kg when tested on specimens at the thickness intended for use, in accordance with ASTM E1354, in the horizontal orientation and at an incident radiant heat flux of 50 kW/m^2.

   2.2 A *flame spread* index of 25 or less and a *smoke-developed index* of 450 or less as determined in accordance with ASTM E84 or UL 723, with test specimen preparation and mounting in accordance with ASTM E2404.

Attached Files

- **XL-Perm-Ultra-NP-3.pdf**
  https://www.cdpaccess.com/proposal/9587/29661/files/download/4016/
- **XL_Perm_DS_11-15.pdf**
  https://www.cdpaccess.com/proposal/9587/29661/files/download/4015/
- **SUBMITTAL-ENVIRO-BARRIER-SILICONEAWB.pdf**
  https://www.cdpaccess.com/proposal/9587/29661/files/download/4014/
- **GE_ELEMAX_Technical Data Sheet.pdf**
  https://www.cdpaccess.com/proposal/9587/29661/files/download/4013/

Reason: Sections 1402.5 and 1402.6 are where the code determines if testing per NFPA 285 is required. 2024 IBC does not currently define "Combustible," but implies that anything not considered "noncombustible" per Section 703.3 is combustible.

Since the purpose of these sections are to determine applicability of testing for vertical and lateral flame propagation of exterior walls containing combustible materials per NFPA 285, and NFPA 285 does define "Combustible," it would make sense to utilize the NFPA 285 definition. (*2023 NFPA 285: "Combustible (Material). A material that, in the form in which it is used and under the conditions anticipated, will ignite and burn; a material that does not meet the definition of noncombustible or limited combustible.")*

The NFPA definition introduces another term that is not defined by IBC; "limited combustible." And it excludes materials considered to be "limited combustible" from being considered "combustible." 2024 IBC Section 703.3.1 Exception includes a similar carve out for materials meeting specific criteria to be considered noncombustible. Presumably, this exception mostly applies to gypsum board.

NFPA 285 considers materials to be "limited combustible" where they are tested per ASTM E2965 and meet certain criteria for peak heat release and total heat release. There are currently a number of silicone-based water resistive barriers on the market that meet these criteria when tested per ASTM E1354, and could likely meet them when retested per E2965 (refer to product data sheets in attachments for examples). If these sections were to use the NFPA definition of combustible, these products would not be considered combustible and could be used without triggering the need for an NFPA 285 test of the full assembly (assuming no other triggers).

Use of such water resistive barriers in lieu of more combustible water resistive barriers would reduce the risk of flame propagation. The ability to forgo the need for designing to a specific NFPA tested assembly, providing engineering judgements for minor variations, and maintaining compliance with that assembly throughout bidding and construction could encourage greater use of these lower-risk materials and improve fire safety in our new building stock.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

Approximately $4200 per project.

Estimated Immediate Cost Impact Justification (methodology and variables):

The functional difference from current state for a project team utilizing a WRB that does not need to be considered combustible would be a reduction in time spent due to not requiring any NFPA tested assemblies.
The size and nature of each project can vary significantly, including the number, type, and complexity of different exterior wall assemblies utilized, as well as the speed of work and billing rates of each employee. The below assumptions were made in consultation with the Director of Quality and the Specifications Team Leader at our firm, and based on their experience working with teams across our 17 offices

Design

- Architect research time to find a tested assembly: Assume 3 hrs per assembly x 3 assemblies per project x $175 per hr rate = $1575.
- Spec writer and architect time to develop portions of the specs to cover the NFPA requirements: assume 3 hrs at $175 per hr rate = $525
- Review of NFPA related submittals from contractor: 6 hrs at $175 per hr rate = $1050. Assumes some processing, coordination, and resubmittal time.

Engineering:

- Preparation of engineering analysis by fire engineer to account for variations from exact tested assembly: 3 hrs at $175 per hr rate = $525

Construction:

- Preparation of NFPA related submittals showing compliance with the tested assembly: 3 hrs at $175 per hr rate = $525
- Assume no, or limited savings in materials even though manufacturers not having to test assemblies could lead to savings, since such costs would be diffused over all of the projects they sell products to. = $0

Estimated Life Cycle Cost Impact:

$0

Estimated Life Cycle Cost Impact Justification (methodology and variables):

We predict no change in life cycle cost as there is no significant change in function of any materials.

FS99-24

FS100-24

IBC: 1402.5, 1402.5.1, 1402.5.2, 1402.5.3, 1402.5.4, 1402.5.5 (New), 1402.5.6 (New), 1402.5.5

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Building Code

1402.5 Vertical and lateral flame propagation.
Exterior walls on *buildings* of Type I, II, III and IV construction that contain a combustible *exterior wall covering*, combustible insulation or a combustible *water-resistive barrier* shall comply with Sections 1402.5.1 through 1402.5.5, as applicable. Where compliance with NFPA 285 and associated acceptance criteria is required in Sections 1402.5.1 through 1402.5.5, the *exterior wall assembly* shall be tested in accordance with and comply with the acceptance criteria of NFPA 285.

1402.5.1 Combustible water-resistive barrier.
Exterior walls containing a combustible *water-resistive barrier* shall comply with Section 1402.6.

1402.5.2 Metal composite material (MCM) .
Exterior walls containing metal composite material (MCM) systems shall comply with Section 1406.

1402.5.3 Exterior insulation and finish system (EIFS) .
Exterior walls containing an exterior insulation and finish system (EIFS) shall comply with Section 1407.

1402.5.4 High-pressure decorative exterior-grade compact laminate (HPL) system .
Exterior walls containing a high-pressure decorative exterior-grade compact laminate (HPL) system shall comply with Section 1408.

Add new text as follows:

1402.5.5 Insulated metal panel (IMP) systems. Exterior walls containing IMP systems shall comply with Section 1409.

1402.5.6 Exterior wall veneers manufactured using combustible adhesives. Exterior walls containing exterior wall veneers manufactured using combustible adhesives shall comply with Section 1402.7.

Revise as follows:

~~1402.5.5~~ 1402.5.7 Foam plastic insulation.
Exterior walls containing *foam plastic insulation* shall comply with Section 2603.

Reason: During the last cycle, Section 1402.5 was revised by FS122-21 (AM) to collect references for relevant IBC sections containing specific requirements for testing of exterior wall assemblies in accordance with, and meeting the acceptance criteria of, NFPA 285. Also added last cycle were new Section 1409 for insulated metal panel (IMP) products and systems (FS149-21 Part I, AS) and new Section 1402.7 for exterior wall veneers manufactured using combustible adhesives (FS125-21, AMPC1). Both of these new sections contain requirements for testing and compliance with NFPA 285 are, therefore, their inclusion in Section 1402.5 is appropriate and will maintain consistency and completeness of the provision.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This change proposal simply adds references to other code sections where existing requirements are located. As such, there are no new technical requirements and no cost impact.

FS100-24

FS101-24

IBC: 1402.5, 1402.5.1, 1402.5.2, 1402.5.3, 1402.5.4, 1402.5.5, 1402.5.6 (New)

Proponents: Theresa Weston, The Holt Weston Consultancy, Rainscreen Association in North America (holtweston88@gmail.com)

2024 International Building Code

Revise as follows:

1402.5 Vertical and lateral flame propagation.
Exterior walls on *buildings* of Type I, II, III and IV construction that contain a combustible *exterior wall covering*, combustible insulation or a combustible *water-resistive barrier* shall comply with Sections 1402.5.1 through ~~1402.5.5~~ 1402.5.6, as applicable. Where compliance with NFPA 285 and associated acceptance criteria is required in Sections 1402.5.1 through ~~1402.5.5~~ 1402.5.6, the *exterior wall assembly* shall be tested in accordance with and comply with the acceptance criteria of NFPA 285.

1402.5.1 Combustible water-resistive barrier.
Exterior walls containing a combustible *water-resistive barrier* shall comply with Section 1402.6.

1402.5.2 Metal composite material (MCM) .
Exterior walls containing metal composite material (MCM) systems shall comply with Section 1406.

1402.5.3 Exterior insulation and finish system (EIFS) .
Exterior walls containing an exterior insulation and finish system (EIFS) shall comply with Section 1407.

1402.5.4 High-pressure decorative exterior-grade compact laminate (HPL) system .
Exterior walls containing a high-pressure decorative exterior-grade compact laminate (HPL) system shall comply with Section 1408.

1402.5.5 Foam plastic insulation.
Exterior walls containing *foam plastic insulation* shall comply with Section 2603.

Add new text as follows:

1402.5.6 Fiber-Reinforced Polymer. *Exterior Walls* containing *fiber-reinforced polymer* shall comply with Section 2613.

Reason: This proposal completes the list of pointers added in the last code change cycle. Section 2613.5 contains requirements for fiber-reinforced polymer materials used in exterior walls and further links to NFPA285 testing requirements. The inclusion of pointers was accepted in the last cycle as it "assists users of the Code by providing reference to all the relevant sections of Chapter 14 and Chapter 26 containing specific requirements for exterior wall assemblies needing testing to NFPA 285" (as stated in the 2021 Report of the Committee Action Hearings on the 2021 Editions of the Group A International Codes" Item FS122-21). This proposal has the same purpose of assisting users of the Code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal does not change requirements but only provides a pointer to existing requirements to aid the user of the code.

FS101-24

FS102-24

IBC: 1402.5, ULC Chapter 35 (New)

Proponents: William Koffel, Koffel Associates, Inc., Fire Safe North America (wkoffel@koffel.com)

2024 International Building Code

Revise as follows:

1402.5 Vertical and lateral flame propagation.

Exterior walls on *buildings* of Type I, II, III and IV construction that contain a combustible *exterior wall covering*, combustible insulation or a combustible *water-resistive barrier* shall comply with Sections 1402.5.1 through 1402.5.5, as applicable. Where compliance with NFPA 285 and associated acceptance criteria is required in Sections 1402.5.1 through 1402.5.5, the *exterior wall assembly* shall be tested in accordance with and comply with the acceptance criteria of NFPA 285.

Exception: Buildings of Type IV-A, IV-B and IV-C construction that are tested in accordance with CAN/ULC-S134, and comply with the following:

1. Flaming on or in the exterior wall covering does not exceed 5 m (16.4 ft) above the opening.
2. Flaming on or in the exterior wall covering does not exceed 5 m (16.4 ft) above the opening.
3. Heat flux during the flame exposure on the exterior wall covering does not exceed 35 kW/m measured at 3.5 m (11.5 ft) above the opening.

Add new standard(s) as follows:

ULC

Underwriters Laboratories of Canada
13775 Commerce Parkway
Richmond, BC V6V 2V4

CAN/ULC-S134 Standard Method of Fire Test of Exterior Wall Assemblies

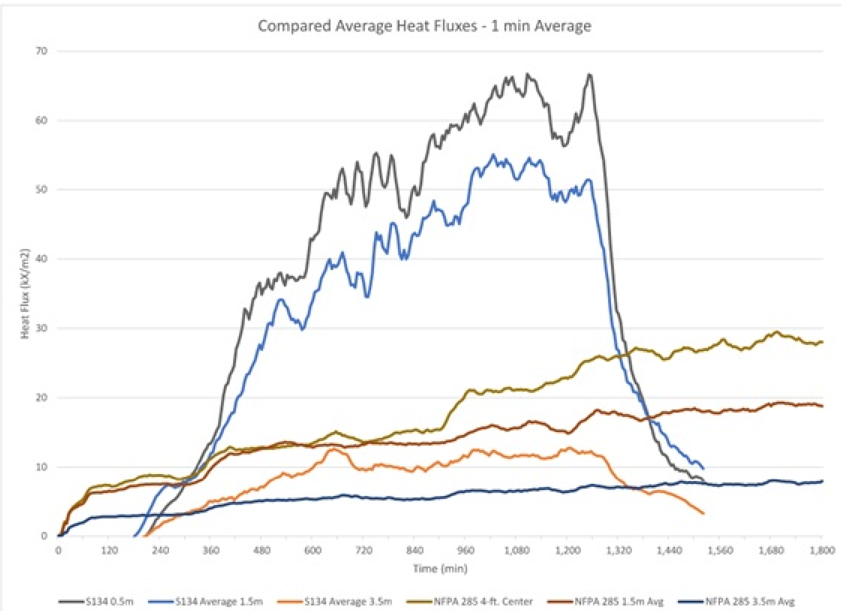
Staff Analysis: A review of the standard proposed for inclusion in the code, CAN/ULC-S134 Standard Method of Fire Test of Exterior Wall Assemblies, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: This test method is being introduced as an alterative to NFPA 285 because of the more intense fire exposure on the façade of the exterior wall covering. This test method is considered to be a more severe assault on the wall system, making it a more conservative assessment of the potential for flame propagation.

In 2015, the International Code Council (ICC) Board of Directors created an Ad Hoc Committee on Tall Wood Buildings (TWB) to study the topic of tall wood buildings and to propose code changes to the International Building Code for the 2021 edition. Over a three-year process, the TWB reviewed many significant considerations relevant for tall wood buildings. Their work resulted in establishing a combination of prescriptive limits and test performance requirements for tall wood buildings up to 18 stories or 270 feet in height. The TWB proposed three additional construction type classifications relative to mass timber. These classifications, Class IV-A, B and C permit a stepped increase in height and area relative to the level of passive protection, or area of exposed interior timber. During the development of fire safety of exterior wall provisions, the TWB considered the use of three exterior wall fire tests: NFPA 285-2012, FM 4880, CAN/ULC-S134-2013. The TWB considered each of these test methods, discussed the unknowns about proven performance, debated height requirements, as well as heard concerns from the fire service and other industry professionals. Ultimately a proposal was put forth that tall wood buildings up to 18 stories shall meet NFPA 285, with an additional requirement that the exterior wall insulation and covering also be non-combustible. This requirement has been included in the International Building Code since the 2021 edition.

CAN/ULC-S134 is a two-story test method developed by National Research Council of Canada in the 1980's. The test simulates an enclosure fire exposure via a 1.37 m high x 2.6 m wide opening with the fire impingement on the exterior surface of the test specimen. The test method enables complete exterior wall coverings be installed on the test support rig with no concrete or masonry substrate, if required. The overall dimension of the test assembly is 10 m high by 5 m wide (i.e. 30.5 ft tall by 15 ft wide), which is larger than the NFPA 285 test facility which is 5.3 m high x 4.1 m wide (i.e. 17.5 ft high by 13.5 ft wide). In both tests, the exterior wall covering is tested a complete system including any external cladding, insulation, external substrate framing and internal wall membrane and must include typical vertical and horizontal joints directly above the opening.

In the NFPA 285 test method, the room burner output is gradually increased to provide a maximum of approximately 900 kW over the 30 minute test duration. A window burner is ignited 5 minutes after the room burner and is gradually increased to contribute an additional 400 kW over the remaining 25 minute test period. In total, the burners are calibrated to achieve average heat fluxes, at the surface of a noncombustible test wall, of approximately 35-40 kW/m2 at 0.92 m (36 inches) above the opening and 15 kW/m2 at 1.54 m (60 inches) above the opening during the peak fire source period of 25-30 minutes. However, these maximum heat flux values are not reached until 25 minutes after the start of the test. The average heat flux achieved over the first 15 minutes of the test is approximately 20 kW/m2, while the average heat flux achieved during the last 15 minutes of the test (which is the period of maximum heat exposure) is approximately 36 kW/m^2. The graph below demonstrates the comparison of the fire exposure on the exterior wall in each test method.



In contrast, the CAN/ULC-S134 test uses linear propane burners designed to produce a burner output of approximately 120 g/s propane (5.5MW) within the room. The total test duration is 25 minutes with 5 minute fire growth phase, 15 minute steady state phase and 5 minute fire decay phase. This fire source is calibrated to achieve a mean heat flux of 45 ± 5 kW/m2 measured 0.5 m (19.5 inches) above the opening soffit, and an average of 27 ± 3 kW/m2 measured 1.5 m (58 inches) above the soffit of the opening, averaged over the entire 15 minute steady state period. Measurements using a noncombustible exterior wall system during the development of the test method demonstrated that this produces an average heat flux of 16 kW/m2 at a height of 3.5 m (136.5 inches, or 11.4 ft) above the opening.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This change provides an optional alternative to the existing requirements, without replacing any existing compliance paths. The cost of both tests is comparable.

FS102-24

FS103-24

IBC: 1402.6

Proponents: David Bueche, Hoover Treated Wood Products (dbueche@frtw.com)

2024 International Building Code

Revise as follows:

1402.6 Water-resistive barriers.
Exterior walls on *buildings* of Type I, II, III or IV construction that are greater than 40 feet (12 192 mm) in height above *grade plane* and contain a combustible *water-resistive barrier* shall be tested in accordance with and comply with the acceptance criteria of NFPA 285.Combustibility shall be determined in accordance with Section 703.3. For the purposes of this section, *fenestration* products, flashing of *fenestration* products and *water-resistive-barrier* flashing and accessories at other locations, including through wall flashings, shall not be considered part of the *water-resistive barrier*.

Exceptions:

1. *Exterior walls* in which the *water-resistive barrier* is the only combustible component and the *exterior wall* has an *exterior wall* covering of brick, concrete, stone, terra cotta, stucco or steel with minimum thicknesses in accordance with Table 1404.2.
2. *Exterior walls* in which the *water-resistive barrier* is the only combustible component and the *water-resistive barrier* complies with the following:
   2.1 A peak heat release rate of less than 150 kW/m^2, a total heat release of less than 20 MJ/m^2 and an effective heat of combustion of less than 18 MJ/kg when tested on specimens at the thickness intended for use, in accordance with ASTM E1354, in the horizontal orientation and at an incident radiant heat flux of 50 kW/m^2.

   2.2 A *flame spread* index of 25 or less and a *smoke-developed index* of 450 or less as determined in accordance with ASTM E84 or UL 723, with test specimen preparation and mounting in accordance with ASTM E2404.
3. <u>Walls constructed of *fire-retardant-treated wood* complying with Section 2303.2 and tested in accordance with and comply with the acceptance criteria of NFPA 285, and the *water-resistive barrier* complies with either Exception 1 or Exception 2.</u>

Reason: Building cladding fires, such as the Grenfell Tower fire in London, UK, have prompted review of the application of the NFPA 285 test standard to identify potential existing conflicts and areas of needed improvement or clarification. Section 1402.5 appears to create a conflict resulting in significant industry confusion regarding the use of fire-retardant-treated wood (FRTW) in Types I, II, III, & IV construction as allowed by Section 602 and 603. This section suggests that FRTW cannot be used with a NFPA 285-compliant water-resistive barrier beyond 40 feet in height. The code currently allows FRTW used in Type III construction to extend to 85 feet in height. As FRTW does not meet the definition of “noncombustible” per Section 703.5, exceptions 1 and 2 cannot be applied. This change provides for the needed clarification to permit FRTW to be used as permitted in Section 602 and 603 in conjunction with a NFPA 285 compliant water-resistive barrier.

One of the arguments from the last code cycle was that the industry wanted this exception because they cannot pass NFPA 285. However, recent tests have resulted in a UL exterior wall system (UL-EWS0045) for an FRTW lumber and plywood assembly with two weather-resistive barrier options demonstrating compliance with NFPA 285.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

There is a potential for construction savings where FRTW use was denied due to existence of a combustible water-resistive barrier.

A cost decrease of $27.46 per square foot is possible in an R-2 Occupancy if Type IIIA Construction can be used in lieu of Type IIA Construction. See the August 2023 ICC Building Valuation Data where an R-2 Occupancy of Type IIIA Construction has a square foot construction cost $175.96 and an R-2 Occupancy of Type IIA Construction has a square foot construction cost of $203.42.

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Estimated Immediate Cost Impact Justification (methodology and variables):

Fire-retardant-treated wood is generally less expensive than noncombustible materials. Because FRTW may be used as an alternate to these materials, the cost may be less.

FS103-24

FS104-24

IBC: 1402.6, 2603.5.7

Proponents: Alexander Haldeman, James Hardie Building Products, James Hardie Building Products (alex.haldeman@jameshardie.com)

2024 International Building Code

Revise as follows:

1402.6 Water-resistive barriers.
Exterior walls on *buildings* of Type I, II, III or IV construction that are greater than 40 feet (12 192 mm) in height above *grade plane* and contain a combustible *water-resistive barrier* shall be tested in accordance with and comply with the acceptance criteria of NFPA 285.Combustibility shall be determined in accordance with Section 703.3. For the purposes of this section, *fenestration* products, flashing of *fenestration* products and *water-resistive-barrier* flashing and accessories at other locations, including through wall flashings, shall not be considered part of the *water-resistive barrier*.

Exceptions:

1. *Exterior walls* in which the *water-resistive barrier* is the only combustible component and the *exterior wall* has an *exterior wall* covering of brick, concrete, stone, terra cotta, stucco, ~~or~~ steel or fiber-cement with minimum thicknesses in accordance with Table 1404.2.
2. *Exterior walls* in which the *water-resistive barrier* is the only combustible component and the *water-resistive barrier* complies with the following:
   2.1 A peak heat release rate of less than 150 kW/m^2, a total heat release of less than 20 MJ/m^2 and an effective heat of combustion of less than 18 MJ/kg when tested on specimens at the thickness intended for use, in accordance with ASTM E1354, in the horizontal orientation and at an incident radiant heat flux of 50 kW/m^2.

   2.2 A *flame spread* index of 25 or less and a *smoke-developed index* of 450 or less as determined in accordance with ASTM E84 or UL 723, with test specimen preparation and mounting in accordance with ASTM E2404.

2603.5.7 Ignition.
Exterior walls shall not exhibit sustained flaming where tested in accordance with NFPA 268. Where a material is intended to be installed in more than one thickness, tests of the minimum and maximum thickness intended for use shall be performed.

Exception: Assemblies protected on the outside with one of the following:

1. A thermal barrier complying with Section 2603.4.
2. A minimum 1-inch (25 mm) thickness of concrete or *masonry*.
3. Glass-fiber-reinforced concrete panels of a minimum thickness of $^3/_8$ inch (9.5 mm).
4. Metal-faced panels having minimum 0.019-inch-thick (0.48 mm) aluminum or 0.016-inch-thick (0.41 mm) corrosion-resistant steel outer facings.
5. A minimum $^7/_8$-inch (22.2 mm) thickness of stucco complying with Section 2510.
6. A minimum $^1/_4$-inch (6.4 mm) thickness of *fiber-cement* lap, panel or shingle siding complying with Section 1404.17 and Section 1404.17.1 or 1404.17.2.

Reason: This change proposal is editorial in nature, and harmonizes materials listed in section 1402.6 with those listed in 2603.5.7

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal provides harmonization of materials listed as exceptions. No additional requirements are being added.

FS105-24

IBC: 1402.7

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Building Code

Revise as follows:

1402.7 Exterior wall ~~veneers~~ coverings manufactured using combustible adhesives used in exterior wall assemblies.
Exterior wall assemblies on *buildings* of Type I, II, III or IV construction that are greater than 40 feet (12 192 mm) in height above *grade plane* and contain an exterior wall ~~*veneer*~~ covering manufactured using a combustible adhesive to laminate a metal core with noncombustible facing materials shall be tested in accordance with, and comply with, the acceptance criteria of NFPA 285. ~~,~~ Such testing shall be performed on exterior wall assemblies that include the exterior wall covering with the adhesive level at the maximum application rate intended for use. Combustibility shall be determined in accordance with Section 703.3.

Reason: Concern over possible misinterpretation of "veneer" in Section 1402.7 has prompted this proposal to clarify the intended building materials and systems that are the scope of the provision.

Adopted during the last cycle under FS125-21 (AMPC1), the intent of 1402.7 was to ensure the IBC requires that vertical and lateral flame propagation performance is verified for exterior wall assemblies containing a type of exterior panel product composed of noncombustible facings and noncombustible cores that are adhered to together using a combustible adhesive. The reason statement for FS125-21 included two figures with images of examples of the subject products – metal honeycomb core panels and corrugated metal core panels. Figures 1 and 2 are reproduced below.

The IBC defines veneer as, "**VENEER**. A facing attached to a wall for the purpose of providing ornamentation, protection or insulation, but not counted as adding strength to the wall." As used in Section 1402.7, there is concern that "veneer" could be misinterpreted to make this requirement apply where any exterior wall assembly has a noncombustible surfacing adhered to any metal substrate using a combustible adhesive instead of only the intended panelized products. Changing the terminology from "veneer" to "panel system" clarifies the requirement.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Figure 1. Metal honeycomb core (facing removed on lower half) – Combustible adhesives used to attach both top and bottom facings.

Figure 2. Corrugated metal core panel (End View) - Combustible adhesives used to attach both top and bottom facings.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This change proposal clarifies the existing code requirement to address a potential misinterpretation as to what building products and use the code provision applies.

FS105-24

FS106-24

IBC: 1402.8

Proponents: Marcelo Hirschler, GBH International, GBH International (mmh@gbhint.com); Tim Earl, GBH International, Self (tearl@gbhint.com)

2024 International Building Code

Revise as follows:

1402.8 Vertical and lateral flame propagation compliance methods.
When exterior wall assemblies are required in this chapter to be tested for vertical and lateral flame propagation in accordance with and comply with the acceptance criteria of NFPA 285, compliance with the requirements shall be established by any of the following:

1. An *exterior wall assembly* tested in accordance with and meeting the acceptance criteria of NFPA 285.
2. An *exterior wall assembly* design *listed* by an *approved agency* for compliance with NFPA 285.
3. An *approved* engineering analysis based on an assembly or condition tested in accordance with and meeting the acceptance criteria of NFPA 285.

Reason: The wording in the upcoming edition of NFPA 285, which contains a new chapter associated with analysis methods describes the process as an "engineering analysis" and not just an analysis.

The wording in section 12.1 reads: "12.1 General.

This chapter shall cover the extension of compliant test results obtained from NFPA 285 to wall assemblies that differ from a tested wall assembly in terms of materials, components, or configuration of materials via an engineering analysis."

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

clarification for consistency with NFPA 285 chapter 12.

FS106-24

FS107-24

IBC: 1403.2

Proponents: Theresa Weston, The Holt Weston Consultancy, Air Barrier Association of America (ABAA) (holtweston88@gmail.com)

2024 International Building Code

Revise as follows:

1403.2 Water-resistive barrier.
Not fewer than one layer of *water-resistive barrier* material shall be attached to the studs or sheathing, with flashing as described in Section 1404.4, in such a manner as to provide a continuous *water-resistive barrier* behind the exterior wall *veneer*. The intersection between the *water-resistive barrier* material and fenestration openings shall be flashed and assembled in accordance with the fenestration manufacturer's installation instructions, or other *approved* methods for applications not addressed by the fenestration manufacturer's instructions. The water-resistive barrier material shall be continuous to the top of walls and terminated at penetrations and *building* appendages in a manner to meet the requirements of the exterior wall envelope as described in Section 1402.2. Where the *water-resistive barrier* also functions as a component of a continuous air barrier, the *water-resistive barrier* shall be installed as an air barrier in accordance with the *International Energy Conservation Code.*
Water-resistive barriers shall comply with one of the following:

1. No. 15 felt complying with ASTM D226, Type 1.
2. ASTM E2556, Type I or II.
3. Foam plastic insulating sheathing *water-resistive barrier* systems complying with Section 1402.2 and installed in accordance with manufacturer's installation instructions.
4. ASTM E331 in accordance with Section 1402.2.
5. Other *approved* materials installed in accordance with the manufacturer's installation instructions.

No. 15 asphalt felt and water-resistive barriers complying with ASTM E2556 shall be applied horizontally with the upper layer lapped over the lower layer not less than 2 inches (51 mm). Where joints occur, the upper and lower layer shall be lapped not less than 6 inches (152 mm).

Reason: This proposal recognizes the challenge of materials that serve multiple functions. In many projects a water-resistive barrier also serves as a major component of an air barrier assembly. This proposal seeks coordination of installation of water-resistive barriers between the IBC and IECC (where they may be used as a part of a continuous air barrier system) in order to streamline the compliance with both codes.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This change proposal does not add or change any code requirements. It only serves to coordinate the provisions between the IBC and IECC.

FS107-24

FS108-24

IBC: 1403.2, 1403.2.1 (New), 1705.21 (New)

Proponents: Theresa Weston, The Holt Weston Consultancy, Air Barrier Association of America (ABAA) (holtweston88@gmail.com)

2024 International Building Code

1403.2 Water-resistive barrier.
Not fewer than one layer of *water-resistive barrier* material shall be attached to the studs or sheathing, with flashing as described in Section 1404.4, in such a manner as to provide a continuous *water-resistive barrier* behind the exterior wall *veneer*. The intersection between the *water-resistive barrier* material and fenestration openings shall be flashed and assembled in accordance with the fenestration manufacturer's installation instructions, or other *approved* methods for applications not addressed by the fenestration manufacturer's instructions. The water-resistive barrier material shall be continuous to the top of walls and terminated at penetrations and *building* appendages in a manner to meet the requirements of the exterior wall envelope as described in Section 1402.2. *Water-resistive barriers* shall comply with one of the following:

1. No. 15 felt complying with ASTM D226, Type 1.
2. ASTM E2556, Type I or II.
3. Foam plastic insulating sheathing *water-resistive barrier* systems complying with Section 1402.2 and installed in accordance with manufacturer's installation instructions.
4. ASTM E331 in accordance with Section 1402.2.
5. Other *approved* materials installed in accordance with the manufacturer's installation instructions.

No. 15 asphalt felt and water-resistive barriers complying with ASTM E2556 shall be applied horizontally with the upper layer lapped over the lower layer not less than 2 inches (51 mm). Where joints occur, the upper and lower layer shall be lapped not less than 6 inches (152 mm).

Add new text as follows:

1403.2.1 Special inspections. The installation of the *water-resistive barrier* shall comply with the provisions of Sections 1704.2 and 1705.21.

1705.21 Water-resistive barrier Installation. *Special inspections* shall be required for the installation of the *water-resistive barrier* and the intersection of the *water-resistive barrier* with flashing in accordance with Sections 1403.2.

Reason: It is estimated that 70% of construction claims are due to water and moisture issues in the enclosure. [2,5] According to a recent report on building enclosure damage, "Water intrusion... .dreaded by homeowners, contractors, and insurance adjusters alike. It is evident why, as it ranks as the second most common cause for property insurance claims and first for the most expensive type of claim. In addition, water intrusion accounts for 70% of construction litigation. On average, each incident costs $11,098; collectively, water intrusion costs over $20 billion annually throughout the United States.[6] Furthermore, data suggests these water intrusion issues are a result of incorrect installation:

- A survey of "top 100" general contracting firms found the "53% of all defects of defects originate from poor workmanship, supervision and inspection of trade contractors during construction." [2]
- A third party quality assurance inspection firm lists several defects in water-resistive barrier and flashing integration among the "top 10 construction defects observed across the U.S. in 2018." [3]

This proposal seeks to reduce water intrusion issues resulting from incorrect installation of the water-resistive barrier and/or integration of flashings with the water-resistive barrier through requiring a special inspection of water-resistive barrier installation.

It should be noted that EIFS and EIFS water-resistive barriers already are subject to special inspections.

Bibliography:

1. ABAA, Air Barrier Quality Assurance Program, https://www.airbarrier.org/qap-overview/
2. Grosskopf, K. R. and D. E. Lucas, “Identifying the Causes of Moisture-Related Defect Litigation in U. S. Building Construction”, COBRA 2008 – The Construction and Building Research Conference of the Royal Institution of Chartered Surveyors, Dublin, Sept 4-5, 2008
3. Hoch, Jeff, “The Top 10 Construction Defects Observed Across the U.S. in 2018, QualityBuilt, March 12, 2019; https://www.qualitybuilt.com/resources/top-10-construction-defects-2018/
4. Report of the Barrett Commission of Inquiry into the Quality of Condominium Construction in British Columbia, Vancouver BC, 1998.
5. Stroik, Brian, “Mock-ups: The Crash Test Dummy for Building Enclosures’” ABAA Conference, Norfolk, VA, March 26-27 2019. https://www.abaaconference.com/wp-content/uploads/2019/04/Mock-Ups-The-Crash-Test-Dummy-for-Building-Enclosures-Brian-Stroik.pdf
6. Swart, Amelia, “Damage Report: Water Intrusion”, Forum Forensics, September 20, 2022, https://www.forumforensics.com/blog/damage-report-water-intrusion

Cost Impact: Increase

Estimated Immediate Cost Impact:

$.20 to .40 per square foot of opaque wall area.

Estimated Immediate Cost Impact Justification (methodology and variables):

This estimate was based on the cost of quality audits reported by the Air Barrier Association of America [1] and is likely a high estimate as an air barrier quality audit would cover more items than a special inspection of the water-resistive barrier and flashing alone. The increased immediate cost needs to be weighed against the liability for potential water intrusion damage if the water-resistive barrier and flashing are not installed correctly. Experience has shown that because of the relative inaccessibility of the water management components in the building enclosures, rebuilding a wall system can cost twice as much as the original wall cost per sq. ft. [4]

FS108-24

FS109-24

IBC: 1403.2, ABTG (New)

Proponents: Jay Crandell, P.E., ABTG / ARES Consulting, Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz)

2024 International Building Code

Revise as follows:

1403.2 Water-resistive barrier.
Not fewer than one layer of *water-resistive barrier* material shall be attached to the studs or sheathing, with flashing as described in Section 1404.4, in such a manner as to provide a continuous *water-resistive barrier* behind the exterior wall *veneer*. The intersection between the *water-resistive barrier* material and fenestration openings shall be flashed and assembled in accordance with the fenestration manufacturer's installation instructions, or other *approved* methods for applications not addressed by the fenestration manufacturer's instructions. The water-resistive barrier material shall be continuous to the top of walls and terminated at penetrations and *building* appendages in a manner to meet the requirements of the exterior wall envelope as described in Section 1402.2. *Water-resistive barriers* shall comply with one of the following:

1. No. 15 felt complying with ASTM D226, Type 1.
2. ASTM E2556, Type I or II.
3. Foam plastic insulating sheathing *water-resistive barrier* systems complying with <u>ANSI/ABTG FS200.1 or</u> Section 1402.2 and installed in accordance with manufacturer's installation instructions.
4. ASTM E331 in accordance with Section 1402.2.
5. Other *approved* materials installed in accordance with the manufacturer's installation instructions.

No. 15 asphalt felt and water-resistive barriers complying with ASTM E2556 shall be applied horizontally with the upper layer lapped over the lower layer not less than 2 inches (51 mm). Where joints occur, the upper and lower layer shall be lapped not less than 6 inches (152 mm).

Add new text as follows:

<u>**ABTG** **ANSI/ABTG FS200.1-2022:.** Standard for Use of Foam Plastic Insulating Sheathing (FPIS) in Building Envelopes: Above-grade Walls</u>

Staff Analysis: A review of the standard proposed for inclusion in the code, ANSI/ABTG FS200.1 - 2022:. Standard for Use of Foam Plastic Insulating Sheathing (FPIS) in Building Envelopes: Above-grade Walls, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: The ANSI/ABTG FS200.1 standard (see Bibliography) provides a complete set of performance testing requirements and criteria for FPIS WRB systems as an alterative to Section 1402.2. The water-resistance testing and criteria of 1402.2 are consistent with that required by the FS200.1 standard. In addition to installed system water-resistance testing, the FS200.1 standard addresses material properties and durability for various WRB system components, requires installation instructions to be consistent with the systems as tested, and also addresses manufacturer and third-party quality control and labeling.

Bibliography: ANSI/ABTG FS200.1 – 2022, Standard for the Use of Foam Plastic Insulating Sheathing (FPIS) in Building Envelopes: Above-grade Walls, Applied Building Technology Group, LLC, Madison, WI. https://www.appliedbuildingtech.com/standards

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposal adds an option (voluntary) for FPIS WRB systems qualified and specified through an ANSI consensus standard. It leaves current code minimum requirements unchanged. Therefore, it does not impact cost of construction.

FS109-24

FS110-24

IBC: 1403.11

Proponents: Matthew Dobson, VSI, VSI (mdobson@vinylsiding.org)

2024 International Building Code

Revise as follows:

1403.11 Polypropylene siding.
Polypropylene siding shall be certified and *labeled* as conforming to the requirements of ASTM D7254 and those of Section 1403.11.1 or 1403.11.2 by an approved agency. *Polypropylene siding* shall be installed in accordance with the requirements of Section 1404.18. ~~and in accordance with the manufacturer's instructions. *Polypropylene siding* shall be secured to the *building* so as to provide weather protection for the *exterior walls* of the *building*.~~

Reason: This change is a cleanup to remove installation provision in the material standards section. The pointer is left here so building officials know where to go for installation requirements.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Removal of unnecessary/redundant words.

FS110-24

FS111-24

IBC: SECTION 202 (New), 1403.14, ASTM Chapter 35 (New)

Proponents: Matthew Dobson, VSI, VSI (mdobson@vinylsiding.org)

2024 International Building Code

Add new definition as follows:

BACKED VINYL SIDING.
A cladding product with manufacturer-installed foam plastic backing material as an integral part of the cladding product.

Revise as follows:

1403.14 Insulated vinyl siding and backed vinyl siding.
Insulated vinyl siding and *backed vinyl siding* shall be certified and *labeled* as conforming to the requirements of ASTM D7793 and D7445, respectively, by an *approved agency*.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

ASTM D7445-24	Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Siding with Foam Plastic Backing (Backed Vinyl Siding)

Staff Analysis: A review of the standard proposed for inclusion in the code, ASTM D7445-24 Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Siding with Foam Plastic Backing (Backed Vinyl Siding), with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024

Reason: This change brings in a new standardized product category which is the same as insulated vinyl siding without the the R-value component. It is a board product with no claimed r-value nor considered a continuous insulation. It is a product that has been commercialize for 20 years and by adding it to the code it will help to differentiate the two categories and provide building officials with an understanding of difference between the two categories. Their installations methods are the same, and we'll address the installation section in the next cycle.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This change is adding an a new product category for reference and regulation, but is not making any requirements on its use.

FS111-24

FS112-24

IBC: 1403.15 (New), 1404.19 (New), 1404.19.1 (New), 1404.19.2 (New), 2605.4 (New), ASTM Chapter 35 (New)

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Building Code

Add new text as follows:

1403.15 Plastic lumber or wood-plastic composite exterior wall covering materials. Where plastic lumber materials and wood-plastic composite materials are used as exterior wall coverings, such materials shall be *listed* and labeled in accordance with ASTM D8484 and shall be installed in accordance with the requirements of Section 1404.19 and the manufacturer's instructions. The materials shall be secured to the building so as to provide weather protection for the exterior walls of the building.

1404.19 Plastic lumber or wood-plastic composite exterior wall covering materials. Plastic lumber materials and wood-plastic composite materials used as exterior wall coverings shall comply with this section and Section 1403.15.

1404.19.1 Design wind pressure 30 pounds per square foot or less. Plastic lumber and wood-plastic composite exterior wall coverings materials shall be limited to exterior walls located in areas where the design wind pressure determined in Section 1609 speed does not exceed 30 pounds per square foot (1.44 kN/m^2) except as provided for in 1404.19.2.

1404.19.2 Design wind pressure greater than 30 pounds per square foot. Where the design wind pressured determined in Section 1609 exceeds 30 pounds per square foot (1.44 kN/m^2), tests or calculations indicating compliance with Chapter 16 shall be submitted.

2605.4 Plastic lumber or wood-plastic composite exterior wall covering materials. Plastic lumber materials or wood-plastic composite materials used as exterior wall covering shall comply with Sections 1403 and 1404.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

D8484-23	Standard Specification for Plastic Lumber Materials and Wood-Plastic Composite Materials Used as Exterior Wall Coverings

Staff Analysis: A review of the standard proposed for inclusion in the code, ASTM D8484-23 Standard Specification for Plastic Lumber Materials and Wood-Plastic Composite Materials Used as Exterior Wall Coverings, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: The IBC code includes requirements for a variety of materials that are used as exterior wall coverings, meaning as components of exterior wall assemblies. They include some plastic siding materials, such as vinyl siding and polypropylene siding. The code also includes requirements for the use of plastic composite materials (which are defined in the IBC as "A generic designation that refers to wood/plastic composites, plastic lumber and similar materials.") in "exterior deck boards, stair treads, handrails and guards" (section 1409), with the requirements shown in section 2612.

In recent years some plastic lumber materials and/or wood-plastic composite materials have been used as components of exterior wall assemblies. However, neither section 1403 (Materials) nor section 1404 (Installation of wall coverings) nor section 1405 (Combustible materials on the exterior side of exterior walls) discuss the requirements for plastic lumber materials or wood-plastic composite materials when used as exterior wall coverings, and clearly there needs to be a difference between the use of materials as deck boards (horizontally) and as exterior wall coverings (vertically).

ASTM has recently developed a specification (ASTM D8484, Standard Specification for Plastic Lumber Materials and Wood-Plastic Composite Materials Used as Exterior Wall Coverings) that contains all the appropriate requirements. The properties contained in ASTM D8484 include the following: conditioning, wind load resistance, linear thermal expansion, resistance to moisture and temperature effects, weatherability (resistance to UV0, freeze-thaw resistance, biodeterioration, flame spread index (testing to ASTM E84), ignitability (testing to NFPA 268), exterior to wall assembly fire performance (testing to NFPA 285, when required), and effect on fire resistance rating (when required).

The requirements contained in ICC-ES AC524 (Wood-plastic Composite Products Used as Exterior Siding) formed the basis of the requirements contained in ASTM D8484.

This proposal recommends incorporating these materials specifically into the code, with reference to them meeting the requirements from ASTM D8484.

Some relevant existing code sections are shown below, for comparison.

1403.9 Vinyl siding. Vinyl siding shall be certified and labeled as conforming to the requirements of ASTM D3679 by an *approved* quality control agency.

1404.14 Vinyl siding. Vinyl siding conforming to the requirements of this section and complying with ASTM D3679 shall be permitted on exterior walls where the design wind pressure determined in accordance with Section 1609 does not exceed 30 pounds per square foot (1.44 kN/m2). Where the design wind pressure exceeds 30 pounds per square foot (1.44 kN/m2), tests or calculations indicating compliance with Chapter 16 shall be submitted. Vinyl siding shall be secured to the building so as to provide weather protection for the exterior walls of the building.

1404.14.1 Application. The siding shall be applied over sheathing or materials listed in Section 2304.6. Siding shall be applied to conform to the water-resistive barrier requirements in Section 1402. Siding and accessories shall be installed in accordance with the approved manufacturer's instructions.

1403.12 Polypropylene siding. Polypropylene siding shall be certified and labeled as conforming to the requirements of ASTM D7254 and those of Section 1403.12.1 or 1403.12.2 by an approved quality control agency. Polypropylene siding shall be installed in accordance with the requirements of Section 1404.18 and in accordance with the manufacturer's instructions. Polypropylene siding shall be secured to the building so as to provide weather protection for the exterior walls of the building.

1403.12.1 Flame spread index. The certification of the flame spread index shall be accompanied by a test report stating that all portions of the test specimen ahead of the flame front remained in position during the test in accordance with ASTM E84 or UL 723.

1403.12.2 Fire separation distance. The fire separation distance between a building with polypropylene siding and the adjacent building shall be not less than 10 feet (3048 mm).

1404.18 Polypropylene siding. Polypropylene siding conforming to the requirements of this section and complying with Section 1403.12 shall be limited to exterior walls located in areas where the wind speed specified in Chapter 16 does not exceed 100 miles per hour (45 m/s) and the

building height is less than or equal to 40 feet (12 192 mm) in Exposure C. Where construction is located in areas where the basic wind speed exceeds 100 miles per hour (45 m/s), or building heights are in excess of 40 feet (12 192 mm), tests or calculations indicating compliance with Chapter 16 shall be submitted. Polypropylene siding shall be installed in accordance with the manufacturer's instructions. Polypropylene siding shall be secured to the building so as to provide

weather protection for the exterior walls of the building.

2605.3 Plastic siding. Plastic siding shall comply with the requirements of Sections 1403 and 1404.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposed code change ensures that existing requirements for exterior wall assemblies and exterior wall coverings are applied to the use of plastic lumber and wood-plastic composite materials in those applications.

FS113-24

IBC: SECTION 202 (New), 1403.15 (New), 1403.15.1 (New), 1403.15.1.1 (New), ICC Chapter 35 (New)

Proponents: Keith P Nelson, DuPont, DuPont (keith.nelson@dupont.com)

2024 International Building Code

Add new definition as follows:

MAGNESIUM-OXIDE-CEMENT PANEL PRODUCT. The general name for a family of panel, board, and sheet products having a core consisting essentially of magnesium-oxide-cement and reinforced with organic or inorganic fibers.

Add new text as follows:

1403.15 Magnesium-oxide-cement panel product. *Magnesium-oxide-cement panel product* shall conform tothe requirements of ICC 1125. Installation shall be in accordance with the manufacturer's installation instructions or an *approved* design.

1403.15.1 Surface burning characteristics. *Magnesium-oxide-cement panel product* shall have, when tested in accordance with ASTM E84 or UL 723, a *listed flame spread index* of 25 or less. The ASTM E84 or UL 723 test shall be continued for an additional 20-minute period and the flame front shall not progress more than 10.5 feet (3200 mm) beyond the centerline of the burners at any time during the test.

1403.15.1.1 Alternate fire testing. *Magnesium-oxide-cement panel product* shall have,when tested in accordance with ASTM E2768, a *listed flame spread index* of 25 or less and where the flame front does not progress more than 10.5 feet (3200 mm) beyond the centerline of the burners at any time during the test.

Add new standard(s) as follows:

ICC

International Code Council, Inc.
200 Massachusetts Avenue, NW, Suite 250
Washington, DC 20001

1125 Standard for Classification of Magnesium Oxide Boards in Building and Construction (IS-MGOB)

Staff Analysis: A review of the standard proposed for inclusion in the code, ICC1125 Standard for Classification of Magnesium Oxide Boards in Building and Construction (IS-MGOB), with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: The code change is introducing a new, North American construction material as defined by the ICC-1125 performance standard under development. The MgO industry desires to add these requirements to the IBC given the import of offshore materials, the scaling of North American production capacity, and the use of all these materials in commercial construction.

The surface burning characteristics limitation is similar to an existing exterior sheathing material in Section 2303.2. Applicable code requirements such as assembly fire performance tests still apply. Installation is to be in accordance with the manufacturer's instructions or an approved structural design for sheathing. The product is currently evaluated under ICC-ES Acceptance Criteria AC-386 for Fiber-Reinforced Magnesium-Oxide-Based Sheets and AC-530 for Fiber-Reinforced Magnesium-Oxide-Based Sheets with a Factory-Bonded Water-Resistive Overlay Membrane.

A Group B code proposal will be submitted for IBC Chapter 6 to address use of MgO in Type I, II and III construction:

602.3 Type III. Type III construction is that type of construction in which the exterior walls are of noncombustible materials and the interior building elements are of any material permitted by this code. Fire-retardant-treated wood framing and sheathing complying with Section 2303.2 and magnesium-oxide-cement panel product conforming with Section 1403.15 shall be permitted within exterior wall assemblies of a 2-hour rating or less.

603.1 Allowable materials. Combustible materials shall be permitted in buildings of Type I or II construction in the following applications and in accordance with Sections 603.1.1 through 603.1.3:
[...]

29. Magnesium-oxide-cement panel product conforming with Section 1403.15.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposal provides another sheathing product alternative and as such does not raise or decrease the cost of construction. The designer is free to choose which sheathing product is most effective for the application. The cost to the manufacturer is neutral as the testing requirements are similar for ICC-1125 and the ICC-ES Acceptance Criteria.

FS113-24

FS114-24

IBC: 1404.3, ANSI/ABTG (New)

Proponents: Jay Crandell, P.E., ABTG / ARES Consulting, Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz)

2024 International Building Code

Revise as follows:

1404.3 Vapor retarders.
Vapor retarder materials shall be classified in accordance with Table 1404.3(1). A vapor retarder shall be provided on the interior side of frame walls in accordance with Table 1404.3(2) and Tables 1404.3(3) or 1404.3(4) as applicable, or an *approved* design using accepted engineering practice for hygrothermal analysis. Vapor retarders shall be installed in accordance with Section 1404.3.2. The appropriate *climate zone* shall be selected in accordance with Chapter 3 of the International Energy Conservation Code.

Exceptions:

1. Basement walls.
2. Below-grade portion of any wall.
3. Construction where accumulation, condensation or freezing of moisture will not damage the materials.
4. A vapor retarder shall not be required in Climate Zones 1, 2, and 3.
5. In Climate Zones 4 through 8, a vapor retarder on the interior side of frame walls shall not be required where the assembly complies with Table 1404.3(5).
6. Vapor control design in accordance with ANSI/ABTG FS200.1.

Add new standard(s) as follows:

ANSI/ABTG FS200.1 - 2022:. Standard for Use of Foam Plastic Insulating Sheathing (FPIS) in Building Envelopes: Above-grade Walls

Staff Analysis: A review of the standard proposed for inclusion in the code, ANSI/ABTG FS200.1 - 2022:. Standard for Use of Foam Plastic Insulating Sheathing (FPIS) in Building Envelopes: Above-grade Walls, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: This proposal adds a reference to the ANSI/ABTG FS200.1 standard (see Bibliography) as an option for complying with the intent of Section 1404.3. Sections 3.4 and 3.5 of the ANSI/ABTG FS200.1 standard provide more complete criteria and options for evaluating moisture control and vapor retarder requirements than are included in Section 1404.3. The criteria in FS200.1 are based on the same research (see Bibliography) and rely on the same criteria used as the basis for development of the limited prescriptive solutions now included in Section 1404.3 for walls with foam plastic insulating sheathing on the exterior.

Bibliography: ANSI/ABTG FS200.1 – 2022, Standard for the Use of Foam Plastic Insulating Sheathing (FPIS) in Building Envelopes: Above-grade Walls, Applied Building Technology Group, LLC, Madison, WI. https://www.appliedbuildingtech.com/standards

ABTG (2015). Assessment of Water Vapor Control Methods for Modern Insulated Light-Frame Wall Assemblies, ABTG Research Report No. 1410-03, Applied Building Technology Group, LLC, Madison, WI. https://www.appliedbuildingtech.com/rr/1410-03

Crandell, J. H., “Assessment of Hygrothermal Performance and Design Guidance for Modern Light-Frame Wall Assemblies,” Advances in Hygrothermal Performance of Building Envelopes: Materials, Systems and Simulations, ASTM STP1599, P. Mukhopadhyaya and D. Fisler, Eds., ASTM International, West Conshohocken, PA, 2017, pp. 362–394, http://dx.doi.org/10.1520/STP159920160097

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal provides an additional voluntary design option for compliance and, therefore, does not change the cost of compliance. However, the added flexibility provided could result in some cases of a cost decrease depending on various factors such as overall assembly conditions, optimization based on materials specified and use of multi-functional capabilities, climate zone, coordination with energy code and possible trade-offs, etc.

FS114-24

FS115-24

IBC: 1404.4.1, AAMA Chapter 35 (New), ABTG (New)

Proponents: Jay Crandell, P.E., ABTG / ARES Consulting, Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz)

2024 International Building Code

Revise as follows:

1404.4.1 Fenestration flashing.
Flashing of the fenestration to the wall assembly shall comply with the fenestration manufacturer's instructions or, for conditions not addressed by the fenestration manufacturer's instructions, shall comply with one of the following:

1. The *water-resistive barrier* manufacturer's flashing instructions.
2. The flashing manufacturer's flashing instructions.
3. The fenestration flashing methods included in FMA/AAMA/WDMA 500.
4. The fenestration flashing methods included in ANSI/ABTG FS200.1.
5. ~~3.~~ A flashing design or method of a *registered design professional*.
6. ~~4.~~ Other *approved* methods.

Add new standard(s) as follows:

AAMA

American Architectural Manufacturers Association
1900 E Golf Road, Suite 1250
Schaumburg, IL 60173

FMA/AAMA/WDMA 500-16: Standard Practice for the Installation of Mounting Flange Windows into Walls Utilizing Foam Plastic Insulating Sheathing (FPIS) with a Separate Water-Resistive Barrier

Add new text as follows:

ABTG ANSI/ABTG FS200.1-2022:. Standard for Use of Foam Plastic Insulating Sheathing (FPIS) in Building Envelopes: Above-grade Walls

Staff Analysis: A review of the standards proposed for inclusion in the code, FMA/AAMA/WDMA 500-16 Standard Practice for the Installation of Mounting Flange Windows into Walls Utilizing Foam Plastic Insulating Sheathing (FPIS) with a Separate Water-Resistive Barrier and ABTG ANSI/ABTG FS200.1-2022:. Standard for Use of Foam Plastic Insulating Sheathing (FPIS) in Building Envelopes: Above-grade Walls, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: The flashing methods included in the FMA/AAMA/WDMA 500 standard (see Bibliography) provides for flashing of windows installed using a window buck on walls with foam sheathing and a separate WRB material. The ANSI/ABTG FS200.1 standard (see Bibliography) provides for flashing of windows on walls with foam sheathing used as the WRB, including with or without a window buck (it also references the FMA/AAMA/WDMA 500 standard as well as performance testing of installation methods in accordance with AAMA 504). Both of these standards are compatible and thoroughly vetted through field experience and laboratory testing (see Bibliography).

Bibliography: FMA/AAMA/WDMA 500-16: Standard Practice for the Installation of Mounting Flange Windows into Walls Utilizing Foam Plastic Insulating Sheathing (FPIS) with a Separate Water-Resistive Barrier, https://store.fgiaonline.org/pubstore/ProductResults.asp?cat=0&src=500

ABTG (2021). Installation and Performance of Flanged Fenestration Units Mounted on Walls with Foam Plastic Insulating Sheathing, ABTG Research Report No. 2104-01, Applied Building Technology Group, LLC, Madison, WI, https://www.appliedbuildingtech.com/rr/2104-01

ANSI/ABTG FS200.1 – 2022, Standard for the Use of Foam Plastic Insulating Sheathing (FPIS) in Building Envelopes: Above-grade Walls, Applied Building Technology Group, LLC, Madison, WI. https://www.appliedbuildingtech.com/standards

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal adds two options to a list of existing options for fenestration flashing. It does not change existing requirements and provides additional options. Therefore, there is no cost impact as the use of the two added methods is voluntary (optional). Providing these options, however, could reduce cost where they are applicable and if used in specific cases.

FS115-24

FS116-24

IBC: 1406.10.3, 1408.10.4

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Building Code

Revise as follows:

1406.10.3 ~~Full-scale tests~~Vertical and lateral flame propagation.
~~The~~Exterior wall assemblies containing an *MCM* system shall be tested in accordance with, and comply with, the acceptance criteria of NFPA 285. Such testing shall be performed on assemblies that include the *MCM* system with the MCM ~~in~~at the maximum thickness intended for use.

1408.10.4 ~~Full-scale tests~~Vertical and lateral flame propagation.
~~The~~Exterior wall assemblies containing an HPL system shall be tested in accordance with, and comply with, the acceptance criteria of NFPA 285. Such testing shall be performed on assemblies that include the HPL system with the HPL ~~in~~at the minimum and maximum thicknesses intended for use.

Reason: The correct application of NFPA 285, and the true intent of these two sections, is to test exterior wall assemblies *containing* these exterior wall covering systems in accordance with and to comply with the acceptance criteria of NFPA 285.Currently, both IBC Sections 1406.10.3 (for MCM) and Section 1408.10.4 (for HPL) appear to only require MCM and HPL exterior wall covering systems be tested in accordance with NFPA 285. This proposal clarifies the requirements so they will be correctly applied.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The IBC currently requires certain exterior wall assemblies containing MCM and HPL systems to be tested to, and comply with, NFPA 285. This change proposal clarifies the proper application of NFPA 285 to those exterior wall assemblies.

FS116-24

FS117-24

IBC: 2603.1.1, IAPMO/ANSI (New)

Proponents: Justin Davis, Self

2024 International Building Code

Revise as follows:

2603.1.1 Spray-applied foam plastic.
Single- and multiple-component *spray-applied foam plastic* insulation shall comply with the provisions of Section 2603 and <u>either</u> ICC 1100<u> or IAPMO/ANSI ES1000</u>.

Add new text as follows:

<u>**IAPMO/ANSI** **ES.** 1000-2020- Building Code Compliance Spray-Applied Polyurethane Foam</u>

Staff Analysis: A review of the standard proposed for inclusion in the code, IAPMO/ANSI ES. 1000-2020 Building Code Compliance Spray-Applied Polyurethane Foam, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: To allow the use of an additional active consensus standard for use showing compliance with the International Building Code. Historically, the codes have included multiple standards that have been used to show compliance. IAPMO/ANSI ES1000 is in the process of being updated at this time.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The new standard is an option to what is already in place in the code.

FS117-24

FS118-24

IBC: 2603.3

Proponents: Mike Fischer, Kellen, The Extruded Polystyrene Foam Association (mfischer@kellencompany.com)

2024 International Building Code

Revise as follows:

2603.3 Surface-burning characteristics.
Unless otherwise indicated in this section, *foam plastic insulation* and foam plastic cores of manufactured assemblies shall have a *flame spread index* of not more than 75 and a *smoke-developed index* of not more than 450 where tested in the maximum thickness intended for use in accordance with ASTM E84 or UL 723. Loose fill-type *foam plastic insulation* shall be tested as board stock for the *flame spread* and smoke-developed indices.

Exceptions:

1. *Smoke-developed index* for interior *trim* as provided for in Section 2604.2.
2. In cold storage *buildings*, ice plants, food plants, food processing rooms and similar areas, *foam plastic insulation* where tested in a thickness of 4 inches (102 mm) shall be permitted in a thickness up to 10 inches (254 mm) where the *building* is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1. The *approved automatic sprinkler system* shall be provided in both the room and that part of the *building* in which the room is located.
3. *Foam plastic insulation* where tested at a thickness of 4 inches (102 mm) with a maximum *flame spread index* of 75 shall be permitted in a thickness not less than 4 inches (102 mm) as part of a Class A, B or C roof-covering assembly. The *smoke-developed index* shall not be limited.

~~3.~~4. *Foam plastic insulation* that is a part of a Class A, B or C roof-covering assembly provided that the assembly with the *foam plastic insulation* satisfactorily passes NFPA 276 or UL 1256. The *smoke-developed index* shall not be limited for roof applications.

~~4.~~5. *Foam plastic insulation* greater than 4 inches (102 mm) in thickness shall have a maximum *flame spread index* of 75 and a *smoke-developed index* of 450 where tested at a minimum thickness of 4 inches (102 mm), provided that the end use is *approved* in accordance with Section 2603.9 using the maximum thickness and density intended for use.

~~5.~~6. *Flame spread* and smoke-developed indices for foam plastic interior signs in *covered and open mall buildings* provided that the signs comply with Section 402.6.4.

Reason: New energy code minimum roof R-value requirements commonly require a thickness of 4 inches or greater for foam plastic insulation. Testing foam plastic flame spread on thicknesses greater than 4 inches is challenging, given the limitations of the flame spread test equipment. Therefore, the IBC needs a new Section 2603.3 Exception to allow flame spread testing at a 4 inch thickness and permit the test results to apply to foam plastic insulation greater than 4 inches in roof applications. There is precedence for this approach as shown in Exception 2 for cold storage buildings and Exception 4 for interior applications.

The smoke-developed index is not limited in the new Exception 3, similar to the former Exception 3.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This code change proposal reflects current practice and code provisions and as such, will neither increase or decrease the cost of construction.

FS118-24

FS119-24

IBC: 2603.3

Proponents: Mike Fischer, Kellen, The Extruded Polystyrene Foam Association (mfischer@kellencompany.com)

2024 International Building Code

Revise as follows:

2603.3 Surface-burning characteristics.
Unless otherwise indicated in this section, *foam plastic insulation* and foam plastic cores of manufactured assemblies shall have a *flame spread index* of not more than 75 and a *smoke-developed index* of not more than 450 where tested in the maximum thickness intended for use in accordance with ASTM E84 or UL 723. Loose fill-type *foam plastic insulation* shall be tested as board stock for the *flame spread* and smoke-developed indices.

Exceptions:

1. *Smoke-developed index* for interior *trim* as provided for in Section 2604.2.
2. In cold storage *buildings*, ice plants, food plants, food processing rooms and similar areas, *foam plastic insulation* where tested in a thickness of 4 inches (102 mm) shall be permitted in a thickness up to 10 inches (254 mm) where the *building* is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1. The *approved automatic sprinkler system* shall be provided in both the room and that part of the *building* in which the room is located.
3. *Foam plastic insulation* that is a part of a Class A, B or C roof-covering assembly provided that the assembly with the *foam plastic insulation* satisfactorily passes NFPA 276 or UL 1256. ~~The *smoke-developed index* shall not be limited for roof applications.~~
4. The *smoke-developed index* of *foam plastic insulation* shall not be limited for applications that are part of Class A, B or C roof-covering assemblies.
5. (~~4.~~) *Foam plastic insulation* greater than 4 inches (102 mm) in thickness shall have a maximum *flame spread index* of 75 and a *smoke-developed index* of 450 where tested at a minimum thickness of 4 inches (102 mm), provided that the end use is *approved* in accordance with Section 2603.9 using the maximum thickness and density intended for use.
6. (~~5.~~) *Flame spread* and smoke-developed indices for foam plastic interior signs in *covered and open mall buildings* provided that the signs comply with Section 402.6.4.

Reason: The smoke-developed index (SDI) exception is moved from the existing Exception 3 to a separate Exception 4 for clarity. This change will improve the language and facilitate code education efforts.

Exception 3 currently implies that both the flame spread and smoke-developed index thresholds are not limited for foam plastic insulation when both the roof covering is classified (Class A, B or C) and the roof assembly passes the NFPA 276 or UL 1256 requirement. The sentence "The smoke-developed index shall not be limited for roof applications" is redundant.

Exception 4 is created to clarify that flame spread is limited, but smoke-developed index is not limited for roof classification only.

Without this proposed language, one might be confused about the FS/SDI requirements foam plastic insulation in Section 2603.4.1.5.

The method of construction listed in item 1 for a wood structural panel deck limits flame spread, but not smoke-developed index for the foam plastic insulation per Section 2603.3, new Exception 4.

Item 2 limits neither flame spread, nor smoke-developed index for the foam plastic insulation per Section 2603.3, existing Exception 3.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This clarification reflects current practice and code requirements and as such will neither increase or decrease the cost of construction.

FS120-24

IBC: 2603.4.1.5

Proponents: Mike Fischer, Kellen, The Extruded Polystyrene Foam Association (mfischer@kellencompany.com)

2024 International Building Code

Revise as follows:

2603.4.1.5 Roofing.
A thermal barrier is not required for above-deck *foam plastic insulation* that is a part of a Class A, B or C roof-covering assembly that is installed in accordance with the code and the manufacturer's instructions and is either constructed as described in Item 1 or 2, or tested as described in Item ~~2~~ 3.

1. The roof assembly is separated from the interior of the *building* by *wood structural panel* sheathing not less than 0.47 inch (11.9 mm) in thickness bonded with exterior glue, with edges supported by blocking, tongue-and-groove joints, other *approved* type of edge support or an equivalent material.

2. Where the foam plastic insulation is separated from the interior of the building by a concrete or composite metal and concrete roof deck in accordance with Section 1508.1, Exception 2.

~~2~~ 3. The assembly with the *foam plastic insulation* satisfactorily passes NFPA 276 or UL 1256.

Reason: There has been confusion about the interpretation of roofing requirements for thermal barriers over foam plastic insulation due to the scattered nature of roofing requirements across Chapters 15 and 26.

Chapter 15 Roofing requirements.

Section 1505.1 requires Class A, B, C roof covering classification (ASTM E108 or UL 790).

Section 1508.1 for roof insulation requires roof assembly testing per UL 1256 or NFPA 276 with use of above-deck thermal insulation. Exception 1 is for foam plastic insulation in Chapter 26 and Exception 2 is for concrete or metal/concrete roof decks with an approved roof covering.

Chapter 26 Roofing requirements for foam plastic insulation thermal barrier.

Section 2603.4 requires a thermal barrier for Class A, B, or C roof-covering assemblies that are not tested in accordance with UL 1256 or NFPA 276.

In Section 2603.4.1.5, the two, Class A, B, or C roof-covering assemblies that are not required to have a thermal barrier are:

1) roof assemblies separated from the interior by wood structural panels and

2) roof assemblies that pass UL 1256 or NFPA 276.

Looking at both Chapter 15 and 26, the two roof decks that do not require UL 1256 or NFPA 276 are wood structural panels per Section 2603.4.1.5, Exception 1 and concrete or metal/concrete roof decks per Section 1508.1, Item 2.

This connects the requirements in Section 1508.1, Exception 2 with the thermal barrier not required in Section 2603.4.1.5. Without the proposed language, one could be confused whether or not a thermal barrier is required between the foam plastic and concrete or metal/concrete roof decks. The language also clarifies that the requirement applies to above-deck foam plastic insulation.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This clarification reflects current practice and code requirements and as such will neither increase or decrease the cost of construction.

FS120-24

FS121-24

IBC: 2603.9

Proponents: Eric Banks, e.w.banks consulting llc, North American Modern Building Alliance (NAMBA) (eric.banks@ewbanksconsulting.com)

2024 International Building Code

Revise as follows:

2603.9 Special approval.
Foam plastic <u>and assemblies containing foam plastic </u>shall not be required to comply with the requirements of Section 2603.4 or those of Section 2603.6 where specifically *approved* based on one of the following large-scale tests:

1. NFPA 286 using the acceptance criteria of Section 803.1.1.1.
2. <u>Room Test of </u>FM 4880.
3. ~~3. UL 1040.~~
4. ~~4~~<u>3</u>. UL 1715.

Such testing shall be performed on the finished manufactured foam plastic assembly in the maximum thickness intended for use. Foam plastics that are used as *interior finish* on the basis of these tests shall also conform to the *flame spread* and smoke-developed requirements of Chapter 8. Assemblies tested shall include seams, joints and other typical details used in the installation of the assembly and shall be tested in the manner intended for use.

Reason: The proposed change brings the approved test methods of 2603.9 Special Approval in-line with the Integrity Fire Tests (Part II) of NFPA 275 *Standard Method of Fire Tests for the Evaluation of Thermal Barriers*. NFPA 275 is a performance testing option referenced in the requirements of Section 2603.4 Thermal barrier. Section 2603.9 Special approval provides another performance test option to permit the use of foam plastic insulation without the thermal barrier required in Section 2603.4 by demonstrating equivalent performance – i.e., no flashover for a period of at least 15-minutes.

The FM 4880 approval standard contains four (4) different large-scale fire tests (Room Test, 16-ft High Parallel Panel Test, 25-ft High Corner Test, and 50-ft High Corner Test) and a series of performance ratings defined by insulation type, facer type, and a prescribed series of tests. It is understood that the 25-ft and 50-ft High Corner Tests have not been performed on foam plastic panels / assemblies for many years, in part due to the availability of the Room Test option provided in FM 4880.

The NFPA 275 Standard Method of Fire Tests for the Evaluation of Thermal Barriers, referenced in Section 2603.4, also generically referenced FM 4880 among the approved test methods for the Integrity Fire Tests (Part II) of the evaluation. The 2022 Edition of NFPA 275, however, was revised to was more clearly and specifically reference the Room Test of FM 4880.

The UL 1040 is also a very large-scale test, using a 20-ft by 20-ft by 30-ft high open-corner configuration, a 764-pound wood crib ignition source and a 30-minute test duration. This test has also not been performed in many years due, to its size, associated cost, and the availability of NFPA 286 and UL 1715 . The NFPA 275 Standard Method of Fire Tests for the Evaluation of Thermal Barriers, referenced in Section 2603.4, referenced UL 1040 among the approved test methods for the Integrity Fire Tests (Part II), however, it was removed from the 2022 Edition of NFPA 275.

The changes will improve the consistency of the evaluations performed under Section 2603.9 and its intent in terms of the Special Approval in reference to Section 2603.4.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposed code change provides clarification regarding the existing tests required for compliance with Section 2603.9.

FS121-24

FS122-24

IBC: 2603.9

Proponents: Eric Banks, e.w.banks consulting llc, North American Modern Building Alliance (NAMBA) (eric.banks@ewbanksconsulting.com)

2024 International Building Code

Revise as follows:

2603.9 Special approval.
Foam plastic shall not be required to comply with the requirements of Section 2603.4 ~~or those of Section 2603.6~~ where specifically *approved* based on one of the following large-scale tests:

1. NFPA 286 using the acceptance criteria of Section 803.1.1.1.
2. FM 4880.
3. UL 1040.
4. UL 1715.

Such testing shall be performed on the finished manufactured foam plastic assembly in the maximum thickness intended for use. Foam plastics that are used as *interior finish* on the basis of these tests shall also conform to the *flame spread* and smoke-developed requirements of Chapter 8. Assemblies tested shall include seams, joints and other typical details used in the installation of the assembly and shall be tested in the manner intended for use.

Reason: Section 2603.9 was revised last cycle (F60-21, Part II) to limit *Special approval* of foam plastic insulation to four (4) referenced standard tests – essentially a narrowing of the scope. One consequence of F60-21, Part II is that Section 2603.9 would potentially permit the use of foam plastic insulation in roof coverings and roof assemblies on the basis of testing that is not designed or intended to assess roofing applications. The four (4) test methods to which Section 2603.9 is now limited (NFPA 286, FM 4880, UL 1040, and UL 1715) are intended for the assessment of insulated wall constructions, insulated wall / wall panel assemblies, and interior finish materials & assemblies.

Section 2603.6 is included below for convenience:

> **2603.6 Roofing.** Foam plastic insulation meeting the requirements of Sections 2603.2, 2603.3 and 2603.4 shall be permitted as part of a roof-covering assembly, provided that the assembly with the foam plastic insulation is a Class A, B or C roofing assembly where tested in accordance with ASTM E108 or UL 790.

The changes to Section 2603.9 have resulted in 2024 IBC language that now provides the potential to obtain approval for use in a roof-covering where an exterior fire exposure test is required (ASTM E108 / UL 790) on the basis of testing that is of an interior fire exposure (NFPA 286, UL 1715, et al) and potentially in conflict with Fire Classification requirements of Section 1505. This proposal will clarify the narrowed scope of Section 2603.9 resulting from the narrowed scope and the limitations of the referenced tests.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposed code change is a clarification of the use of existing requirements under Section 2603.9.

FS122-24

FS123-24

IBC: [BF] 2612.3, ASTM Chapter 35 (New)

Proponents: Marcelo Hirschler, GBH International, GBH International (mmh@gbhint.com)

2024 International Building Code

Revise as follows:

[BF] 2612.3 Flame spread index.

Plastic composite deck boards, *stair* treads, *handrails* and *guards* shall exhibit a *flame spread index* not exceeding 200 when tested in accordance with ASTM E84 or UL 723 with the test specimen remaining in place during the test. Specimen preparation and mounting shall be in accordance with ASTM E3202.

Exception: Materials determined to be noncombustible in accordance with Section 703.3.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

E3202	Standard Practice for Specimen Preparation and Mounting of Plastic Composites for Use as Deck Boards, Stair Treads, Guards or Handrails to Assess Surface Burning Characteristics (2024)

Staff Analysis: A review of the standard proposed for inclusion in the code, ASTM E3202 Standard Practice for Specimen Preparation and Mounting of Plastic Composites for Use as Deck Boards, Stair Treads, Guards or Handrails to Assess Surface Burning Characteristics (2024), with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: Whenever an explicit standard practice for specimen preparation and mounting of ASTM E84 has been developed by ASTM it has been incorporated into the IBC. ASTM E3202 has recently been developed. Such references are included in Chapter 8 (ASTM E2404, ASTM E2573, ASTM E2579), chapter 14 (ASTM E2404), chapter 26 (ASTM E2599), and the IMC (ASTM E2231). This ensures the labs use the proper standardized procedure.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is consistent with the references to ASTM E84 mounting methods in other chapters of the IBC and IMC and does not add requirements but provides guidance.

FS123-24

IBC General Code Change Proposals

The following code change proposals are labeled as general code change proposals because they are proposals for changes to sections in chapters of the International Building Code that are designated as the responsibility of the IBC-General Code Development Committee (see page iv of the Introductory pages of this monograph), which meets in the Group B cycle in 2025. However most of the changes included in this Group A code development cycle are to sections of the code that have been prefaced with a [BF], [BE], [F], [P] or [M] meaning that they are the responsibility of a different Code Development Committee—either the IBC-Fire Safety Committee [BF], the IBC-Egress [BE], the IFC Committee [F], the IPC Committee [P] or the IMC Committee [M]. The remaining are changes that are grouped together as Parts of a single Group B General change, some of which are related to Group A codes and are therefore heard in Group A. An example is G1-24, Parts I through VIII, which includes, IBC-E, IBC-FS, IFC, IMC, IPC, IPSDC, IRC MP, IPSDC, ISPSC.

The committee assigned for each code change proposal is indicated in a banner statement near the beginning of the proposal. A list of the affected hearing orders is included below. Refer to these individual hearing orders.

IBC – Egress

IBC – Fire Safety

IFC

IMC

IPC

G1-24 Part I

IBC: 701.1, SECTION 801, 801.1, 901.1, 1401.1, 2601.1

Proponents: Steven Orlowski, Sundowne Building Code Consultants, LLC, Self (sorlowski@sbcc.codes); Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org); Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

THIS IS AN 8 PART CODE CHANGE.

PART I WILL BE HEARD BY THE IBC-FIRE SAFETY CODE COMMITTEE.

PART II WILL BE HEARD BY THE IBC-EGRESS CODE COMMITTEE.

PART III WILL BE HEARD BY THE IRC PLUMBING & MECHANICAL CODE COMMITTEE.

PART V WILL BE HEARD BY THE SWIMMING POOL AND SPA CODE COMMITTEE.

PART IV AND VI WILL BE HEARD BY THE PLUMBING CODE COMMITTEE.

PART VII WILL BE HEARD BY THE MECHANICAL CODE COMMITTEE.

PART VIII WILL BE HEARD BY THE FIRE CODE COMMITTEE.

SEE THE TENTATIVE HEARING SCHEDULE FOR THESE COMMITTEES.

2024 International Building Code

CHAPTER 7 FIRE AND SMOKE PROTECTION FEATURES

SECTION 701 GENERAL

Revise as follows:

701.1 Scope.
~~The provisions of this chapter shall govern the materials~~ Materials, systems and assemblies used for structural *fire resistance* and fire-resistance-rated construction separation of adjacent spaces to safeguard against the spread of fire and smoke within a *building* and the spread of fire to or from *buildings.* Design, installation, and construction of fire and smoke protection features shall comply with this chapter.

CHAPTER 8 INTERIOR FINISHES

Revise as follows:

SECTION 801 ~~SCOPE~~GENERAL

801.1 Scope. ~~The provisions of this chapter shall govern the use of materials~~ Materials used as *interior finishes*, *trim* and *decorative materials* *shall comply with this chapter.*.

CHAPTER 9 FIRE PROTECTION AND LIFE SAFETY SYSTEMS

SECTION 901 GENERAL

Revise as follows:

901.1 Scope.
~~The provisions of this chapter shall specify where~~ Where fire protection and *life safety systems* are required by this chapter, ~~and shall apply to~~ the design, installation and operation of *fire protection* and *life safety systems* shall comply with this chapter.

CHAPTER 14 EXTERIOR WALLS

SECTION 1401 GENERAL

Revise as follows:

1401.1 Scope.
~~The provisions of this chapter shall establish the minimum requirements for *exterior*~~ *Exterior walls*, exterior wall assemblies, *exterior wall coverings*, *exterior wall* openings, exterior windows and doors, exterior soffits and fascias, and architectural *trim shall comply with this chapter*.

CHAPTER 26 PLASTIC

SECTION 2601 GENERAL

Revise as follows:

2601.1 Scope.
~~These provisions shall govern the materials~~Materials, design, application, construction and installation of foam plastic, *foam plastic insulation*, plastic *veneer*, interior plastic finish and *trim*, light-transmitting plastics and plastic composites, including *plastic lumber* shall comply with this chapter.

G1-24 Part I

G1-24 Part II

IBC: SECTION 1001, 1001.1, 1001.2, 1101.1

Proponents: Steven Orlowski, Sundowne Building Code Consultants, LLC, Self (sorlowski@sbcc.codes); Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org); Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Building Code

CHAPTER 10 MEANS OF EGRESS

Revise as follows:

SECTION 1001 ~~ADMINISTRATION~~GENERAL

1001.1 ~~General~~Scope.
Buildings or portions thereof shall be provided with a *means of egress* system ~~as required by~~ and shall comply with this chapter. The provisions of this chapter shall control the design, construction and arrangement of *means of egress* components required to provide an *approved means of egress* from *structures* and portions thereof.

1001.2 ~~Minimum requirements~~General.
It shall be unlawful to alter a *building* or *structure* in a manner that will reduce the number of *exits* or the minimum width or required capacity of the *means of egress* to less than required by this code.

CHAPTER 11 ACCESSIBILITY

SECTION 1101 GENERAL

Revise as follows:

1101.1 Scope.
~~The provisions of this chapter shall control the design~~ Design and construction of *facilities* for accessibility for individuals with disabilities shall comply with this chapter.

G1-24 Part II

G1-24 Part III

IRC: M1201.1, M1301.1, M1401.1 (New), M1501.1 (New), SECTION M1601, M1601.1 (New), M1701.1, M1801.1 (New), SECTION M1901, M1901.1 (New), SECTION M2001, M2001.1 (New), SECTION M2101, M2101.1 (New), CHAPTER 22, SECTION M2201, M2201.1 (New), SECTION M2301, M2301.1, P2501.1, P2601.1, SECTION P2701, P2701.1 (New), P2801.1 (New), P2901.1 (New), P3001.1, SECTION P3101, P3101.1, SECTION P3201, P3201.1 (New), P3301.1

Proponents: Steven Orlowski, Sundowne Building Code Consultants, LLC, Self (sorlowski@sbcc.codes); Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org); Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Residential Code

CHAPTER 12 MECHANICAL ADMINISTRATION

SECTION M1201
GENERAL

Revise as follows:

M1201.1 Scope.
The provisions of of this chapter shall establish the general administrative requirements applicable to mechanical systems and inspection requirements of this code.~~Chapters 12 through 24 shall regulate the design~~Design, installation, maintenance, *alteration* and inspection of *mechanical systems* that are permanently installed and used to control environmental conditions within *buildings*shall comply with Chapters 12 through 24 of this code. These chapters shall also regulate those *mechanical systems*, system components, *equipment* and *appliances* specifically addressed in this code.

CHAPTER 13 GENERAL MECHANICAL SYSTEM REQUIREMENTS

SECTION M1301
GENERAL

Revise as follows:

M1301.1 Scope.
~~The provisions of this chapter shall govern the installation~~ Installation of *mechanical systems* not specifically covered in other chapters applicable to *mechanical systems* shall comply with this chapter. Installations of mechanical *appliances, equipment* and systems not addressed by this code shall comply with the applicable provisions of the *International Fuel Gas Code* and the *International Mechanical Code* .

CHAPTER 14 HEATING AND COOLING EQUIPMENT AND APPLIANCES

SECTION M1401
GENERAL

Add new text as follows:

M1401.1 Scope. Heating and cooling equipment and appliances shall comply with this chapter.

CHAPTER 15 EXHAUST SYSTEMS

SECTION M1501
GENERAL

Add new text as follows:

M1501.1 **Scope.** Exhaust systems shall comply with this chapter.

CHAPTER 16 DUCT SYSTEMS

Add new text as follows:

M1601
GENERAL

M1601.1 **Scope.** Duct systems serving HVAC and exhaust shall comply with this chapter.

Revise as follows:

SECTION ~~M1601~~ M1602
DUCT CONSTRUCTION

CHAPTER 17 COMBUSTION AIR

SECTION M1701
GENERAL

Add new text as follows:

M1701.1 **Scope.** For other than gas fired appliances regulated by Chapter 24, combustion air systems shall comply with this chapter.

Revise as follows:

M~~1701.1~~1701.2 ~~Scope~~General requirements.
Solid fuel-burning *appliances* shall be provided with *combustion air* in accordance with the *appliance* manufacturer's installation instructions. Oil-fired *appliances* shall be provided with *combustion air* in accordance with NFPA 31. The methods of providing *combustion air* in this chapter do not apply to fireplaces, fireplace stoves and direct-vent *appliances*. The requirements for combustion and dilution air for gas-fired *appliances* shall be in accordance with Chapter 24.

CHAPTER 18 CHIMNEYS AND VENTS

SECTION M1801
GENERAL

Add new text as follows:

M1801.1 **Scope.** For other than gas fired appliances regulated by Chapter 24, chimneys and vents shall comply with this chapter.

CHAPTER 19 SPECIAL APPLIANCES, EQUIPMENT AND SYSTEMS

Add new text as follows:

SECTION M1901 GENERAL

M1901.1 Scope. For other things fired appliances regulated by Chapter 24, appliances, systems, and equipment identified herein shall comply with this chapter.

Revise as follows:

SECTION ~~M1901~~ M1902 RANGES AND OVENS

CHAPTER 20 BOILERS AND WATER HEATERS

Add new text as follows:

SECTION M2001 GENERAL

M2001.1 Scope. Systems that heat water shall comply with this chapter.

Revise as follows:

SECTION ~~M2001~~ M2002 BOILERS

CHAPTER 21 HYDRONIC PIPING

Add new text as follows:

SECTION M2101 GENERAL

M2101.1 Scope. Hydronic piping shall comply with this chapter.

Revise as follows:

SECTION ~~M2101~~ M2102 HYDRONIC PIPING SYSTEMS INSTALLATION

CHAPTER 22 FUEL OIL STORAGE AND~~SPECIAL~~ PIPING ~~AND STORAGE~~ SYSTEMS

Add new text as follows:

SECTION M2201 GENERAL

<u>M2201.1</u> <u>SCOPE</u>. <u>Fuel oil storage and piping systems shall comply with this chapter.</u>

Revise as follows:

SECTION ~~M2201~~ <u>M2202</u> OIL TANKS

CHAPTER 23 SOLAR THERMAL ENERGY SYSTEMS

Revise as follows:

SECTION M2301 ~~SOLAR THERMAL ENERGY SYSTEMS~~<u>GENERAL</u>

M2301.1 ~~General~~<u>Scope</u>.
~~This section provides for the design~~<u>Design</u>, construction, installation, *alteration* and *repair* of *equipment* and systems using solar thermal energy to provide space heating or cooling, *hot water* heating and swimming pool heating <u>shall comply with this code</u>.

CHAPTER 25 PLUMBING ADMINISTRATION

SECTION P2501 GENERAL

Revise as follows:

P2501.1 Scope.
The provisions of this chapter shall establish the general administrative requirements applicable to plumbing systems and inspection requirements of this code.<u> Design, installation, maintenance, alteration and inspection of plumbing systems that are permanently installed and used to control environmental conditions within buildings shall comply with Chapters 25 through 33 of this code. These chapters shall also regulate those plumbing systems, system components, equipment and appliances specifically addressed in this code.</u>

CHAPTER 26 GENERAL PLUMBING REQUIREMENTS

SECTION P2601 GENERAL

Revise as follows:

P2601.1 Scope.
~~The provisions of this chapter shall govern the installation of plumbing not specifically covered in other chapters applicable to plumbing systems. The installation of plumbing, *appliances, equipment* and systems not addressed by this code shall comply with the applicable provisions of the *International Plumbing Code* .~~<u> Installation of plumbing, not specifically covered in other chapters applicable to plumbing systems, shall comply with this chapter.</u>

CHAPTER 27 PLUMBING FIXTURES

Add new text as follows:

SECTION P2701 GENERAL

P2701.1 Scope. Design, Installation, and materials of plumbing fixtures, faucets and fixture fittings shall comply with this chapter.

Revise as follows:

SECTION ~~P2701~~ P2702 FIXTURES, FAUCETS AND FIXTURE FITTINGS

CHAPTER 28 WATER HEATERS

SECTION P2801 GENERAL

Add new text as follows:

P2801.1 Scope. Design, Installation, and materials of water heaters and hot water storage tanks shall comply with this chapter.

CHAPTER 29 WATER SUPPLY AND DISTRIBUTION

SECTION P2901 GENERAL

Add new text as follows:

P2901.1 Scope. Design, Installation, and materials of hot and cold water supply and distribution system, for utilization in connection with human occupancy and habitation, and individual water supply systems shall comply with this chapter.

CHAPTER 30 SANITARY DRAINAGE

SECTION P3001 GENERAL

Add new text as follows:

P3001.1 Scope. Design, Installation, construction, and materials of sanitary drainage systems shall comply with this chapter.

Revise as follows:

~~P3001.1~~ P3001.2 General requirements~~Scope~~.
~~The provisions of this chapter shall govern the materials, design, construction and installation of sanitary drainage systems. Plumbing materials shall conform to the requirements of this chapter.~~ The drainage, waste and vent (DWV) system shall consist of piping for conveying wastes from plumbing fixtures, *appliances* and appurtenances, including fixture traps; above-grade drainage piping; below-grade drains within the *building*, such as a *building drain*; below- and above-grade venting systems; and piping to the public sewer or private septic system.

CHAPTER 31 VENTS

Revise as follows:

SECTION P3101
~~VENT SYSTEMS~~GENERAL

P3101.1 ~~General~~ Scope. ~~This chapter shall govern the selection and installation of piping, tubing and fittings for vent systems. This chapter shall control the minimum diameter of vent pipes, circuit vents, branch vents and *individual vents*, and the size and length of vents and various aspects of vent stacks and stack vents. Additionally, this chapter regulates vent grades and connections, height above fixtures and relief vents for stacks and fixture traps, and the venting of sumps and sewers.~~Design, installation, construction, and materials of vent systems shall comply with this chapter.

CHAPTER 32 TRAPS

Revise as follows:

SECTION P3201
~~FIXTURE TRAPS~~ GENERAL

Add new text as follows:

P3201.1 Scope. Design, installation, construction, and materials of fixture traps shall comply with this chapter.

CHAPTER 33 STORM DRAINAGE

SECTION P3301
GENERAL

Revise as follows:

P3301.1 Scope.
~~The provisions of this chapter shall govern the materials, design, construction and installation of storm drainage.~~Design, installation, construction, and materials of storm drainage systems shall comply with this chapter.

G1-24 Part III

G1-24 Part IV

IPSDC: CHAPTER 3, SECTION 301, 301.1, CHAPTER 4, SECTION 401, 401.1, SECTION 501, CHAPTER 5, 501.1, CHAPTER 6, SECTION 601, 601.1, CHAPTER 7, SECTION 701, 701.1, CHAPTER 8, SECTION 801, 801.1, CHAPTER 9, SECTION 901, 901.1, CHAPTER 10, SECTION 1001, 1001.1, CHAPTER 11, SECTION 1101, 1101.1, CHAPTER 12, SECTION 1201, 1201.1, CHAPTER 13, SECTION 1301, 1301.1

Proponents: Steven Orlowski, Sundowne Building Code Consultants, LLC, Self (sorlowski@sbcc.codes); Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org); Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Private Sewage Disposal Code

CHAPTER 3 GENERAL REGULATIONS

SECTION 301 GENERAL

Revise as follows:

301.1 Scope.
~~The provisions of this chapter shall govern the general regulations of *private*~~*Private* *sewage disposal systems*, including specific limitations and *flood hazard areas* shall comply with this chapter.

CHAPTER 4 SITE EVALUATION AND REQUIREMENTS

SECTION 401 GENERAL

Revise as follows:

401.1 Scope.
~~The provisions of this chapter shall govern the evaluation~~ Evaluation of private sewage disposal systems and requirements for ~~*private sewage disposal system*~~ sitesshall comply with this chapter.

SECTION 501 GENERAL

CHAPTER 5 MATERIALS

Revise as follows:

501.1 Scope.
~~The provisions of this chapter shall govern the requirements for materials~~ Materials for *private sewage disposal systems* shall comply with this chapter.

CHAPTER 6 SOIL ABSORPTION SYSTEMS

SECTION 601 GENERAL

Revise as follows:

601.1 Scope.
~~The provisions of this chapter shall govern the sizing~~ Sizing and installation of soil absorption systems shall comply with this chapter.

CHAPTER 7 PRESSURE DISTRIBUTION SYSTEMS

SECTION 701 GENERAL

Revise as follows:

701.1 Scope.
~~The provisions of this chapter shall govern the design~~ Design, and installation of *pressure distribution systems* shall comply with this chapter.

CHAPTER 8 TANKS

SECTION 801 GENERAL

Revise as follows:

801.1 Scope.
~~The provisions of this chapter shall govern the design~~ Design, installation, repair and maintenance of septic tanks, treatment tanks and holding tanks shall comply with this chapter.

CHAPTER 9 MOUND SYSTEMS

SECTION 901 GENERAL

Revise as follows:

901.1 Scope.
~~The provisions of this chapter shall govern the design~~ Design and installation of mound systems shall comply with this chapter.

CHAPTER 10 CESSPOOLS

SECTION 1001 GENERAL

Revise as follows:

1001.1 Scope.
~~The provisions of this chapter shall govern the design~~ Design and installation of *cesspools* shall comply with this chapter.

CHAPTER 11 RESIDENTIAL WASTEWATER SYSTEMS

SECTION 1101
GENERAL

Revise as follows:

1101.1 Scope.
~~The provisions of this chapter shall govern residential~~ Residential wastewater systemsshall comply with this chapter.

CHAPTER 12 INSPECTIONS

SECTION 1201
GENERAL

Revise as follows:

1201.1 Scope.
~~The provisions of this chapter shall govern the inspection~~ Inspection of *private sewage disposal systems* shall comply with this chapter.

CHAPTER 13 NONLIQUID SATURATED TREATMENT SYSTEMS

SECTION 1301
GENERAL

Revise as follows:

1301.1 Scope.
~~The provisions of this chapter shall govern nonliquid~~ Nonliquid saturated treament systems shall comply with this chapter.

G1-24 Part IV

G1-24 Part V

ISPSC: 301.1, 301.1.1, 401.1, 401.2, 401.3, 501.1, 501.2, 601.1, 601.2, 601.3, 701.1, 701.1.1, 701.2, 801.1, 801.2, 901.1, 901.2, 1001.1, 1001.2

Proponents: Steven Orlowski, Sundowne Building Code Consultants, LLC, Self (sorlowski@sbcc.codes); Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org); Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Swimming Pool and Spa Code

CHAPTER 3 GENERAL COMPLIANCE

SECTION 301 GENERAL

Revise as follows:

301.1 Scope. ~~The provisions of this chapter shall govern the general~~ General design and construction of public and *residential* pools and spas and related piping, equipment, and materials shall comply with this chapter. ~~Provisions that are unique to a specific type of pool or spa are located in Chapters 4 through 10.~~

~~**301.1.1 Application of Chapters 4 through 10.** Where differences occur between the provisions of this chapter and the provisions of Chapters 4 through 10, the provisions of Chapters 4 through 10 shall apply.~~

CHAPTER 4 PUBLIC SWIMMING POOLS

SECTION 401 GENERAL

Revise as follows:

401.1 Scope. ~~The provisions of this chapter shall apply only to~~ Design, construction, installation, repair, and operation of Class A, Class B, Class C, Class E and Class F public swimming pools shall comply with this chapter.

~~**401.2 Intent.** The provisions in this chapter shall govern the design, equipment, operation, warning signs, installation, sanitation, new construction, and *alteration* specific to the types of public swimming pools indicated in Section 401.1.~~

~~**401.3 Chapter 3 compliance required.** In addition to the requirements of this chapter, public swimming pools shall comply with the requirements of Chapter 3.~~

CHAPTER 5 PUBLIC SPAS AND PUBLIC EXERCISE SPAS

SECTION 501 GENERAL

Revise as follows:

501.1 Scope. ~~This chapter shall govern the design~~Design, installation, construction and repair of public spas and exercise spas shall comply with this chapter ~~regardless of whether a fee is charged for use~~.

~~**501.2 General.** In addition to the requirements of this chapter, public spas and public exercise spas shall comply with the requirements of~~

~~Chapter 3.~~

CHAPTER 6 AQUATIC RECREATION FACILITIES

SECTION 601 GENERAL

Revise as follows:

601.1 Scope. ~~This chapter covers public pools and water containment systems used for aquatic recreation. This chapter provides specifications for the design~~ Design, construction, installation, alteration, repair, and operation of Class D-1 through Class D-6 ~~equipment, operation, signs, installation, sanitation, new construction, and rehabilitation of~~ public swimming pools and water containment systems intended to be used for aquatic recreation facilities shall comply with this chapter ~~play. This chapter covers Class D-1 through Class D-6 public pools whether they are provided as stand-alone attractions or in various combinations in a composite attraction.~~

601.2 Combinations. Where combinations of Class D-1 through Class D-6 pools exist within an aquatic recreation ~~a~~ facility, each element ~~in the facility~~ shall comply with the applicable code sections as if the element functioned as a part of a freestanding public swimming pool of Class D-1 through Class D-6.

~~**601.3 General.** In addition to the requirements of this chapter, aquatic recreation facilities shall comply with the requirements of Chapter 3.~~

CHAPTER 7 ONGROUND STORABLE RESIDENTIAL SWIMMING POOLS

SECTION 701 GENERAL

Revise as follows:

701.1 Scope. ~~This chapter describes certain criteria for the design,~~ Design, manufacturing, and testing of *onground storable pools* intended for *residential* use shall comply with this chapter. ~~This includes portable pools with flexible or nonrigid side walls that achieve their structural integrity by means of uniform shape, support frame or a combination thereof, and that can be disassembled for storage or relocation. This chapter includes what has been commonly referred to in past standards or codes as onground or above-ground pools.~~

~~**701.1.1 Permanent inground residential swimming pool.** This chapter does not apply to permanent inground *residential* pools, as defined in Chapter 8.~~

~~**701.2 General.** In addition to the requirements of this chapter, onground storable *residential* swimming pools shall comply with the requirements of Chapter 3.~~

CHAPTER 8 PERMANENT INGROUND RESIDENTIAL SWIMMING POOLS

SECTION 801 GENERAL

Revise as follows:

801.1 Scope. ~~The provisions of this chapter shall govern permanent inground *residential* swimming pools. Permanent inground~~ Design, construction, installation, alteration, repair and operation of permament *residential* swimming pools ~~shall~~ which include pools that are inground, partially aboveground or entirely aboveground shall comply with this chapter ~~grade. This chapter does not cover pools that are specifically manufactured for above-ground use and that are capable of being disassembled and stored. This chapter covers new construction, modification and repair of inground *residential* swimming pools.~~

~~**801.2 General.** Permanent inground *residential* pools shall comply with the requirements of Chapter 3.~~

CHAPTER 9 PERMANENT RESIDENTIAL SPAS AND PERMANENT RESIDENTIAL EXERCISE SPAS

SECTION 901 GENERAL

Revise as follows:

901.1 Scope. ~~This chapter shall govern the design, installation,~~ Design, construction, installation, alteration, repair, and operation ~~and repair~~ of permanently installed *residential* spas and exercise spas intended for *residential* use, shall comply with this chapter and Sections 501 through 503 and 505 through 507..

~~**901.2 General.** Permanent *residential* spas and permanent *residential* exercise spas shall comply with Chapter 5 except that Sections 504.1, 504.1.1 and 508.1 shall not apply. Such spas shall comply with the requirements of Chapter 3.~~

CHAPTER 10 PORTABLE RESIDENTIAL SPAS AND PORTABLE RESIDENTIAL EXERCISE SPAS

SECTION 1001 GENERAL

Revise as follows:

1001.1 Scope. ~~This chapter shall govern the installation,~~ Installation, *alteration* and repair of portable *residential* spas and portable exercise spas intended for *residential* use shall comply with this chapter.

~~**1001.2 General.** In addition to the requirements of this chapter, portable *residential* spas and portable *residential* exercise spas shall comply with the requirements of Chapter 3.~~

G1-24 Part V

G1-24 Part VI

IPC: 301.1, 401.1, 501.1, 601.1, 701.1, 801.1, 901.1, 1001.1, 1101.1, 1201.1, , 1201.2(New), 1301.1, 1301.1.1(New), 1401.1; IBC: [P] 2901.1

Proponents: Steven Orlowski, Sundowne Building Code Consultants, LLC, Self (sorlowski@sbcc.codes); Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org); Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Plumbing Code

CHAPTER 3 GENERAL REGULATIONS

SECTION 301 GENERAL

Revise as follows:

301.1 Scope.
~~The provisions of this chapter shall govern the general regulations regarding the installation of plumbing not specific to other chapters.~~ General installation of plumbing systems shall comply with this chapter.

CHAPTER 4 FIXTURES, FAUCETS AND FIXTURE FITTINGS

SECTION 401 GENERAL

Revise as follows:

401.1 Scope. ~~This chapter shall govern the materials, design and installation of plumbing fixtures, faucets and fixture fittings in accordance with the type of *occupancy*, and shall provide for the minimum number of fixtures for various types of *occupancies*.~~ Design, installation, and materials of plumbing fixtures, faucets and fixture fittings shall comply with this chapter.

CHAPTER 5 WATER HEATERS

SECTION 501 GENERAL

Revise as follows:

501.1 Scope.
~~The provisions of this chapter shall govern the materials, design and installation of water heaters and the related safety devices and appurtenances.~~ Design, installation, and materials of hot water heaters and hot water storage tanks shall comply with this chapter.

CHAPTER 6 WATER SUPPLY AND DISTRIBUTION

SECTION 601 GENERAL

Revise as follows:

601.1 Scope.

601.1 Scope.
~~This chapter shall govern the materials, design and installation~~Design, installation, and materials of hot and cold ~~of~~ water supply systems ~~, both hot and cold,~~ for utilization in connection with human occupancy and habitation and ~~shall govern the installation~~ of individual water supply systems shall comply with this chapter.

CHAPTER 7 SANITARY DRAINAGE

SECTION 701 GENERAL

Revise as follows:

701.1 Scope.
~~The provisions of this chapter shall govern the materials, design, construction and installation of sanitary drainage systems.~~Design, Installation, construction, and materials of sanitary drainage systems shall comply with this chapter.

CHAPTER 8 INDIRECT/SPECIAL WASTE

SECTION 801 GENERAL

Revise as follows:

801.1 Scope.
~~This chapter shall govern matters concerning indirect waste piping~~ Indirect and special wastes systems shall comply with this chapter. ~~This chapter shall further control matters concerning food-handling establishments, sterilizers, humidifiers, clear-water waste, swimming pools, methods of providing *air breaks* or *air gaps*, and neutralizing devices for corrosive wastes.~~

CHAPTER 9 VENTS

SECTION 901 GENERAL

Revise as follows:

901.1 Scope.
~~The provisions of this chapter shall govern the materials, design, construction and installation of vent systems.~~Design, installation, construction, and materials of vent systems shall comply with this chapter.

CHAPTER 10 TRAPS, INTERCEPTORS AND SEPARATORS

SECTION 1001 GENERAL

Revise as follows:

1001.1 Scope.
~~This chapter shall govern the material and installation of traps, interceptors and separators.~~Installation and materials of traps, interceptors, and separators shall comply with this chapter.

CHAPTER 11 STORM DRAINAGE

SECTION 1101 GENERAL

Revise as follows:

1101.1 Scope.
~~The provisions of this chapter shall govern the materials, design, construction and installation of storm drainage.~~Design, installation, construction, and materials of storm drainage systems shall comply with this chapter.

CHAPTER 12 SPECIAL PIPING AND STORAGE SYSTEMS

SECTION 1201 GENERAL

Revise as follows:

1201.1 Scope.
~~The provisions of this chapter shall govern the design~~ Design and installation of piping and storage systems for nonflammable medical gas systems and nonmedical oxygen systems shall comply with this chapter.
~~All maintenance and operations of such systems shall be in accordance with the *International Fire Code.*~~

Add new text as follows:

1201.2 Maintenance and operation. Maintenance and operations of of nonflammable medical gas systems and nonmedical oxygen systems shall be in accordance with the *International Fire Code*.

CHAPTER 13 NONPOTABLE WATER SYSTEMS

SECTION 1301 GENERAL

Revise as follows:

1301.1 General.
~~The provisions of Chapter 13 shall govern the materials, design, construction and installation~~ Design, installation, construction, and materials of systems for the collection, storage, treatment and distribution of nonpotable water shall comply with this chapter. ~~For nonpotable rainwater systems, the provisions of CSA B805/ICC 805 shall be an alternative for regulating the materials, design, construction and installation of systems for rainwater collection, storage, treatment and distribution of nonpotable water~~. The use and application of nonpotable water shall comply with laws, rules and ordinances applicable in the jurisdiction.

Add new text as follows:

1301.1.1 Nonpotable Rainwater Systems. The provisions of CSA B805/ICC 805 shall be an alternative for regulating the design, installation, construction, and materials of systems for rainwater collection, storage, treatment, and distribution of nonpotable water.

CHAPTER 14 SUBSURFACE GRAYWATER SOIL ABSORPTION SYSTEMS

SECTION 1401
GENERAL

Revise as follows:

1401.1 Scope. ~~The provisions of this chapter shall govern the materials, design, construction and installation~~Design, installation, construction, and materials of subsurface graywater soil absorption systems connected to nonpotable water from on-site water reuse systems shall comply with this chapter.

2024 International Building Code

CHAPTER 29 PLUMBING SYSTEMS

SECTION 2901
GENERAL

Revise as follows:

[P] 2901.1 Scope.
~~The provisions of this chapter and the *International Plumbing Code* shall govern the design,~~ Design, construction, erection and installation of plumbing components, appliances, equipment and systems used in *buildings* and *structures* covered by this code shall comply with this chapter and the *International Plumbing Code*. Toilet and bathing rooms shall be constructed in accordance with Section 1210. Private sewage disposal systems shall conform to the *International Private Sewage Disposal Code* . The *International Fire Code* , the *International Property Maintenance Code* and the *International Plumbing Code* shall govern the use and maintenance of plumbing components, appliances, equipment and systems. The *International Existing Building Code* and the *International Plumbing Code* shall govern the *alteration*, *repair*, relocation, replacement and addition of plumbing components, *appliances*, *equipment* and systems.

G1-24 Part VI

G1-24 Part VII

IMC: 301.1, 401.1, CHAPTER 5, 501.1, CHAPTER 6, 601.1, 701.1, 701.2, 702.1(New), 702.2(New), 702.3(New), 901.1, 901.2, 1001.1, 1001.2(New), 1101.1, 1201.1, 1201.2(New), 1301.1, 1301.2, 1401.1; IBC: [M] 2801.1

Proponents: Steven Orlowski, Sundowne Building Code Consultants, LLC, Self (sorlowski@sbcc.codes); Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org); Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Mechanical Code

CHAPTER 3 GENERAL REGULATIONS

SECTION 301 GENERAL

Revise as follows:

301.1 Scope.
~~This chapter shall govern the approval and installation~~Installation of all *equipment* and *appliances* that comprise parts of the *building* mechanical systems shall comply with this chapter. ~~regulated by this code in accordance with Section 101.2.~~

CHAPTER 4 VENTILATION

SECTION 401 GENERAL

Revise as follows:

401.1 Scope. ~~This chapter shall govern the ventilation~~ Ventilation of spaces within a *building* intended to be occupied, other than by systems regulated by Chapter 5, shall comply with this chapter. ~~Mechanical exhaust systems, including exhaust systems serving clothes dryers and cooking *appliances*; hazardous exhaust systems; dust, stock and refuse conveyor systems; subslab soil exhaust systems; smoke control systems; energy recovery ventilation systems and other systems specified in Section 502 shall comply with Chapter 5.~~

CHAPTER 5 EXHAUST SYSTEMS, SMOKE CONTROL SYSTEMS, AND ENERGY RECOVERY VENTILATION SYSTEMS

SECTION 501 GENERAL

Revise as follows:

501.1 Scope. ~~This chapter shall govern the design~~Design, construction and installation of ~~mechanical~~ exhaust systems, smoke control systems, and ~~including exhaust systems serving clothes dryers and cooking *appliances*; hazardous exhaust systems; dust, stock and refuse conveyor systems; subslab soil exhaust systems; smoke control systems;~~ energy recovery ventilation systems shall comply with this chapter. ~~and other systems specified in Section 502.~~

CHAPTER 6 ~~DUCT SYSTEMS~~AIR MOVEMENT

SECTION 601

GENERAL

Revise as follows:

601.1 Scope. ~~Duct systems used for the~~ Air movement for the purpose of ~~air in~~ air-conditioning, heating, ~~ventilating~~ and ventilation or exhaust systems ~~shall conform to the provisions of this chapter except as otherwise~~ other than specified in Chapters 5 and 7, shall comply with this chapter.

Exception: Ducts discharging combustible material directly into any *combustion* chamber shall conform to the requirements of NFPA 82.

CHAPTER 7 COMBUSTION AIR

SECTION 701 GENERAL

Revise as follows:

701.1 Scope.
For other than fireplaces, fireplace stoves and direct-vent *appliances*, combustion air shall comply with this chapter.
~~Solid fuel-burning *appliances* shall be provided with *combustion air* in accordance with the *appliance* manufacturer's installation instructions.~~
~~Oil-fired *appliances* shall be provided with *combustion air* in accordance with NFPA 31. The methods of providing *combustion air* in this chapter do not apply to fireplaces, fireplace stoves and direct-vent *appliances*.~~
~~The requirements for combustion and dilution air for gas-fired *appliances* shall be in accordance with the *International Fuel Gas Code*.~~

Add new text as follows:

702.1 Solid fuel-burning appliances. Solid fuel-burning *appliances* shall be provided with *combustion air* in accordance with the *appliance* manufacturer's installation instructions.

702.2 Oil-fired appliances. Oil-fired *appliances* shall be provided with *combustion air* in accordance with NFPA 31.

702.3 Gas-fired appliances. Combustion and dilution air for gas-fired *appliances* shall be in accordance with the *International Fuel Gas Code*.

Revise as follows:

~~701.2~~703.1 ~~Dampered openings~~Interlock.
Where *combustion air* openings are provided with volume, smoke or fire dampers, the dampers shall be interlocked with the firing cycle of the *appliances* served, so as to prevent operation of any *appliance* that draws *combustion air* from the room or space when any of the dampers are closed. Manual dampers shall not be installed in *combustion air* ducts. Ducts not provided with dampers and that pass through rated construction shall be enclosed in a shaft in accordance with the *International Building Code*.

CHAPTER 9 SPECIFIC APPLIANCES, FIREPLACES AND SOLID FUEL-BURNING EQUIPMENT

SECTION 901 GENERAL

Revise as follows:

901.1 Scope. ~~This chapter shall govern the approval,~~ For other than gas-fired *appliances* regulated by the *International Fuel Gas Code*, the design, installation, construction, maintenance, *alteration* and repair of ~~the~~ *appliances*, systems, and *equipment* specifically identified herein shall comply with this chapter. ~~and factory-built fireplaces. The approval, design, installation, construction, maintenance, *alteration* and repair of gas-fired *appliances* shall be regulated by the *International Fuel Gas Code*.~~

Delete without substitution:

~~**901.2 General.** The requirements of this chapter shall apply to the mechanical *equipment* and *appliances* regulated by this chapter, in addition to the other requirements of this code.~~

CHAPTER 10 BOILERS, WATER HEATERS AND PRESSURE VESSELS

SECTION 1001 GENERAL

Revise as follows:

1001.1 Scope. ~~This chapter shall govern the installation~~ Installation, *alteration* and repair of boilers, water heaters and pressure vessels, other than those specified in section 1001.2, shall comply with this chapter.

~~**Exceptions:**~~

1. ~~Pressure vessels used for unheated water supply.~~
2. ~~Portable unfired pressure vessels and Interstate Commerce Commission containers.~~
3. ~~Containers for bulk oxygen and medical gas.~~
4. ~~Unfired pressure vessels having a volume of 5 cubic feet (0.14 m^3) or less operating at pressures not exceeding 250 pounds per square inch (psi) (1724 kPa) and located within *occupancies* of Groups B, F, H, M, R, S and U.~~
5. ~~Pressure vessels used in *refrigeration systems* that are regulated by Chapter 11 of this code.~~
6. ~~Pressure tanks used in conjunction with coaxial cables, telephone cables, power cables and other similar humidity control systems.~~
7. ~~Any boiler or pressure vessel subject to inspection by federal or state inspectors.~~
8. ~~Pressure vessels used in specific *appliances* and *equipment* that are regulated by Chapter 9 of this code.~~

Add new text as follows:

1001.2 Nonapplicability. This chapter shall not apply to the following:

1. Pressure vessels used for unheated water supply.
2. Portable unfired pressure vessels and Interstate Commerce Commission containers.
3. Containers for bulk oxygen and medical gas.
4. Unfired pressure vessels having a volume of 5 cubic feet (0.14 m^3) or less operating at pressures not exceeding 250 pounds per square inch (psi) (1724 kPa) and located within *occupancies* of Groups B, F, H, M, R, S and U.
5. Pressure vessels used in *refrigeration systems* that are regulated by Chapter 11 of this code.
6. Pressure tanks used in conjunction with coaxial cables, telephone cables, power cables and other similar humidity control systems.
7. Any boiler or pressure vessel subject to inspection by federal or state inspectors.
8. Pressure vessels used in specific *appliances* and *equipment* that are regulated by Chapter 9 of this code.

CHAPTER 11 REFRIGERATION

SECTION 1101 GENERAL

Revise as follows:

1101.1 Scope. ~~This chapter shall govern the design~~Design, installation, construction and repair of *refrigeration systems* shall comply with this chapter. ~~Permanently installed refrigerant storage systems and other components shall be considered as part of the *refrigeration system* to which they are attached.~~

CHAPTER 12 HYDRONIC PIPING

SECTION 1201 GENERAL

Revise as follows:

1201.1 Scope. ~~The provisions of this chapter shall govern the construction~~Construction, installation, *alteration* and repair of hydronic piping systems that are part of the heating, ventilation, and air-conditioning systems shall comply with this chapter. ~~This chapter shall apply to hydronic piping systems that are part of heating, ventilation and air-conditioning systems. Such piping systems shall include steam, hot water, radiant heating, radiant cooling , chilled water, steam condensate, ground source heat pump loop systems, and snow- and ice-melting. Potable cold and hot water distribution systems shall be installed in accordance with the *International Plumbing Code*.~~

Add new text as follows:

1201.2 System configuration. Hydronic piping systems shall include steam, hot water, radiant heating, radiant cooling , chilled water, steam condensate, ground source heat pump loop systems, and snow- and ice-melting. Potable cold and hot water distribution systems shall be installed in accordance with the *International Plumbing Code*.

CHAPTER 13 FUEL OIL PIPING AND STORAGE

SECTION 1301 GENERAL

Revise as follows:

1301.1 Scope.
~~This chapter shall govern the design~~Design, installation, construction and repair of fuel oil storage and piping systems shall comply with this chapter. ~~The storage of fuel oil and flammable and combustible liquids shall be in accordance with Chapters 6 and 57 of the International Fire Code.~~

1301.2 Storage ~~and piping systems~~.
Fuel oil storage systems shall comply with Section 605.4 of the International Fire Code. ~~Fuel oil piping systems shall comply with the requirements of this code.~~ The storage of fuel oil and flammable and combustible liquids shall be in accordance with Chapter 57 of the *International Fire Code.*

CHAPTER 14 SOLAR THERMAL SYSTEMS

SECTION 1401
GENERAL

Revise as follows:

1401.1 Scope. ~~This chapter shall govern the design, construction,~~ Design, installation, construction *alteration* and repair of solar thermal systems, *equipment* and *appliances* intended to utilize solar energy for space heating or cooling, domestic hot water heating, swimming pool heating or process heating shall comply with this chapter.

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CHAPTER 28 MECHANICAL SYSTEMS

SECTION 2801
GENERAL

Revise as follows:

[M] 2801.1 Scope.
~~The provisions of this chapter, the *International Mechanical Code* and the *International Fuel Gas Code* shall govern the design,~~ Design, construction, erection and installation of mechanical appliances, equipment and systems used in *buildings* and *structures* covered by this code shall comply with this chapter, the *International Mechanical Code* and the *International Fuel Gas Code*. Masonry chimneys, fireplaces and barbecues shall comply with the *International Mechanical Code* and Chapter 21 of this code. The *International Fire Code* , the *International Property Maintenance Code* , the *International Mechanical Code* and the *International Fuel Gas Code* shall govern the use and maintenance of mechanical components, appliances, equipment and systems. The *International Existing Building Code* , the *International Mechanical Code* and the *International Fuel Gas Code* shall govern the *alteration*, *repair*, relocation, replacement and addition of mechanical components, appliances, equipment and systems.

Reason:

Currently, there is inconsistency among all the I-Codes in how the scoping sections are written at the beginning of each chapter. The Code Correlation Committee requested a task group be formed to review the scoping section in all the I-Codes and determine if there would be a way to harmonize both the language and style across the model codes. The Scoping Task Group was formed and consisted of several members from the various Code Action Committees and interested parties (some with no client interest). The task group reviewed each chapter of the I-codes and after careful consideration, developed a format that could be incorporated and repeated for all the I-Codes.

As you will see in the proposed changes above, most of the chapters began with a style and format that was already consistent and was only slightly changed to give the scoping a more authoritative infliction. Where the chapter contained no scoping provisions, the task group added scoping language based on the content of the chapter. Where the existing scoping sections provided a laundry list of what is contained in the chapter, these list were reformatted into a list form to make it easier for users to see what information was contained. The Scoping Task group proposes that the recommended changes will improve the code by:

1. Create consistency in language used in the scope for all the I-Codes.
2. Creates a scoping section for chapters that did not have one before to clarify what is covered by the chapter.
3. Clarify the items covered and not covered in the chapter, using consistent format to send the user to different chapter(s) or code(s).
4. Remove redundant administrative language from existing scoping sections.
5. Where there were extensive number of items outlined in the scoping section, the items are now broken out into a list format to make it easier for the reader to indicate what is contained in the chapter.

To the best of the task groups knowledge the proposed changes are editorial in nature and no requirements not already addressed in the existing scoping or in the chapter being referenced were added. As these proposed changes are editorial, there is no cost impact on the cost of construction.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

As stated in our reason statement, these proposed changes are editorial, there is no cost impact on the cost of construction.

G1-24 Part VII

G1-24 Part VIII

IFC: 301.1, 401.1, 601.1, 701.1, 801.1, 901.1, SECTION 1001, 1001.1, [BE] 1001.2, 1101.1, 1201.1, 2001.1, 2101.1, 2201.1, 2201.1.1 (New), 2301.1, 2401.1, 2501.1, 2501.1.1 (New), 2701.1, 2801.1, 2901.1, 2901.1.1 (New), 3001.1, 3101.1, 3101.1.1 (New), 3201.1, 3301.1, 3401.1, 3401.1.1 (New), SECTION 3601, 3601.1, 3701.1, 3801.1, 3801.2, 3801.2.1 (New), 3801.2.2 (New), 3901.1, 3901.1.1 (New), 4001.1, 4101.1, 4101.1.1 (New), 5001.1, 5001.1.1, 5101.1, 5301.1, 5301.1.1, 5301.1.2, 5303.1, 5401.1, 5401.1.1 (New), 5501.1, 5501.1.1 (New), 5501.1.2 (New), 5601.1, 5601.1.1, 5601.1.2, 5701.1, 5701.2, 5801.1, 5801.1.1 (New), 5801.1.2 (New), 5901.1, 6001.1, 6001.1.1 (New), 6201.1, 6301.1, 6301.1.1 (New), 6301.1.2 (New), 6401.1, 6401.1.1 (New), 6501.1, 6601.1, 6601.1.1 (New), 6601.1.2 (New), 6701.1, 6701.1.1 (New); IWUIC: 301.1, 401.1, 401.3, 501.1, 501.1.1 (New), 601.1

Proponents: Steven Orlowski, Sundowne Building Code Consultants, LLC, Self (sorlowski@sbcc.codes); Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org); Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Fire Code

CHAPTER 3 GENERAL REQUIREMENTS

SECTION 301
GENERAL

Revise as follows:

301.1 Scope. ~~The provisions of this chapter shall govern the occupancy~~ Occupancy and maintenance of all structures and premises for precautions against fire and the spread of fire and general requirements of fire safety shall comply with this chapter.

CHAPTER 4 EMERGENCY PLANNING AND PREPAREDNESS

SECTION 401
GENERAL

Revise as follows:

401.1 Scope.
Reporting of emergencies, coordination with emergency response forces, emergency plans and procedures for managing or responding to emergencies shall comply with ~~the provisions of this section~~ this chapter.

> **Exception:** Firms that have *approved* on-premises firefighting organizations and that are in compliance with *approved* procedures for fire reporting.

CHAPTER 6 BUILDING SERVICES AND SYSTEMS

SECTION 601
GENERAL

Revise as follows:

601.1 Scope.
~~The provisions of this chapter shall apply to the installation, operation, testing and maintenance of the~~ The following building services and systems shall comply with this chapter:

1. Electrical systems, equipment and wiring.
2. Information technology server rooms.

3. Elevator systems, emergency operation and recall.
4. Fuel-fired appliances, heating systems, chimneys and fuel oil storage.
5. Commercial cooking equipment and systems.
6. Commercial cooking oil storage.
7. Mechanical refrigeration systems.
8. Hyperbaric facilities.
9. Clothes dryer exhaust systems.

CHAPTER 7 FIRE AND SMOKE PROTECTION FEATURES

SECTION 701 GENERAL

Revise as follows:

701.1 Scope.
~~The provisions of this chapter shall govern the inspection~~ Inspection and maintenance of ~~the materials, systems and assemblies used for structural *fire resistance*, *fire-resistance-rated* construction separation of adjacent spaces and construction installed to resist the passage of smoke to safeguard against the spread of~~ fire and smoke protection features in ~~within a building and the spread of fire to or from~~ buildings shall comply with this chapter. ~~New buildings shall comply with the *International Building Code.*~~ .

CHAPTER 8 INTERIOR FINISH, DECORATIVE MATERIALS AND FURNISHINGS

SECTION 801 GENERAL

Revise as follows:

801.1 Scope.
~~The provisions of this chapter shall govern interior~~ Interior finish, interior trim, furniture, furnishings, decorative materials and decorative vegetation in buildingsshall comply with this chapter. ~~Existing buildings shall comply with Sections 803 through 808. New buildings shall comply with Sections 804 through 808, and Section 803 of the International Building Code.~~

CHAPTER 9 FIRE PROTECTION AND LIFE SAFETY SYSTEMS

SECTION 901 GENERAL

Revise as follows:

901.1 Scope.
~~The provisions of this chapter shall specify where~~ Where *fire protection* and *life safety systems* are required by this chapter, ~~and shall apply to~~ the design, installation, inspection, operation, testing and maintenance of all *fire protection* and *life safety systems* shall comply with this chapter.

CHAPTER 10 MEANS OF EGRESS

Revise as follows:

SECTION 1001
~~ADMINISTRATION~~GENERAL

1001.1 ~~General~~ Scope.
Buildings or portions thereof shall be provided with a *means of egress* system ~~as required by~~ and shall comply with this chapter. The provisions of this chapter shall control the design, construction, ~~and~~ arrangement and maintenance of *means of egress* components required to provide an *approved means of egress* from structures and portions thereof. ~~Sections 1003 through 1031 shall apply to new construction. Section 1032 shall apply to existing buildings.~~

> **Exception:** Detached one- and two-family *dwellings* and *townhouses* not more than three stories above *grade plane* in height with a separate means of egress and their accessory structures shall comply with the *International Residential Code*.

[BE] 1001.2 ~~Minimum requirements~~General. It shall be unlawful to alter a building or structure in a manner that will reduce the number of *exits* or the capacity of the *means of egress* to less than required by this code.

CHAPTER 11 CONSTRUCTION REQUIREMENTS FOR EXISTING BUILDINGS

SECTION 1101
GENERAL

Revise as follows:

1101.1 Scope. ~~The provisions of this chapter shall apply to existing~~ Existing buildings constructed prior to the adoption of this code shall comply with this chapter.

CHAPTER 12 ENERGY SYSTEMS

SECTION 1201
GENERAL

Revise as follows:

1201.1 Scope.
~~The provisions of this chapter shall apply to the installation~~ Installation, operation, maintenance, repair, retrofitting, testing, commissioning and decommissioning of energy systems used for generating or storing energy, including but not limited to energy storage systems under the exclusive control of an electric utility or lawfully designated agency shall comply with this chapter. It shall not apply to equipment associated with the generation, control, transformation, transmission, or distribution of energy installations that is under the exclusive control of an electric utility or lawfully designated agency. Energy storage systems regulated by Section 1207 shall comply with this chapter, as appropriate, and NFPA 855.

CHAPTER 20 AVIATION FACILITIES

SECTION 2001
GENERAL

Revise as follows:

2001.1 Scope. Airports, heliports, helistops and aircraft hangars shall comply ~~be in accordance~~ with this chapter.

CHAPTER 21 DRY CLEANING

SECTION 2101 GENERAL

Revise as follows:

2101.1 Scope. Dry cleaning plants and their operations shall comply with ~~the requirements of~~ this chapter.

CHAPTER 22 COMBUSTIBLE DUST-PRODUCING OPERATIONS

SECTION 2201 GENERAL

Revise as follows:

2201.1 Scope. The equipment, processes and operations involving dust explosion hazards and use or handling of *combustible dust* shall comply with ~~the provisions of~~ this chapter.

~~**Exceptions:**~~

~~1. Storage and use of consumer materials in Group B or R occupancies.~~

~~2. Storage and use of commercially packaged materials in Group M occupancies.~~

~~3. Materials displayed in original packaging in Group M occupancies and intended as building materials or for personal or household use.~~

~~4. Storage of sealed containers of *combustible dust* at facilities not associated with an operation that uses, handles or generates *combustible dust*.~~

~~5. Materials stored or used in farm buildings or similar occupancies intended for on-premises agricultural purposes.~~

Add new text as follows:

2201.1.1 Non-applicability. This chapter shall not apply to any of the following:

1. Storage and use of consumer materials in Group B or R occupancies.
2. Storage and use of commercially packaged materials in Group M occupancies.
3. Materials displayed in original packaging in Group M occupancies and intended as building materials or for personal or household use.
4. Storage of sealed containers of *combustible dust* at facilities not associated with an operation that uses, handles or generates *combustible dust*.
5. Materials stored or used in farm buildings or similar occupancies intended for on-premises agricultural purposes.

CHAPTER 23 MOTOR FUEL-DISPENSING FACILITIES AND REPAIR GARAGES

SECTION 2301 GENERAL

Revise as follows:

2301.1 Scope.
Public and private automotive ~~Automotive~~ motor fuel-dispensing facilities, marine motor fuel-dispensing facilities, fleet vehicle motor fuel-dispensing facilities, aircraft motor-vehicle fuel-dispensing facilities and repair garages shall comply ~~be in accordance~~ with this chapter ~~and the *International Building Code*, *International Fuel Gas Code* and *International Mechanical Code*. Such operations shall include both those that are open to the public and private operations~~.

CHAPTER 24 FLAMMABLE FINISHES

SECTION 2401 GENERAL

Revise as follows:

2401.1 Scope. ~~This chapter shall apply to locations or areas where any of the~~ The following activities shall comply with this chapter: ~~are conducted:~~

1. The application of flammable finishes to articles or materials by means of spray apparatus.
2. The application of flammable finishes by dipping or immersing articles or materials into the contents of tanks, vats or containers of *flammable* or *combustible liquids* for coating, finishing, treatment or similar processes.
3. The application of flammable finishes by applying combustible powders to articles or materials utilizing powder spray guns, electrostatic powder spray guns, fluidized beds or electrostatic fluidized beds.
4. Floor surfacing or finishing operations using Class I or II liquids in areas exceeding 350 square feet (32.5 m^2).
5. The application of flammable finishes consisting of dual-component coatings or Class I or II liquids where applied by brush or roller in quantities exceeding 1 gallon (4 L).

CHAPTER 25 FRUIT AND CROP RIPENING

SECTION 2501 GENERAL

Revise as follows:

2501.1 Scope. Ripening processes where ethylene gas is introduced into a room to promote the ripening of fruits, vegetables and other crops shall comply with this chapter.

~~**Exception:** Mixtures of ethylene and one or more inert gases in concentrations that prevent the gas from reaching greater than 25 percent of the lower explosive limit (LEL) when released to the atmosphere.~~

Add new text as follows:

2501.1.1 Non-applicability. This chapter shall not apply to mixtures of ethylene and one or more inert gases in concentrations that prevent the gas from reaching greater than 25 percent of the lower explosive limit (LEL) when released to the atmosphere.

CHAPTER 27 SEMICONDUCTOR FABRICATION FACILITIES

SECTION 2701 GENERAL

Revise as follows:

2701.1 Scope.
Semiconductor fabrication facilities and comparable ~~research and development~~ areas classified as Group H-5 shall comply with this chapter. ~~and the *International Building Code.*~~ The use, storage and handling of hazardous materials in Group H-5 shall comply with this chapter~~,~~ and other applicable provisions of this code. ~~and the *International Building Code.*~~

CHAPTER 28 LUMBER YARDS AND AGRO-INDUSTRIAL, SOLID BIOMASS AND WOODWORKING FACILITIES

SECTION 2801 GENERAL

Revise as follows:

2801.1 Scope. The storage, manufacturing and processing of solid biomass feedstock, timber, lumber, plywood, veneers and agro-industrial byproducts shall ~~be in accordance~~ comply with this chapter.

CHAPTER 29 MANUFACTURE OF ORGANIC COATINGS

SECTION 2901 GENERAL

Revise as follows:

2901.1 Scope. Organic coating manufacturing processes shall comply with this chapter. ~~, except that this chapter shall not apply to processes manufacturing nonflammable or water-thinned coatings or to operations applying coating materials.~~

Add new text as follows:

2901.1.1 Non-applicability. This chapter shall not apply to processes manufacturing nonflammable or water-thinned coatings or to operations applying coating materials.

CHAPTER 30 INDUSTRIAL OVENS

SECTION 3001 GENERAL

Revise as follows:

3001.1 Scope.
~~This chapter shall apply to the installation~~ Installation and operation of industrial ovens and furnaces shall comply with this chapter, and applicable provisions of ~~the *International Fuel Gas Code*, the *International Mechanical Code*,~~ NFPA 86~~, and this chapter~~. The terms “ovens” and “furnaces” are used interchangeably in this chapter.

CHAPTER 31 TENTS, TEMPORARY SPECIAL EVENT STRUCTURES AND OTHER MEMBRANE STRUCTURES

SECTION 3101 GENERAL

Revise as follows:

3101.1 Scope.

3101.1 Scope.
Tents, temporary special event structures and *membrane structures* shall comply with this chapter. ~~The provisions of Section 3103 are applicable only to temporary *tents* and *membrane structures*. The provisions of Sections 3104 and 3108 are applicable to temporary and permanent *tents* and *membrane structures*. The provisions of Section 3105 are applicable to temporary special event structures. The provisions of Section 3106 are applicable to inflatable amusement devices. The provisions of Section 3107are applicable to outdoor assembly events. Other temporary structures shall comply with the *International Building Code*.~~

Add new text as follows:

3101.1.1 Applicability. The following applies as follows:

1. The provisions of Section 3103 are applicable only to temporary *tents* and *membrane structures*.
2. The provisions of Sections 3104 and 3108 are applicable to temporary and permanent *tents* and *membrane structures*.
3. The provisions of Section 3105 are applicable to temporary special event structures.
4. The provisions of Section 3106 are applicable to inflatable amusement devices.
5. The provisions of Section 3107 are applicable to outdoor assembly events.
6. Other temporary structures not covered by this chapter shall comply with the *International Building Code*.

CHAPTER 32 HIGH-PILED COMBUSTIBLE STORAGE

SECTION 3201
GENERAL

Revise as follows:

3201.1 Scope.
High-piled combustible storage shall ~~be in accordance~~ comply with this chapter. In addition to the requirements of this chapter, the following material-specific requirements shall apply:

1. Aerosols shall be in accordance with Chapter 51.
2. *Flammable* and *combustible liquids* shall be in accordance with Chapter 57.
3. Hazardous materials shall be in accordance with Chapter 50.
4. Storage of combustible paper records shall be in accordance with NFPA 13.
5. Storage of *combustible fibers* shall be in accordance with Chapter 37.
6. General storage of combustible material shall be in accordance with Chapter 3.

CHAPTER 33 FIRE SAFETY DURING CONSTRUCTION AND DEMOLITION

SECTION 3301
GENERAL

Revise as follows:

3301.1 Scope.
~~This chapter shall apply to structures~~ Structures in the course of construction, *alteration* or demolition, including those in underground locations shall comply with this chapter. Compliance with NFPA 241 is required for items not specifically addressed herein.

CHAPTER 34 TIRE REBUILDING AND TIRE STORAGE

SECTION 3401
GENERAL

Revise as follows:

3401.1 Scope.
Tire rebuilding plants, tire storage and tire byproduct facilities shall comply with this chapter~~,~~ and other applicable requirements of this code~~. and NFPA 13. Tire storage in buildings shall also comply with Chapter 32.~~

Add new text as follows:

3401.1.1 Additional Requirements. The following shall also apply.

1. The rubber tire protection requirements of NFPA 13.
2. Storage of tires shall comply with Chapter 32.

CHAPTER 36 MARINAS

Revise as follows:

SECTION 3601
~~SCOPE~~GENERAL

3601.1 Scope. Marina facilities shall ~~be in accordance~~ comply with this chapter.

CHAPTER 37 COMBUSTIBLE FIBERS

SECTION 3701
GENERAL

Revise as follows:

3701.1 Scope. ~~The equipment~~Equipment, processes and operations involving *combustible fibers* shall comply with this chapter.

CHAPTER 38 HIGHER EDUCATION LABORATORIES

SECTION 3801
GENERAL

Revise as follows:

3801.1 Scope.
Higher education laboratories ~~complying with the requirements of this chapter shall be permitted to exceed the maximum allowable quantities of hazardous materials in *control areas* set forth in Chapter 50 without requiring classification as a Group H occupancy~~ shall comply with this chapter. Except as specified in this chapter, such laboratories shall comply with all applicable provisions of this code.~~and the *International Building Code*.~~

3801.2 Application.

The provisions of this chapter shall be applied as exceptions or additions to applicable requirements of this code. ~~Unless specifically modified by this chapter, the storage, use and handling of hazardous materials shall comply with the provisions in Chapters 50 through 67 and the *International Building Code* for quantities not exceeding the maximum allowable quantity.~~

Add new text as follows:

3801.2.1 Materials exceeding the Maximum Allowable Quantity. Occupancies complying with this chapter shall be permitted to exceed the maximum allowable quantities of hazardous materials in control areas set forth in Chapter 50 without requiring classification as a Group H occupancy

3801.2.2 Materials not exceeding the Maximum Allowable Quantity . Unless specifically modified by this chapter, the storage, use and handling of hazardous materials shall comply with the provisions of chapters 50 through 67 for quantities not exceeding the maximum allowable quantities.

CHAPTER 39 PROCESSING AND EXTRACTION FACILITIES

SECTION 3901 GENERAL

Revise as follows:

3901.1 Scope.
Facilities where plant processing and solvent-based extraction are conducted, including but not limited to cultivation and related activities, pre-extraction or post-extraction, shall comply with this chapter and the *International Building Code*. The use, storage, transfilling and handling of hazardous materials in these facilities shall comply with this chapter, other applicable provisions of this code and the *International Building Code*.

~~**Exception:** Greenhouses in compliance with Section 3112 of the *International Building Code* not utilizing carbon dioxide enrichment.~~

Add new text as follows:

3901.1.1 Non-applicability. This chapter shall not apply to greenhouses in compliance with Section 3112 of the *International Building Code* not utilizing carbon dioxide enrichment.

CHAPTER 40 STORAGE OF DISTILLED SPIRITS AND WINES

SECTION 4001 GENERAL

Revise as follows:

4001.1 ~~General~~Scope.
~~The storage~~Storage of distilled spirits and wines in barrels and casks shall comply with this chapter. ~~in addition to other applicable requirements of this code.~~

CHAPTER 41 TEMPORARY HEATING AND COOKING OPERATIONS

SECTION 4101 GENERAL. Section 4101.5 relocated from before 3107.13

Revise as follows:

4101.1 ~~General~~Scope. ~~The provisions of this chapter shall apply to the use~~ Use, operation, testing and maintenance of mobile and

portable equipment and devices used for temporary heating and cooking shall comply with this chapter. Temporary heating and cooking operations with open flames shall also comply with any additional applicable requirements in Section 308
.

~~**Exception:** Temporary heating devices used in the course of construction, alteration and demolition of structures shall comply with Section 3304.~~

Add new text as follows:

4101.1.1 Non-applicability. This chapter shall not apply to temporary heating devices used in the course of construction, alteration and demolition of structures complying with Section 3304.

CHAPTER 50 HAZARDOUS MATERIALS—GENERAL PROVISIONS

SECTION 5001 GENERAL

Revise as follows:

5001.1 Scope.
Prevention, control and mitigation of dangerous conditions related to storage, dispensing, use and handling of hazardous materials shall ~~be in accordance~~ comply with this chapter.
This chapter shall apply to all hazardous materials, including those materials regulated elsewhere in this code, except that where specific requirements are provided in other chapters, those specific requirements shall apply in accordance with the applicable chapter. Where a material has multiple hazards, all hazards shall be addressed.

~~**Exceptions:**~~

1. ~~In retail or wholesale sales occupancies, medicines, foodstuff, cosmetics and commercial or institutional products containing not more than 50 percent by volume of water-miscible liquids and with the remainder of the solutions not being flammable, provided that such materials are packaged in individual containers not exceeding 1.3 gallons (5 L).~~
2. ~~Alcoholic beverages in retail or wholesale sales occupancies, provided that the liquids are packaged in individual containers not exceeding 1.3 gallons (5 L).~~
3. ~~Application and release of pesticide and agricultural products and materials intended for use in weed abatement, erosion control, soil amendment or similar applications where applied in accordance with the manufacturer's instructions and label directions.~~
4. ~~The off-site transportation of hazardous materials where in accordance with Department of Transportation (DOTn) regulations.~~
5. ~~Building materials not otherwise regulated by this code.~~
6. ~~Refrigeration systems (see Section 608).~~
7. ~~Stationary storage battery systems regulated by Section 1207.~~
8. ~~The display, storage, sale or use of fireworks and *explosives* in accordance with Chapter 56.~~
9. ~~*Corrosives* utilized in personal and household products in the manufacturer's original consumer packaging in Group M occupancies.~~
10. ~~The storage of beer, distilled spirits and wines in barrels and casks.~~
11. ~~The use, storage or both of dispensers containing alcohol-based hand rubs classified as Class I or II liquids where in accordance with Section 5705.5.~~
12. ~~Specific provisions for flammable liquids in motor fuel-dispensing facilities, repair garages, airports and marinas in Chapter 23.~~

13. ~~Storage and use of fuel oil in tanks and containers connected to oil-burning equipment. Such storage and use shall be in accordance with Section 605. For abandonment of fuel oil tanks, Chapter 57 applies.~~

14. ~~Storage and display of aerosol products complying with Chapter 51.~~

15. ~~Storage and use of *flammable* or *combustible liquids* that do not have a fire point when tested in accordance with ASTM D92, not otherwise regulated by this code.~~

16. ~~*Flammable* or *combustible liquids* with a *flash point* greater than 95°F (35°C) in a water-miscible solution or dispersion with a water and inert (noncombustible) solids content of more than 80 percent by weight, which do not sustain combustion, not otherwise regulated by this code.~~

17. ~~Commercial cooking oil storage tank systems located within a building and designed and installed in accordance with Section 607 and NFPA 30.~~

Add new text as follows:

5001.1.1 Non-applicability. This chapter shall not apply to any of the following:

1. Retail or wholesale sales occupancies containing medicines, foodstuff, cosmetics and commercial or institutional products containing not more than 50 percent by volume of water-miscible liquids and with the remainder of the solutions not being flammable, provided that such materials are packaged in individual containers not exceeding 1.3 gallons (5 L).

2. Alcoholic beverages in retail or wholesale sales occupancies, provided that the liquids are packaged in individual containers not exceeding 1.3 gallons (5 L).

3. Application and release of pesticide and agricultural products and materials intended for use in weed abatement, erosion control, soil amendment or similar applications where applied in accordance with the manufacturer's instructions and label directions.

4. The off-site transportation of hazardous materials complying with Department of Transportation (DOTn) regulations.

5. Building materials not otherwise regulated by this code.

6. Refrigeration systems complying with Section 608.

7. Stationary storage battery systems complying with Section 1207.

8. The display, storage, sale or use of fireworks and *explosives* complying with Chapter 56.

9. *Corrosives* utilized in personal and household products in the manufacturer's original consumer packaging in retail or wholesale occupancies.

10. The storage of beer, distilled spirits and wines in barrels and casks.

11. The use, storage or both of dispensers containing alcohol-based hand rubs classified as Class I or II liquids where in complying with Section 5705.5.

12. Specific provisions for flammable liquids in motor fuel-dispensing facilities, repair garages, airports and marinas complying with Chapter 23.

13. Storage and use of fuel oil in tanks and containers connected to oil-burning equipment complying with Section 605. Abandonment of fuel oil tanks shall comply with Chapter 57.

14. Storage and display of aerosol products complying with Chapter 51.

15. Storage and use of *flammable* or *combustible liquids* that do not have a fire point when tested in accordance with ASTM D92, not otherwise regulated by this code.

16. *Flammable* or *combustible liquids* with a *flash point* greater than 95°F (35°C) in a water-miscible solution or dispersion with a water and inert (noncombustible) solids content of more than 80 percent by weight, which do not sustain combustion, not otherwise regulated by this code.

17. Commercial cooking oil storage tank systems located within a building complying with Section 607 and NFPA 30.

Revise as follows:

5001.1.2 ~~**500.1.1.1**~~ **Waiver.** The provisions of this chapter are waived where the *fire code official* determines that such enforcement is preempted by other codes, statutes or ordinances. The details of any action granting such a waiver shall be recorded and entered in the files of the code enforcement agency.

CHAPTER 51 AEROSOLS

SECTION 5101 GENERAL

Revise as follows:

5101.1 Scope.
~~The provisions of this chapter, the *International Building Code* and NFPA 30B shall apply to the~~ Manufacturing, storage and display of aerosol products, aerosol cooking spray products and plastic aerosol 3 products shall comply with this chapter, and NFPA 30B . Manufacturing of aerosol products, aerosol cooking spray products and plastic aerosol 3 products using hazardous materials shall also comply with Chapter 50.

CHAPTER 53 COMPRESSED GASES

SECTION 5301 GENERAL

Revise as follows:

5301.1 Scope.
Storage, use and handling of *compressed gases* in *compressed gas* containers, cylinders, tanks and compressed gas systems shall comply with this chapter and NFPA 55.~~, including those gases regulated elsewhere in this code. Partially full *compressed gas* containers, cylinders or tanks containing residual gases shall be considered as full for the purposes of the controls required.~~
~~Liquefied natural gas for use as a vehicular fuel shall also comply with NFPA 52 and NFPA 59A.~~

~~*Compressed gases* classified as hazardous materials shall also comply with Chapter 50 for general requirements and chapters addressing specific hazards, including Chapters 58 (Flammable Gases and Flammable *Cryogenic Fluids*), 60 (Highly Toxic and Toxic Materials), 63 (*Oxidizers*, Oxidizing Gases and Oxidizing *Cryogenic Fluids*) and 64 (*Pyrophoric* Materials).Compressed hydrogen (CH_2) shall also comply with the applicable portions of Chapters 23 and 58 of this code, the *International Fuel Gas Code* and NFPA 2.Cutting and welding gases shall also comply with Chapter 35.~~

~~**Exceptions:**~~

1. ~~Gases used as refrigerants in refrigeration systems (see Section 608).~~
2. ~~Compressed natural gas (CNG) for use as a vehicular fuel shall comply with Chapter 23, the *International Fuel Gas Code* and NFPA 52 .~~
3. ~~*Cryogenic fluids* shall comply with Chapter 55.~~
4. ~~LP-gas shall comply with Chapter 61 and the *International Fuel Gas Code*.~~

Add new text as follows:

5301.1.1 Non-applicability. This chapter shall not apply to any of the following:

1. Gases used as refrigerants in refrigeration systems complying with Section 608.
2. Compressed natural gas (CNG) for use as a vehicular fuel complying with Chapter 23 and NFPA 52.
3. *Cryogenic fluids* complying with Chapter 55.
4. LP-gas complying with Chapter 61.

5301.1.2 Additional Requirements. Compressed gasses shall also comply with the following:

1. Liquefied natural gas for use as a vehicular fuel shall comply with NFPA 52 and NFPA 59A.
2. Compressed gases classified as hazardous materials shall comply with Chapter 50 for general requirements and chapters addressing specific hazards, including Chapters 58 (Flammable Gases and Flammable Cryogenic Fluids), 60 (Highly Toxic and Toxic Materials), 63 (Oxidizers, Oxidizing Gases and Oxidizing Cryogenic Fluids) and 64 (Pyrophoric Materials).
3. Compressed hydrogen shall comply with the applicable portions of Chapters 23 and 58 of this code, and NFPA 2.
4. Cutting and welding gases shall comply with Chapter 35.

Revise as follows:

5303.1 ~~Containers, cylinders and tanks~~ Compressed gas containers. *Compressed gas containers*~~, cylinders and tanks~~ shall comply with this section. ~~*Compressed gas* containers, cylinders or tanks that are not designed for refillable use shall not be refilled after use of the original contents.~~

Add new text as follows:

5303.1.1 Partially filled compressed gas containers. Partially full compressed gas containers containing residual gasses shall be considered as full for the purposes of the controls required.

5303.1.2 Refillable Compressed Gas Containers. Compressed gas containers that are not designed for refillable use shall not be refilled after the use of the original contents.

CHAPTER 54 CORROSIVE MATERIALS

SECTION 5401 GENERAL

Revise as follows:

5401.1 Scope.

~~The storage~~ Storage and use of *corrosive* materials shall comply ~~be in accordance~~ with this chapter. *Compressed gases* shall also comply with Chapter 53.

~~**Exceptions:**~~

1. ~~Display and storage in Group M and storage in Group S occupancies complying with Section 5003.11.~~
2. ~~Stationary storage battery systems in accordance with Section 1207.~~
3. ~~This chapter shall not apply to R-717 (ammonia) where used as a refrigerant in a refrigeration system (see Section 608).~~

Add new text as follows:

5401.1.1 Non-applicability. This chapter shall not apply to any of the following:

1. Display and storage in Group M and storage in Group S occupancies complying with Section 5003.11.
2. Refrigeration systems complying with section 608.
3. Stationary Battery Storage systems complying with section 1207

CHAPTER 55 CRYOGENIC FLUIDS

SECTION 5501
GENERAL

Revise as follows:

5501.1 Scope.
Storage, use and handling of *cryogenic fluids* shall comply with this chapter and NFPA 55. ~~*Cryogenic fluids* classified as hazardous materials shall also comply with the general requirements of Chapter 50. Partially full containers containing residual *cryogenic fluids* shall be considered as full for the purposes of the controls required.~~

~~**Exceptions:**~~

~~1. Fluids used as refrigerants in refrigeration systems (see Section 608).~~
~~2. Liquefied natural gas (LNG), which shall comply with NFPA 59A.~~

~~Oxidizing *cryogenic fluids*, including oxygen, shall comply with Chapter 63, as applicable.~~
~~Flammable *cryogenic fluids*, including hydrogen, methane and carbon monoxide, shall comply with Chapters 23 and 58, as applicable.~~
~~Inert *cryogenic fluids*, including argon, helium and nitrogen, shall comply with ANSI/CGA P-18.~~

Add new text as follows:

5501.1.1 Non-applicability. This chapter shall not apply to any of the following:

1. Fluids used as refrigerants in refrigeration systems complying with Section 608.
2. Liquefied natural gas (LNG) complying with NFPA 59A.

5501.1.2 Additional Requirements. *In addition to the requirements of this chapter, the following shall also apply:*

1. *Cryogenic fluids* classified as hazardous materials shall comply with the general requirements of Chapter 50.
2. Partially full containers containing residual *cryogenic fluids* shall be considered as full for the purposes of the controls required.
3. Oxidizing *cryogenic fluids*, including oxygen, shall comply with Chapter 63.
4. Flammable *cryogenic fluids*, including hydrogen, methane and carbon monoxide, shall comply with Chapters 23 and 58.
5. Inert *cryogenic fluids*, including argon, helium and nitrogen, shall comply with ANSI/CGA P-18.

CHAPTER 56 EXPLOSIVES AND FIREWORKS

SECTION 5601
GENERAL

Revise as follows:

5601.1 Scope.
~~The provisions of this chapter shall govern the possession~~ Possession, manufacture, storage, handling, sale and use of *explosives*, *explosive materials*, fireworks and small arms ammunition shall comply with this chapter.

~~**Exceptions:**~~

1. ~~The Armed Forces of the United States, Coast Guard or National Guard.~~
2. ~~*Explosives* in forms prescribed by the official United States Pharmacopoeia.~~
3. ~~The possession, storage and use of small arms ammunition where packaged in accordance with DOTn packaging requirements.~~
4. ~~The possession, storage and use of not more than 1 pound (0.454 kg) of commercially manufactured sporting black powder, 20 pounds (9 kg) of smokeless powder and 10,000 small arms primers for hand loading of small arms ammunition for personal consumption.~~
5. ~~The use of *explosive materials* by federal, state and local regulatory, law enforcement and fire agencies acting in their official capacities.~~
6. ~~Special industrial *explosive* devices that in the aggregate contain less than 50 pounds (23 kg) of *explosive materials*.~~
7. ~~The possession, storage and use of blank industrial-power load cartridges where packaged in accordance with DOTn packaging regulations.~~
8. ~~Transportation in accordance with DOTn 49 CFR Parts 100–185.~~
9. ~~Items preempted by federal regulations.~~

Delete and substitute as follows:

~~**5601.1.1 Explosive material standard**~~**.**
~~In addition to the requirements of this chapter, NFPA 495 shall govern the manufacture, transportation, storage, sale, handling and use of *explosive materials* .~~

5601.1.1 Non-applicability. This chapter shall not apply to any of the following:

1. Where preempted by federal regulation, including use by the armed forces
2. Explosives in forms prescribed by the United States Pharmacopia.
3. Possession, storage and use of small arms ammunition and blank industrial-powerload cartridges where packaged in accordance with DOTn packaging requirements.
4. The possession, storage and use of not more than 1 pound (0.454 kg)of commercially manufactured sporting black powder, 20 pounds (9 KG)of smokeless powder and 10,000 small arms primers for hand loading of small arms ammunition for personal consumption.
5. The use of explosive materials by federal, state, and local regulatory law enforcement agencies acting in their official capacities
6. Special industrial explosive devices that in aggregate contain less than 50 pounds (23 KG) of explosive materials.
7. The off-site transportation of *explosive materials* where in accordance with Department of Transportation (DOTn) regulations.

~~**5601.1.2 Explosive material terminals**~~**.**
~~In addition to the requirements of this chapter, the operation of *explosive material* terminals shall conform to the provisions of NFPA 498.~~

5601.1.2 Additional Requirements. In addition to the requirements of this chapter, the following shall also apply:

1. Operation of *explosive material* terminals shall comply with NFPA 498.

2. Manufacture, transportation, storage, sale, handling, and use of explosive materials shall comply with NFPA 495

CHAPTER 57 FLAMMABLE AND COMBUSTIBLE LIQUIDS

SECTION 5701 GENERAL

Revise as follows:

5701.1 Scope~~ and application~~.
Prevention, control and mitigation of dangerous conditions related to storage, use, dispensing, mixing and handling of *flammable* and *combustible liquids* shall comply with this chapter and ~~be in accordance with~~ Chapter 50 ~~and this chapter~~.

5701.2 Nonapplicability.
This chapter shall not apply to liquids as otherwise provided in other laws or regulations or chapters of this code, including:

1. Specific provisions for *flammable liquids* in motor fuel-dispensing facilities, repair garages, airports and marinas ~~in~~complying with Chapter 23.
2. Medicines, foodstuffs, cosmetics and commercial or institutional products containing not more than 50 percent by volume of water-miscible liquids and with the remainder of the solution not being flammable, provided that such materials are packaged in individual containers not exceeding 1.3 gallons (5 L).
3. Quantities of alcoholic beverages in retail or wholesale sales or storage occupancies, provided that the liquids are packaged in individual containers not exceeding 1.3 gallons (5 L).
4. Storage and use of fuel oil in tanks and containers connected to oil-burning equipment~~. Such storage and use shall be in accordance~~ complying with Section 605. ~~For~~ Abandonment of fuel oil tanks~~,~~ shall comply with this chapter ~~applies~~.
5. Refrigeration systems complying with ~~(see~~ Section 608~~)~~.
6. Storage and display of aerosol products complying with Chapter 51.
7. Storage and use of liquids that do not have a fire point when tested in accordance with ASTM D92.
8. Liquids with a *flash point* greater than 95°F (35°C) in a water-miscible solution or dispersion with a water and inert (noncombustible) solids content of more than 80 percent by weight, which do not sustain combustion.
9. Liquids without *flash points* that can be flammable under some conditions, such as certain halogenated hydrocarbons and mixtures containing halogenated hydrocarbons.
10. The storage of beer, distilled spirits and wines in barrels and casks.
11. Commercial cooking oil storage tank systems located within a building and designed and installed in ~~accordance~~ compliance with Section 607 and NFPA 30.
12. Application and release of pesticide and agricultural products and materials intended for use in weed abatement, erosion control, soil amendment or similar applications where applied in accordance with the manufacturer's instructions and label directions.
13. The off-site transportation of *flammable* or *combustible liquids* where in accordance with Department of Transportation (DOTn) regulation.

CHAPTER 58 FLAMMABLE GASES AND FLAMMABLE CRYOGENIC FLUIDS

SECTION 5801 GENERAL

Revise as follows:

5801.1 Scope.
~~The storage~~Storage and use of flammable gases and flammable *cryogenic fluids* shall comply ~~be in accordance~~ with this chapter, NFPA 2 and NFPA 55. ~~*Compressed gases* shall also comply with Chapter 53 and *cryogenic fluids* shall also comply with Chapter 55. Flammable *cryogenic fluids* shall comply with Section 5806. Hydrogen motor fuel-dispensing stations and repair garages and their associated above-ground hydrogen storage systems shall also be designed, constructed and maintained in accordance with Chapter 23.~~

~~**Exceptions:**~~

1. ~~Gases used as refrigerants in refrigeration systems (see Section 608).~~
2. ~~Liquefied petroleum gases and natural gases regulated by Chapter 61.~~
3. ~~Fuel-gas systems and appliances regulated under the *International Fuel Gas Code* other than gaseous hydrogen systems and appliances.~~
4. ~~*Pyrophoric* gases in accordance with Chapter 64.~~

Add new text as follows:

5801.1.1 Non-applicability. This chapter shall not apply to any of the following:

1. Gases used as refrigerants in refrigeration systems complying with Section 608.
2. Liquefied petroleum gases and natural gases complying with Chapter 61.
3. Fuel-gas systems and appliances regulated under the *International Fuel Gas Code* other than gaseous hydrogen systems and appliances.
4. *Pyrophoric* gases complying with Chapter 64

5801.1.2 Additional requirements. In addition to the requirements of this chapter, the following shall also apply:

1. *Compressed gases* shall comply with Chapter 53.
2. *Cryogenic fluids* shall comply with Chapter 55.
3. Flammable *cryogenic fluids* shall comply with Section 5806.
4. Hydrogen motor fuel-dispensing stations and repair garages and their associated above-ground hydrogen storage systems shall be designed, constructed and maintained in accordance with Chapter 23.

CHAPTER 59 FLAMMABLE SOLIDS

SECTION 5901 GENERAL

Revise as follows:

5901.1 Scope. ~~The storage~~Storage and use of flammable solids shall comply ~~be in accordance~~ with this chapter.

CHAPTER 60 HIGHLY TOXIC AND TOXIC MATERIALS

SECTION 6001 GENERAL

Revise as follows:

6001.1 Scope.
~~The storage~~Storage and use of highly toxic and toxic materials shall comply with this chapter. *Compressed gases* shall also comply with Chapter 53.

~~**Exceptions:**~~

1. ~~Display and storage in Group M and storage in Group S occupancies complying with Section 5003.11.~~
2. ~~Conditions involving pesticides or agricultural products as follows:~~
   - 2.1. ~~Application and release of pesticide, agricultural products and materials intended for use in weed abatement, erosion control, soil amendment or similar applications when applied in accordance with the manufacturer's instruction and label directions.~~
   - 2.2. ~~Transportation of pesticides in compliance with the Federal Hazardous Materials Transportation Act and regulations thereunder.~~
   - 2.3. ~~Storage in *dwellings* or private garages of pesticides registered by the US Environmental Protection Agency to be utilized in and around the home, garden, pool, spa and patio.~~

Add new text as follows:

6001.1.1 Non-applicability. This chapter shall not apply to any of the following:

1. Display and storage in Group M and storage in Group S occupancies complying with Section 5003.11.
2. Conditions involving pesticides or agricultural products as follows:
   - 2.1. Application and release of pesticide, agricultural products and materials intended for use in weed abatement, erosion control, soil amendment or similar applications when applied in accordance with the manufacturer's instruction and label directions.
   - 2.2. Transportation of pesticides in compliance with the Federal Hazardous Materials Transportation Act and regulations there under.
   - 2.3. Storage in *dwellings* or private garages of pesticides registered by the US Environmental Protection Agency to be utilized in and around the home, garden, pool, spa and patio.

CHAPTER 62 ORGANIC PEROXIDES

SECTION 6201 GENERAL

Revise as follows:

6201.1 Scope.
~~The storage~~Storage and use of *organic peroxides* shall comply ~~be in accordance~~ with this chapter and Chapter 50.
Unclassified detonable *organic peroxides* that are capable of *detonation* in their normal shipping containers under conditions of fire exposure shall be stored in accordance with Chapter 56.

CHAPTER 63 OXIDIZERS, OXIDIZING GASES AND OXIDIZING CRYOGENIC FLUIDS

SECTION 6301 GENERAL

Revise as follows:

6301.1 Scope.
~~The storage~~Storage and use of oxidizing materials shall comply ~~be in accordance~~ with this chapter and Chapter 50. ~~Oxidizing gases shall also comply with Chapter 53. Oxidizing *cryogenic fluids* shall also comply with Chapter 55.~~

~~**Exceptions:**~~

1. ~~Display and storage in Group M and storage in Group S occupancies complying with Section 5003.11.~~
2. ~~Bulk oxygen systems at industrial and institutional consumer sites shall be in accordance with NFPA 55.~~
3. ~~Liquid oxygen stored or used in home health care in Group I-1, I-4 and R occupancies in accordance with Section 6306.~~

Add new text as follows:

6301.1.1 Non-applicability. This chapter shall not apply to any of the following:

1. Display and storage in Group M and storage in Group S occupancies complying with Section 5003.11.
2. Bulk oxygen systems at industrial and institutional consumer sites complying with NFPA 55.
3. Liquid oxygen stored or used in home health care in Group I-1, I-4 and R occupancies complying with Section 6306.

6301.1.2 Additional Requirements. In addition to the requirements of this chapter, the following shall also apply:

1. Oxidizing gases shall comply with Chapter 53.
2. Oxidizing *cryogenic fluids* shall comply with Chapter 55.

CHAPTER 64 PYROPHORIC MATERIALS

SECTION 6401 GENERAL

Revise as follows:

6401.1 Scope.
~~The storage~~Storage and use of *pyrophoric* materials shall comply ~~be in accordance~~ with this chapter. ~~*Compressed gases* shall also comply with Chapter 53.~~

Add new text as follows:

6401.1.1 Additional requirements. Compressed gases shall also comply with Chapter 53.

CHAPTER 65 PYROXYLIN (CELLULOSE NITRATE) PLASTICS

SECTION 6501 GENERAL

Revise as follows:

6501.1 Scope.
~~This chapter shall apply to the storage~~ Storage and handling of plastic substances, materials or compounds with cellulose

nitrate (pyroxylin) as a base, by whatever name known, in the form of blocks, sheets, tubes or fabricated shapes shall comply with this chapter.
Cellulose nitrate (pyroxylin) motion picture film shall comply with the requirements of Section 306.

CHAPTER 66 UNSTABLE (REACTIVE) MATERIALS

SECTION 6601 GENERAL

Revise as follows:

6601.1 Scope.
~~The storage~~ Storage and use of unstable (reactive) materials shall comply ~~be in accordance~~ with this chapter. ~~*Compressed gases* shall also comply with Chapter 53.~~

~~**Exceptions:**~~

~~1. Display and storage in Group M and storage in Group S occupancies complying with Section 5003.11.~~
~~2. Detonable unstable (reactive) materials shall be stored in accordance with Chapter 56.~~

Add new text as follows:

6601.1.1 Non-applicability. This chapter shall not apply to any of the following:

1. Display and storage in Group M and storage in Group S occupancies complying with Section 5003.11.
2. Detonable unstable (reactive) materials shall be stored in compliance with Chapter 56.

6601.1.2 Additional Requirement. *Compressed gases* shall also comply with Chapter 53.

CHAPTER 67 WATER-REACTIVE SOLIDS AND LIQUIDS

SECTION 6701 GENERAL

Revise as follows:

6701.1 Scope.
~~The storage~~ Storage and use of water-reactive solids and liquids shall comply ~~be in accordance~~ with this chapter.

~~**Exceptions:**~~

~~1. Display and storage in Group M and storage in Group S occupancies complying with Section 5003.11.~~
~~2. Detonable water-reactive solids and liquids shall be stored in accordance with Chapter 56.~~

Add new text as follows:

6701.1.1 Non-applicability. This chapter shall not apply to any of the following:

1. Display and storage in Group M and storage in Group S occupancies complying with Section 5003.11.
2. Detonable water-reactive solids and liquids stored in compliance with Chapter 56.

2024 International Wildland Urban Interface Code

CHAPTER 3 WILDLAND-URBAN INTERFACE AREAS

SECTION 301 GENERAL

Revise as follows:

301.1 Scope. ~~The provisions of this chapter provide methodology~~ Methodology for ~~to establish~~ establishing and ~~record~~ recording *wildland-urban interface areas* ~~based on the findings of fact~~ shall comply with this chapter..

CHAPTER 4 WILDLAND-URBAN INTERFACE AREA REQUIREMENTS

SECTION 401 GENERAL

Revise as follows:

401.1 Scope. The following items occurring in *Wildland-urban interface areas* shall comply with this chapter: ~~be provided with emergency vehicle access and water supply in accordance with this chapter.~~

1. Subdivisions
2. Fire Apparatus Access
3. Water Supply
4. Fire Protection Plans

401.3 General safety precautions.
General safety precautions shall comply ~~be in accordance~~ with this chapter. ~~See also Appendix A.~~

CHAPTER 5 SPECIAL BUILDING CONSTRUCTION REGULATIONS

SECTION 501 GENERAL

Revise as follows:

501.1 Scope.
Buildings and structures shall be constructed in compliance ~~accordance~~ with this chapter ~~the *International Building Code*~~and ~~this code~~ applicable Building Code.

~~**Exceptions:**~~

1. ~~Accessory structures not exceeding 120 square feet (11 m^2) in floor area where located not less than 50 feet (15 240 mm) from buildings containing habitable spaces.~~
2. ~~Agricultural buildings not less than 50 feet (15 240 mm) from buildings containing habitable spaces.~~

Add new text as follows:

501.1.1 Additional Requirements. In addition to complying with the applicable building code, the following types of structures shall comply with this code:

1. Accessory Structures not exceeding 120 square feet (11 m^2) in floor area located less than 50 feet (15240 mm) from buildings containing habitable spaces.

2. Agricultural buildings less than 50 feet from buildings containing habitable spaces.

CHAPTER 6 FIRE PROTECTION REQUIREMENTS

SECTION 601 GENERAL

Revise as follows:

601.1 Scope. ~~The provisions of this chapter establish general requirements for new and existing buildings, structures and premises located within *wildland-urban interface areas*.~~
Mitigation of hazards from fire in wildland urban interface areas shall comply with this chapter.

Reason: Currently, there is inconsistency among all the I-Codes in how the scoping sections are written at the beginning of each chapter. The Code Correlation Committee requested a task group be formed to review the scoping section in all the I-Codes and determine if there would be a way to harmonize both the language and style across the model codes. The Scoping Task Group was formed and consisted of several members from the various Code Action Committees and interested parties (some with no client interest). The task group reviewed each chapter of the I-codes and after careful consideration, developed a format that could be incorporated and repeated for all the I-Codes.

As you will see in the proposed changes above, most of the chapters began with a style and format that was already consistent and was only slightly changed to give the scoping a more authoritative infliction. Where the chapter contained no scoping provisions, the task group added scoping language based on the content of the chapter. Where the existing scoping sections provided a laundry list of what is contained in the chapter, these list were reformatted into a list form to make it easier for users to see what information was contained. The Scoping Task group proposes that the recommended changes will improve the code by:

1. Create consistency in language used in the scope for all the I-Codes.
2. Creates a scoping section for chapters that did not have one before to clarify what is covered by the chapter.
3. Clarify the items covered and not covered in the chapter, using consistent format to send the user to different chapter(s) or code(s).
4. Remove redundant administrative language from existing scoping sections.
5. Where there were extensive number of items outlined in the scoping section, the items are now broken out into a list format to make it easier for the reader to indicate what is contained in the chapter.

To the best of the task groups knowledge the proposed changes are editorial in nature and no requirements not already addressed in the existing scoping or in the chapter being referenced were added. As these proposed changes are editorial, there is no cost impact on the cost of construction.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

As stated in the reason statement, these proposed changes are editorial, there is no cost impact on the cost of construction.

G1-24 Part VIII

G2-24

IBC: SECTION 202 (New); IFC: SECTION 202 (New)

Proponents: Jeff O'Neil, Chair, Committee on Healthcare (ahc@iccsafe.org)

THIS CODE CHANGE WILL BE HEARD BY THE IBC EGRESS COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEE.

2024 International Building Code

Add new definition as follows:

CLINICAL NEED. A known care or welfare risk to care recipients that necessitates an enhanced level of safety or security.

2024 International Fire Code

Add new definition as follows:

CLINICAL NEED. A known care or welfare risk to care recipients that necessitates an enhanced level of safety or security.

Reason: Certain sections of the code allow certain conditions based the clinical needs of the occupants. However, there has not been an official definition for what “clinical need” means and it has been widely interpreted. This proposal seeks to clear up confusion and create a common ground of understanding.

The term Clinical Need is most often found in conjunction with Group I-1 and I-2 occupancies. Certain groups of occupants within these settings require different levels of protections. There are references to the term Clinical Need in several sections, primarily having reference to locking of doors: IBC/IFC (2021 section references) 1010.2.4, 1010.2.13.1 and 1010.2.14, IEBC Section 804.14.2 (2024 reference) and one mention in relation to smoking: IFC Section 310.2.

The purpose of this change is to establish the basis for what is known as clinical need. This is a relatively short definition, but speaks to the component of how a patient in a hospital, or resident of a nursing home or assisted living setting, often have a security need that presents itself more urgently than a life-safety/egress need.

The word “known” is purposefully used related to care, and can take many forms. Court orders are a primary example of the need to put a behavioral health patient in a locked unit, and this is known on admission. Doctor’s orders are also commonly issued, particularly for individuals suffering from cognitive issues, and need to be placed into specialty units with extra security to protect them from harm. These factors become known at the time of placement.

“Welfare risk” is also purposefully used phrasing. A primary example of a welfare risk to a care recipient would be a memory care/dementia unit, where wandering throughout or outside of the building could put that individual in grave risk because of not being fully aware if their surroundings. A closed, locked unit represents the safest environment for their condition.

Similarly, many elders in assisted living have balance and gait issues that make regular use of stairways dangerous. As stair towers are not regularly used or observed, if a resident gets into the stair and falls, this can be a fatal event. Locking these stair tower doors, during non-emergency conditions, is the only way to prevent this.

Another, very common welfare risk is in maternity and neo-natal intensive care units where child abduction is a continual threat. Having the ability to lock doors for stair towers and other exits is critical to preventing this.

“Necessitates” is a term used to set up the scope of the individual technical requirements of the code chapters. By formulating this wording, the working group from the Committee for Healthcare (CHC) took particular care not to bury code requirements in the definition, to avoid creating more confusion. The locations where “clinical need” is already used in the code were reviewed and discussed, and it was determined that the technical requirements around clinical need for the specific section (such as, door locking) was covered in a better way. It did not do the definition well to try and cover each and every technical requirement.
Due to patient privacy laws, specific orders relating to patient or resident care cannot be released as part of justification for the construction of an environment appropriate for care. However, the level of care needed can be provided by the design professional representing the owner/care provider specific to the known care or welfare risk to care recipients. It is reasonable for an AHJ to request a narrative or functional program from the Design team or Owner/care provider as part of the approval process.

This proposal is submitted by the ICC Committee for Healthcare (CHC).
The Committee on Healthcare (CHC) was established by the ICC Board of Directors in 2011 to pursue opportunities to study and develop effective and efficient provisions for Hospital, Nursing Homes, Assisted Living and Ambulatory Care Facilities. This committee was formed in cooperation with the American Society for Healthcare Engineering (ASHE). In July of 2017, the ICC Board made CHC a standing committee. In 2023 the CHC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the CHC website at CHC webpage.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The addition of this definition will not add or decrease any construction costs. Yes, the implementation of special locking provisions does add cost to the project. However, the code sections that refer to this definition are already in the code. This definition simply adds clarity.

G2-24

G3-24

IBC: SECTION 202; IFC: SECTION 202

Proponents: Gabriel Levy, incandescence life safety, inc, Colorado Chapter Code Development Committee (glevy@incandescencels.com)

THIS CODE CHANGE WILL BE HEARD BY THE IBC EGRESS COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEE.

2024 International Building Code

[BE] EXIT ACCESS. That portion of a *means of egress* system that leads from any occupied portion of a *building* or *structure* to an *exit*.

Revise as follows:

[BE] EXIT ACCESS RAMP. ~~A~~ An interior or exterior *ramp* within the *exit access* portion of the *means of egress* system.

[BE] EXIT ACCESS STAIRWAY. ~~A~~ An interior or exterior *stairway* within the *exit access* portion of the *means of egress* system.

[BE] EXIT. That portion of a *means of egress* system between the *exit access* and the *exit discharge* or *public way*. Exit components include exterior exit doors at the *level of exit discharge*, *interior exit stairways* and *ramps*, *exit passageways*, exterior exit *stairways* and *ramps*, point identified by the r*egistered design professional* between an exterior *exit access stairway or ramp* and the *public way*, and *horizontal exits*.

2024 International Fire Code

[BE] EXIT ACCESS. That portion of a *means of egress* system that leads from any occupied portion of a building or structure to an *exit*.

Revise as follows:

[BE] EXIT ACCESS RAMP. ~~A~~ An interior or exterior *ramp* within the *exit access* portion of the *means of egress* system.

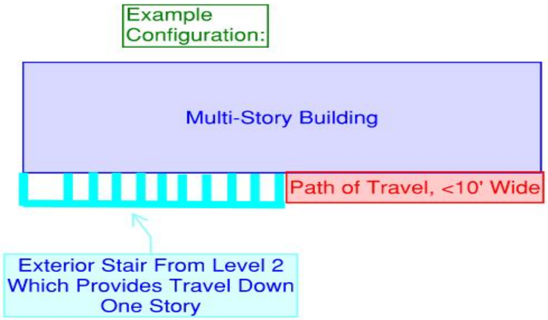
[BE] EXIT ACCESS STAIRWAY. ~~A~~ An interior or exterior *stairway* within the *exit access* portion of the *means of egress* system.

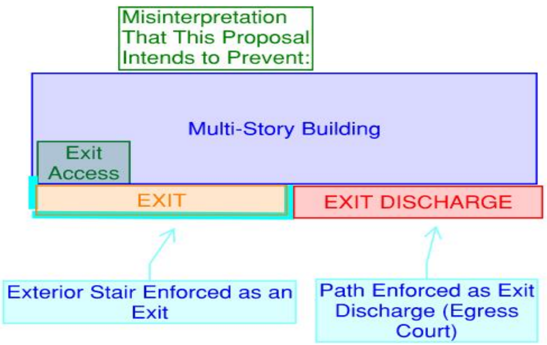
[BE] EXIT. That portion of a *means of egress* system between the *exit access* and the *exit discharge* or *public way*. Exit components include exterior exit doors at the *level of exit discharge*, *interior exit stairways* and *ramps*, *exit passageways*, exterior exit *stairways* and *ramps*, a point identified by the r*egistered design professional* between an exterior *exit access stairway or ramp* and the *public way*, and *horizontal exits*.

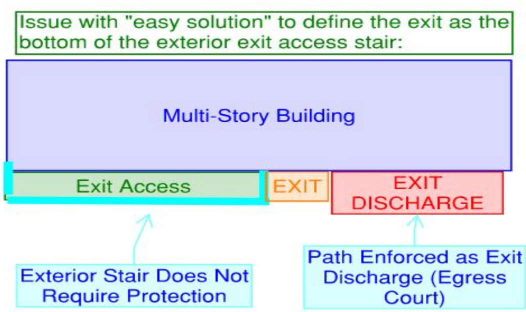
Reason: This proposal serves to resolve two ambiguities – clearly identifying that exit stairs are permitted to serve as exit access, and clarifying where the exit starts after an exterior exit access stair. An exit access stairway is permitted at the exterior of the building.

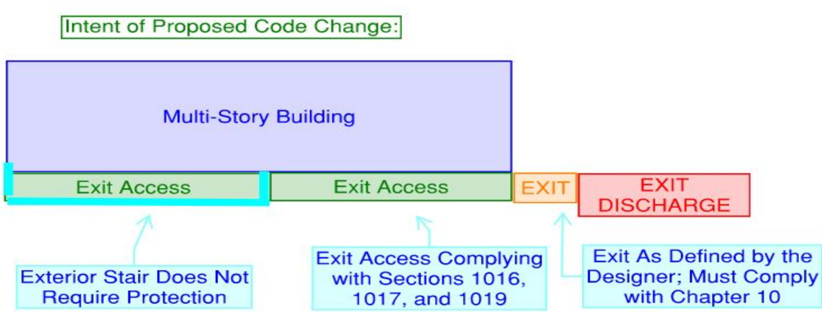
Code change E7-12/13 deleted the word "interior" from the definition of *exit access stairway and ramp* so that the provisions which allow an unenclosed exit access stair would be equally applicable to interior or exterior stairways. However, *exterior exit stairway* provisions of IBC 1027 can be mistakenly applied to *exit access stairways* located exterior to the building. Reviewers often see an exterior stair and enforce exterior exit requirements. However, if the stair is permitted to serve as exit access rather than as an exit, the exterior exit stairway requirements of 1027 are not required and often erroneously enforced. The proposed change intends to emphasize that an exit access stairway is permitted at the exterior.

Code change E7-12/13 did not provide an obvious *exit* component for the means of egress after an exterior *exit access stairway*. The definition of *exit* is amended to identify that the *exit* component exists after an exterior *exit access stairway*. While an easy solution would be to define the exit as the bottom of the exterior *exit access stair*, there are configurations where redundant protection would be required if the travel after an exterior *exit access stair* were defined as *exit* and *exit discharge*. For example, where an *exit access stair* ends along a path adjacent to an exterior wall, that path could require egress court protection. However, under the same logic as previous code change E7-12/13, if that path were interior to the building, it would not require separation from the building. Therefore, by defining that path as a continuation of exit access (rather than defining the bottom of the stair as an exit, thus the path as exit discharge), the exit access does not require rated protection. This change would allow a designer to propose any point after an exterior exit access stair as a the *exit.* That said, the defined *exit* must still meet all requirements of Chapter 10, such as travel distance and protection. Some figures below are provided for reference.


Example Configuration:
Multi-Story Building
Path of Travel, <10' Wide
Exterior Stair From Level 2 Which Provides Travel Down One Story


Misinterpretation That This Proposal Intends to Prevent:
Multi-Story Building
Exit Access
EXIT
EXIT DISCHARGE
Exterior Stair Enforced as an Exit
Path Enforced as Exit Discharge (Egress Court)


Issue with "easy solution" to define the exit as the bottom of the exterior exit access stair:
Multi-Story Building
Exit Access
EXIT
EXIT DISCHARGE
Exterior Stair Does Not Require Protection
Path Enforced as Exit Discharge (Egress Court)


Intent of Proposed Code Change:
Multi-Story Building
Exit Access
Exit Access
EXIT
EXIT DISCHARGE
Exterior Stair Does Not Require Protection
Exit Access Complying with Sections 1016, 1017, and 1019
Exit As Defined by the Designer; Must Comply with Chapter 10

Bibliography: https://www.iccsafe.org/wp-content/uploads/02_IBC-E1.pdf

Cost Impact: Decrease

Estimated Immediate Cost Impact:

Assuming a Type IIIA Group R-2 building utilizes this configuration, ICC estimates that the cost of constructing an unrated enclosure along the exit access path to be $177.77/sf.

Estimated Immediate Cost Impact Justification (methodology and variables):

Under the justification that this proposal is similar to E7 12/13, such that an equivalent interior space after an exit access stair would be permitted as unrated, this proposal saves the cost of that hypothetical construction.

G3-24

G4-24

IBC: SECTION 202; IFC: SECTION 202

Proponents: David Renn, PE, SE, City and County of Denver, Colorado Chapter Code Development Committee (david.renn@denvergov.org)

THIS CODE CHANGE WILL BE HEARD BY THE IBC FIRE SAFETY COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEE.

2024 International Building Code

Revise as follows:

[BF] EXTERIOR WALL. A wall or other building component~~, bearing or nonbearing,~~ that is used ~~as an enclosing wall for~~ to enclose or partially enclose a *building*, other than a *fire wall*, and that has a slope of 60 degrees (1.05 rad) or greater with the horizontal plane.

2024 International Fire Code

Revise as follows:

[BF] EXTERIOR WALL. A wall or other building component~~, bearing or nonbearing,~~ that is used ~~as an enclosing wall for~~ to enclose or partially enclose a *building*, other than a *fire wall*, and that has a slope of 60 degrees (1.05 rad) or greater with the horizontal plane.

Staff Analysis: The term *exterior wall* is also defined in the IRC but has a different definition than the IBC and IFC definition. IRC proposals will be in Group B.

Reason: Currently, exterior wall Section 705.1 requires that exterior walls comply with this section (705). For structures such as open parking garages, architects have argued that none of Section 705 applies since the structure doesn't have exterior walls, just columns, edge beams (or slab edge) and vehicle barriers - by doing this, the opening limitations of 705.8.1 would not apply and they could have unlimited openings at very small fire separation distances (including zero fire separation distance). This is clearly not the intent of the code since Table 705.9 for maximum area of exterior wall openings includes a footnote that indicates that the area of openings in an open parking garage with an FSD of 10 feet or greater shall not be limited.

To fix the issue above, this proposal modifies the definition of "exterior wall" to include walls and other building components, which would capture columns, beams, and vehicle barriers at the edge of an open parking garage or similar structure. The definition is also revised to clarify that a building can be partially enclosed, such is the case for an open parking garage. "bearing or nonbearing" is also removed since it doesn't add anything to the definition since all walls or other building components are either bearing or nonbearing. With this change, Section 705 would apply to an open parking garage or similar structure that doesn't have walls at the perimeter.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is simply a clarification that the "exterior wall" of a building can contain components other than walls, so there is no cost impact.

G4-24

G5-24

IBC: SECTION 202

Proponents: Theresa Weston, The Holt Weston Consultancy, Rainscreen Association in North America (holtweston88@gmail.com)

THIS CODE CHANGE WILL BE HEARD BY THE IBC FIRE SAFETY COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEE.

2024 International Building Code

Revise as follows:

[BF] EXTERIOR WALL ASSEMBLY. A system including the *exterior wall* covering, framing, and components such as ~~weather-resistive barriers~~ <u>*water-resistive barriers*</u> and insulating materials. This system provides protection of the *building* structural members and conditioned interior space from the detrimental effects of the exterior environment.

Reason: This proposal provides consistency as it updates the definition to include a reference to defined term “water-resistive barrier” rather than the currently used “weather-resistive barrier”. While both “weather-resistive barrier” and “water-resistive barrier” are in common usage, “water-resistive barrier” is solely used within the code and is the defined term. Section 1403.2 is entitled “Water-resistive barrier”.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is an editorial change that corrects the definition to include the code defined term "water-resistive barrier" rather than "weather-resistant barrier.

G5-24

G6-24

IBC: SECTION 202; IFC: SECTION 202

Proponents: David Renn, PE, SE, City and County of Denver, Colorado Chapter Code Development Committee (david.renn@denvergov.org)

THIS CODE CHANGE WILL BE HEARD BY THE IBC FIRE SAFETY COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEE.

2024 International Building Code

Revise as follows:

[BF] FIRE SEPARATION DISTANCE. The distance measured from the *building* face to one of the following:

1. The closest interior *lot line*.
2. To the centerline of a street, an alley or *public way*.
3. To an imaginary line between two *buildings* on the lot.

The distance shall be measured at right angles from the *building* face ~~of the wall~~.

2024 International Fire Code

Revise as follows:

[BF] FIRE SEPARATION DISTANCE. The distance measured from the building face to one of the following:

1. The closest interior *lot line*.
2. To the centerline of a street, an alley or *public way*.
3. To an imaginary line between two buildings on the lot.

The distance shall be measured at right angles from the *building* face ~~of the wall~~.

Staff Analysis: This definition is found in the IBC, IFC, and the IRC. A similar proposal for IRC will be heard with Group B.

Reason: Fire separation distance is measured from the "building face", per the first sentence of the definition. However, the last sentence states the distance is measured at right angles to the "face of the wall". For consistency in terminology, this proposal simply revises the last sentence to be consistent with the first sentence. "Building face" is a better term to use since some buildings, or portions of buildings, do not have exterior walls. For example, an open parking garage may have only columns, beams, and vehicle barriers at the face of the building.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is an editorial change that simply changes the terminology in the last sentence to be consistent with terminology in the first sentence. The meaning of fire separation distance remains the same and there is no technical change in this proposal. Accordingly, there will be no cost impact.

G6-24

G7-24

IBC: SECTION 202; IFC: SECTION 202; IMC®: SECTION 202; IWUIC: SECTION 202

Proponents: Mike Fischer, Kellen, The Extruded Polystyrene Foam Association (mfischer@kellencompany.com); Jonathan Roberts, UL Solutions, UL Solutions (jonathan.roberts@ul.com)

THIS CODE CHANGE WILL BE HEARD BY THE IBC FIRE SAFETY COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEE.

2024 International Building Code

Revise as follows:

[BF] FLAME SPREAD INDEX. A comparative measure, expressed as a dimensionless number, derived from visual measurements of the spread of flame versus time for a material tested in accordance with ASTM E84 or UL 723. Where ceiling and floor values are reported, the ceiling value is the *flame spread index*.

[BF] SMOKE-DEVELOPED INDEX. A comparative measure, expressed as a dimensionless number, derived from measurements of smoke obscuration versus time for a material tested in accordance with ASTM E84 or UL 723. Where ceiling and total smoke values are reported, the ceiling value is the *smoke-developed index*.

2024 International Fire Code

Revise as follows:

[BF] FLAME SPREAD INDEX. A comparative measure, expressed as a dimensionless number, derived from visual measurements of the spread of flame versus time for a material tested in accordance with ASTM E84 or UL 723. Where ceiling and floor values are reported, the ceiling value is the *flame spread index*.

[BF] SMOKE-DEVELOPED INDEX. A comparative measure, expressed as a dimensionless number, derived from measurements of smoke obscuration versus time for a material tested in accordance with ASTM E84 or UL 723. Where ceiling and total smoke values are reported, the ceiling value is the *smoke-developed index*.

2024 International Mechanical Code

Revise as follows:

[BF] FLAME SPREAD INDEX. ~~The numerical value assigned to a material tested in accordance with ASTM E84 or UL 723~~. A comparative measure, expressed as a dimensionless number, derived from visual measurements of the spread of flame versus time for a material tested in accordance with ASTM E84 or UL 723. Where ceiling and floor values are reported, the ceiling value is the *flame spread index*.

[BF] SMOKE-DEVELOPED INDEX. ~~A numerical value assigned to a material tested in accordance with ASTM E84.~~ A comparative measure, expressed as a dimensionless number, derived from measurements of smoke obscuration versus time for a material tested in accordance with ASTM E84 or UL 723. Where ceiling and total smoke values are reported, the ceiling value is the *smoke-developed index*.

2024 International Wildland Urban Interface Code

Revise as follows:

[BF] FLAME SPREAD INDEX. A comparative measure, expressed as a dimensionless number, derived from visual measurements of the spread of flame versus time for a material tested in accordance with ASTM E84 or UL 723. Where ceiling and floor values are reported, the ceiling value is the *flame spread index*.

Staff Analysis: *Flame Spread Index* and *Smoke-Developed Index* are both defined in the IRC. The same revisions will be proposed in

Group B for IRC.

Reason: Roberts (UL):

The revisions are as follows:

1) The purpose of the test is to determine the comparative burning characteristics of the material under test by evaluating the spread of flame over its surface and the density of the smoke developed when exposed to a test fire. These measurements are made as the test flame advances along the ceiling of the sample.

However, materials that melt and drip to the floor of the test chamber and continue burning, often have a second measurement reported, based upon the flame spread advancements of material burning along the floor of the furnace. For materials exhibiting these behaviors, both ceiling and floor measurements are reported for the flame spread, while ceiling and total smoke measurements are reported for the smoke developed.

The intent of the code requirement for these materials has been that when both the floor and ceiling measurements are reported, the ceiling measurement applies to the building code. This code change proposal clarifies that the ceiling measurement is applicable to avoid confusion when these two values are reported.

UL 723 contains specific direction in Section 7 (Classification) and Section 9 (Reporting) for the determination and reporting of ceiling and floor flame spread and ceiling and total smoke developed.

2) The International Mechanical Code (IMC) definitions are revised to match the IBC, IRC, IFC and IWUIC for consistency. Reference to UL 723 is the smoke-developed index is also added for consistency.

3) There is one other flame spread and smoke-developed index test standard besides ASTM E84 and UL 723. It is the CAN/ULC S102.2 test standard used for loose fill insulation, where the product is mounted and tested on the floor of the tunnel apparatus. Therefore, this test standard is listed as an exception in IBC Section 720.4 and IRC R302.10.

The clarification to the definitions regarding reporting of ASTM E84 and UL 723 values will not impact the reporting of CAN/ULC S102.2, which is currently limited to one product with one floor measurement.

Reason: Fischer (XPSA): While ASTM E84 and UL 723 contain the same requirements, there are a few minor differences in how data are captured and reported. This proposal will clarify how the test data from testing under either standard correlates to the FS and SD requirements in the code. It will also aid in code education efforts by improving the language.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This clarification reflects current practice and as such will neither increase or decrease the cost of construction.

G7-24

G8-24 Part I

IBC: SECTION 202; IFC: SECTION 202

Proponents: Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org)

THIS IS A 2 PART CODE CHANGE.

PART I WILL BE HEARD BY THE IBC EGRESS CODE COMMITTEE.

PART II WILL BE HEARD BY THE MECHANICAL CODE COMMITTEE.

SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Building Code

Revise as follows:

[BE] FLOOR AREA, GROSS. The floor area within the inside perimeter of ~~the~~ a *exterior walls* of the *building* ~~under consideration~~, exclusive of ~~vent~~ *shafts* with no openings and *courts*, without deduction for *corridors*, *stairways*, *ramps*, closets, the thickness of interior walls, columns or other features. The floor area of a *building*~~, or portion thereof,~~ not provided with surrounding *exterior walls* shall be the occupiable space ~~usable area~~ under the horizontal projection of ~~the~~ a roof or floor above. ~~The *gross floor area* shall not include *shafts* with no openings or interior *courts*.~~

[BE] FLOOR AREA, NET. The ~~actual occupied area~~ occupiable space of a building, not including unoccupied accessory areas such as *corridors*, *stairways*, *ramps*, toilet rooms, mechanical rooms and closets.

2024 International Fire Code

Revise as follows:

[BE] FLOOR AREA, GROSS. The floor area within the inside perimeter of ~~the~~ a *exterior walls* of the *building* ~~under consideration~~, exclusive of ~~vent~~ *shafts* with no openings and *courts*, without deduction for *corridors*, *stairways*, *ramps*, closets, the thickness of interior walls, columns or other features. The floor area of a *building*~~, or portion thereof,~~ not provided with surrounding *exterior walls* shall be the occupiable space ~~usable area~~ under the horizontal projection of ~~the~~ a roof or floor above. ~~The *gross floor area* shall not include *shafts* with no openings or interior *courts*.~~

[BE] FLOOR AREA, NET. The ~~actual occupied area~~ occupiable space of a building, not including unoccupied accessory areas such as *corridors*, *stairways*, *ramps*, toilet rooms, mechanical rooms and closets.

G8-24 Part I

G8-24 Part II

IMC®: SECTION 202

Proponents: Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org)

2024 International Mechanical Code

Delete without substitution:

~~**FLOOR AREA, NET.** The actual occupied area, not including unoccupied accessory areas or thicknesses of walls.~~

Reason: The changes clean up both definitions for readability and to remove redundancy. Additionally, it clarifies the use of “floor area” in IBC/IFC Table 1004.5 to point back to definitions.

The IMC includes the definition 'floor area, net', but does not use it in the text. They do include the definition of 'net occupiable floor area' which is used in Section 403.3.1.1.1.1 and footnote a in Table 403.3.1.1. We are proposing to delete this term since it is not used and is inconsistent with the IBC and IFC.

The IZC also includes definitions for 'floor area, net' and 'floor area, gross'. They are different from IBC and IFC and are not used in the text. There will be a code change in Group B to address this.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC webpage.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is an editorial change to the definitions to provide additional clarity for application in determining occupant loads. This will not result in any changes to construction.

G8-24 Part II

G9-24

IBC: SECTION 202; IFC: SECTION 202; IPMC: SECTION 202

Proponents: Jennifer Goupil, Structural Engineering Institute of ASCE, American Society of Civil Engineers (jgoupil@asce.org)

THIS CODE CHANGE WILL BE HEARD BY THE IBC EGRESS COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEE.

2024 International Building Code

Revise as follows:

[BE] GUARD. A ~~*building*~~ component or ~~a system of *building*~~ assembly of components located at or near the open sides of an elevated walking surface ~~surfaces~~ that minimizes the possibility of a fall from the elevated walking surface ~~to a lower level~~.

2024 International Fire Code

Revise as follows:

[BE] GUARD. A ~~*building*~~ component or ~~a system of *building*~~ assembly of components located at or near the open sides of an elevated walking surface ~~surfaces~~ that minimizes the possibility of a fall from the elevated walking surface ~~to a lower level~~.

2024 International Property Maintenance Code

Revise as follows:

[BE] GUARD. A ~~*building*~~ component or ~~a system of *building*~~ assembly of components located at or near the open sides of an elevated walking surface ~~surfaces~~ that minimizes the possibility of a fall from the elevated walking surface ~~to a lower level~~.

Reason: This proposal is a coordination proposal to improve the alignment between the provisions in the International Codes with the provisions of the 2022 edition of ASCE/SEI 7 Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE/SEI 7-22). The Dead and Live Load Subcommittee of ASCE 7 has been working for several cycles to align the requirements in these documents related to Dead and Live Loads.

The proposed changes to the definition of the word Guard are intended to remove unnecessary and potentially confusing words, as well as to improve the coordination between the definitions in the International Codes and in ASCE 7.

The word "building" is struck in two places as it is unnecessary and does not appear in the ASCE 7 definition. The definition is clear without it. Additionally, the use of the word “building” could cause confusion as the scope of the IBC includes buildings and structures per Section 101.2, but the word “structures” does not appear alongside the word “building”.

The word "system" is changed to "assembly" to match the ASCE 7 definition. The words in this usage are interchangeable. However, in ASCE 7 the defined term is Guard System, and as such the ASCE 7 definition uses “assembly” to avoid using “system” in both the defined term and in the definition. It is generally considered not good practice to repeat words being defined in the definition itself.

The addition of the word "elevated" and the removal of the phrase "to a lower level" matches ASCE 7 text and uses less words to accomplish the same meaning. There is no need to define where you are falling to once it is established that the guard is on the elevated surface.

Note, this definition appears in the following I-codes and the intent is to have the proposal revise the definition in each code; IBC, IRC, IFC, and IPMC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal will not increase or decrease costs related to guards as the proposal does not in any way revise the code requirements for guards. The proposal is an editorial code change which aligns specific words in the ICC definition with specific words in the ASCE 7 definition.

G10-24 Part I

IBC: SECTION 202; IFC: SECTION 202

Proponents: Jennifer Goupil, Structural Engineering Institute of ASCE, American Society of Civil Engineers (jgoupil@asce.org)

THIS IS A 2 PART CODE CHANGE.

PART I WILL BE HEARD BY THE IBC EGRESS CODE COMMITTEE.

PART II WILL BE HEARD BY THE SWIMMING POOL AND SPA CODE COMMITTEE.

SEE THE TENTATIVE SCHEDULE FOR THESE COMMITTEES.

2024 International Building Code

Revise as follows:

[BE] HANDRAIL. A horizontal or sloping rail grasped ~~intended for grasping~~ by ~~the~~ hand for guidance or support.

2024 International Fire Code

Revise as follows:

[BE] HANDRAIL. A horizontal or sloping rail grasped ~~intended for grasping~~ by ~~the~~ hand for guidance or support.

G10-24 Part I

G10-24 Part II

ISPSC: SECTION 202

Proponents: Jennifer Goupil, Structural Engineering Institute of ASCE, American Society of Civil Engineers (jgoupil@asce.org)

2024 International Swimming Pool and Spa Code

Revise as follows:

HANDRAIL. A ~~support device~~ horizontal or sloping rail ~~that is intended to be gripped~~ grasped by ~~a user~~ hand for ~~the purpose of resting or steadying~~ guidance or support.~~, typically located within or at exits to the pool or spa or as part of a set of steps.~~

Reason: This proposal is a coordination proposal to improve the alignment between the provisions in the International Codes with the provisions of the 2022 edition of ASCE/SEI 7 Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE/SEI 7-22). The Dead and Live Load Subcommittee of ASCE 7 has been working for several cycles to align the requirements in these documents related to Dead and Live Loads.

The modified wording proposed herein matches the wording used in the ASCE 7 definition.

Removing the phrase “intended for” removes unnecessary words. Many definitions describe what an object is used for. It is not necessary to explicitly call out the use as the object’s purpose or intention. It is simpler, and clearer to just state the use.

Note, this definition appears in the following I-codes and the intent is to have the proposal revise the definition in each code; IBC, IRC, ISPSC and IFC. The IRC proposal will be in Group B.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal will not increase or decrease costs related to handrails as the proposal does not in any way revise the code requirements for handrails. The proposal is an editorial code change which aligns specific words in the ICC definition with specific words in the ASCE 7 definition.

G10-24 Part II

G11-24

IBC: SECTION 202; IFC: SECTION 202

Proponents: John Poole, Poole Fire Protection, Inc., ASI Southeast (jpoole@poolefire.com); Matthew Stepp, ASI Southeast Inc, ASI Southeast Inc (mstepp@asi-southeast.com); Dale Wheeler, Systech Fire Protection LLC, Scranton Products (sgidw@aol.com)

THIS CODE CHANGE WILL BE HEARD BY THE IBC FIRE SAFETY COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEE.

2024 International Building Code

Revise as follows:

[BF] INTERIOR WALL AND CEILING FINISH. The exposed *interior surfaces* of *buildings*, including but not limited to: fixed or movable walls and partitions~~; toilet room privacy partitions;~~ columns; ceilings; and interior wainscoting, paneling or other finish applied structurally or for decoration, acoustical correction, surface insulation, structural fire resistance or similar purposes, but not including *trim*.

2024 International Fire Code

Revise as follows:

[BF] INTERIOR WALL AND CEILING FINISH. The exposed interior surfaces of buildings, including but not limited to: fixed or movable walls and partitions~~; toilet room privacy partitions;~~ columns; ceilings; and interior wainscoting, paneling or other finish applied structurally or for decoration, acoustical correction, surface insulation, structural *fire resistance* or similar purposes, but not including trim.

Reason: POOLE: Toilet partitions are primarily made from stainless steel, powder coated galvanneal, plastic laminate (particleboard with high pressure laminate facing and edging), phenolic, and high-density polyethylene (HDPE). As a result of changes made to the definition of “Interior Wall and Ceiling Finish” in 2006, toilet room privacy partitions have been defined as an interior wall partition, which subjects it to various flammability test methods to be considered compliant. Based on the extensive history in manufacturing and selling toilet partitions, along with many hours of researching fires from the National Fire Incident Reporting System (NFIRS) data and the National Fire Protection Association (NFPA) One-Stop Data Shop, that occur in a public restroom, we have yet identified a scenario where toilet room privacy partitions, made from any of these materials, was the primary source or contributing fuel for a fire, which was responsible for the loss of life or significant property damage/loss.

The current flammability testing methods are unnecessary and add significant manufacturing and other related costs. Since the changes in the 2009 IBC, Section 803.12, manufacturers of HDPE toilet room privacy partitions have been subjected to a different set of flammability testing standards than all of materials that are commercially used for producing toilet partitions without any supporting historical fire loss data to justify these increased flammability testing measures. For HDPE toilet room privacy partitions to be compliant with IBC regulations and pass the NFPA 286 room corner test, manufacturers have had to consider many reformulations, which in turn increases the cost of this product with no historical fire loss data to justify these increased costs. Each reformulation subjects the manufacturer to increase the overall cost of the product to the consumer. Additional costs come from many different aspects of the product development life cycle including additives to improve the overall performance of the product due to these testing parameters that increases the cost of the product by up to 100%, or selecting a different additive that does not increase the cost but is a known carcinogen. A manufacturer must consider all the additional expenses that will be incurred throughout the entire product process including, but not limited to: an increase in weight of the product by up to 30% which in turn increases freight costs; the repairs and maintenance of the manufacturing equipment in order to produce products due to additives; ensuring employee safety when handling the heavier material; revisions to packaging to manage the additional weight and ensure quality of product; increase in the cost of other raw materials to ensure the quality of the product; revisions to hardware components necessary to install the partitions to ensure product life cycle performance due to the additional weight; the cost of the product outside of the manufacturing facility such as freight to the construction site; additional labor costs required for installation of heavier components to ensure employee safety; reduction of product life expectancy and therefore increased replacement costs due to the introduction of additives that reduces the durability of HDPE and the replacement components. All of these above items increase the cost to the end consumer solely for the benefit of being compliant to a regulation that is not justified based upon loss of life and property fire loss data.

In addition to the significant costs imposed on toilet room privacy partition manufacturers, none of the fire test standards required by the

IBC are specific to the external fuel loading or how toilet room privacy partitions are used and installed. In terms of fire risks in public restrooms, the main ignitable materials in public restrooms are paper products such as toilet paper and/or paper hand towels. Although difficult to ignite, disinfectant and hand soap containers could also be considered ignitable fuels within public restrooms. In terms of these materials, toilet paper dispensers are generally affixed to a toilet room privacy partition to allow easy occupant access. Currently, there is no requirement for the toilet paper dispensers or other devices affixed to a toilet room privacy partition to adhere to interior wall finish requirements. The vast majority of public restrooms contain few, if any, potential ignition sources. Therefore, based on the low propensity for fire ignition, coupled with the low fuel loading within these spaces, the risks of a substantial fire occurring are nearly non-existent. And this is supported by the lack of fire data that reflects the toilet room privacy partitions were the primary source or contributing fuel source of a fire, which was responsible for the loss of life or significant property damage/loss.

HDPE toilet room privacy partitions are exclusively installed in restrooms and HDPE partitions installed in other areas cannot, by definition, be classified as toilet room privacy partitions. As discussed previously, having a fire in a restroom capable of igniting an HDPE toilet room privacy partition is not expected, especially if the restroom is provided with automatic sprinkler protection. When the toilet stall is occupied, it can be expected that the occupant will be in very close proximity to the partitions, providing for very early warning of an incipient stage fire. While it can be expected that a restroom occupant will require more pre-movement time than an occupant of other spaces, this time disparity is offset with the earlier warning. Also, due to general architectural design philosophies, restrooms are separated from most normally occupied spaces to provide their occupants with increased privacy. Therefore, in the case of a restroom fire, once outside of the restroom and in the publicly occupiable disorder, the occupant would be shielded from the restroom fire by the room's walls and door. Therefore, the smoke indices and the peak heat release rates from an HDPE toilet room privacy partition are largely irrelevant in terms of protecting a restroom occupant from a fire, even if one were to be ignited in a public restroom.

For these reasons, it can be expected that the life safety of both restroom occupants, and those within the adjacent publicly occupiable spaces will be at risk from a restroom fire from any toilet partition. Therefore, requiring toilet room privacy partitions, including those constructed of HDPE, to be fire rated to meet interior finish requirements, poses an undue burden on the toilet room privacy partition industry and the consumers, and provides no added benefit, since a restroom fire problem does not exist. For the above-described rationale, "toilet room privacy partitions" should be removed from the "interior wall and ceiling finish" definition in Section 202 of the IBC and IFC.

WHEELER:

Purpose: This code change would remove toilet room privacy partitions from the definition of Interior Wall and Ceiling Finish.

Reasons: Toilet room privacy partitions are not properly characterized as interior finish and should not be subject to interior finish requirements.

Substantiation: In IBC editions 2003 and prior, toilet room privacy partitions were not indicated to be interior wall and ceiling finish. The 2006 edition of the IBC included the current code language. However, no convincing technical substantiation was provided to support that change. Further, toilet room privacy partitions are not similar to typical interior finishes, such as wall coverings, floor coverings, or decorative items. Toilet room privacy partitions are not directly adhered to walls of ceilings as are typical interior finishes. Also, toilet room partitions are installed perpendicular to walls, and therefore are not subject to the same corner-exposure as other wall finishes. Corner configurations of traditional wall coverings are known to produce taller flames due to the reduced air entrainment, compared to a fire in the open or along a single wall, but that is not the case with toilet room partitions. Toilet room privacy partitions also differ from fixed or movable walls with regard to environment and exposure within a building. Typical sources of fire ignition found in areas other than toilet rooms do not exist in proximity to toilet room privacy partitions.

The bulk of ordinary combustibles in a toilet room are not typically near the toilet room privacy partitions. So, for example, a fire starting in a waste can, is not expected to be near to or impact toilet room partitions.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

POOLE: Building owners and those responsible for sourcing toilet room privacy partitions, specifically HDPE partitions, will initially see somewhat reduced costs from $0 and less, which would vary based on the costs identified in the reason statement.

WHEELER: The proposed code change will reduce the cost of construction by removing requirements that are not properly applicable.

Estimated Immediate Cost Impact Justification (methodology and variables):

POOLE: It is anticipated that as additional products from additional manufacturers are able to enter the marked, costs will be reduced. These manufacturers will incur lower initial costs, as they will not be required to pay for materials additives and fire tests that may not represent the real-world conditions in which these materials are installed and utilized.

WHEELER:

Logical Analysis.

G11-24

G12-24 Part I

IBC: SECTION 202 (New)

Proponents: Alexander Haldeman, James Hardie Building Products, James Hardie Building Products (alex.haldeman@jameshardie.com)

THIS IS A 5 PART CODE CHANGE.

PART I WILL BE HEARD BY THE IBC-FIRE SAFETY COMMITTEE.

PART II AND V WILL BE HEARD BY THE FIRE CODE COMMITTEE.

PART III AND IV WILL BE HEARD BY THE MECHANICAL CODE COMMITTEE.

SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Building Code

Add new definition as follows:

<u>**NONCOMBUSTIBLE MATERIAL.** A material that does not contribute appreciably to an ambient fire. Materials that comply with Section 703.3.1 of the IBC are considered noncombustible materials.</u>

703.3.1 Noncombustible materials.
Materials required to be noncombustible shall be tested in accordance with ASTM E136. Alternately, materials required to be noncombustible shall be tested in accordance with ASTM E2652 using the acceptance criteria prescribed by ASTM E136.

> **Exception:** Materials having a structural base of noncombustible material as determined in accordance with ASTM E136, or with ASTM E2652 using the acceptance criteria prescribed by ASTM E136, with a surfacing of not more than 0.125 inch (3.18 mm) in thickness having a *flame spread index* not greater than 50 when tested in accordance with ASTM E84 or UL 723 shall be acceptable as noncombustible.

G12-24 Part I

G12-24 Part II

IFC: SECTION 202 (New)

Proponents: Alexander Haldeman, James Hardie Building Products, James Hardie Building Products (alex.haldeman@jameshardie.com)

2024 International Fire Code

Add new definition as follows:

NONCOMBUSTIBLE MATERIAL. A material that does not contribute appreciably to an ambient fire. Materials that comply with Section 703.3.1 of the International Building Code are considered noncombustible materials.

G12-24 Part II

G12-24 Part III

IFGC: SECTION 202

Proponents: Alexander Haldeman, James Hardie Building Products, James Hardie Building Products (alex.haldeman@jameshardie.com)

2024 International Fuel Gas Code

Revise as follows:

[M] NONCOMBUSTIBLE MATERIALS. ~~Materials that, where tested in accordance with ASTM E136, have not fewer than three of four specimens tested meeting all of the following criteria:~~
A material that does not contribute appreciably to an ambient fire. Materials that comply with Section 703.3.1 of the International Building Code are considered noncombustible materials.

1. ~~The recorded temperature of the surface and interior thermocouples shall not at any time during the test rise more than 54ºF (30ºC) above the furnace temperature at the beginning of the test.~~

2. ~~There shall not be flaming from the specimen after the first 30 seconds.~~

3. ~~If the weight loss of the specimen during testing exceeds 50 percent, the recorded temperature of the surface and interior thermocouples shall not at any time during the test rise above the furnace air temperature at the beginning of the test, and there shall not be flaming of the specimen.~~

G12-24 Part III

G12-24 Part IV

IMC®: SECTION 202

Proponents: Alexander Haldeman, James Hardie Building Products, James Hardie Building Products (alex.haldeman@jameshardie.com)

2024 International Mechanical Code

Revise as follows:

NONCOMBUSTIBLE MATERIAL. ~~A material that passes ASTM E136.~~ A material that does not contribute appreciably to an ambient fire. Materials that comply with Section 703.3.1 of the International Building Code are considered noncombustible materials.

G12-24 Part IV

G12-24 Part V

IWUIC: SECTION 202

Proponents: Alexander Haldeman, James Hardie Building Products, James Hardie Building Products (alex.haldeman@jameshardie.com)

2024 International Wildland Urban Interface Code

Revise as follows:

NONCOMBUSTIBLE MATERIAL. ~~As applied to building construction material means a material that, in the form in which it is used, is either one of the following:~~
A material that does not contribute appreciably to an ambient fire. Materials that comply with Section 703.3.1 of the *International Building Code* are considered noncombustible materials.

1. ~~Material of which no part will ignite and burn when subjected to fire. Any material conforming to ASTM E136 shall be considered noncombustible within the meaning of this section.~~
2. ~~Material having a structural base of noncombustible material as defined in Item 1 above, with a surfacing material not over $^{1}/_{8}$ inch (3.2 mm) thick, which has a flame spread index of 50 or less. Flame spread index as used herein refers to a flame spread index obtained according to tests conducted as specified in ASTM E84 or UL 723.~~

~~"Noncombustible" does not apply to surface finish materials. Material required to be noncombustible for reduced clearances to flues, heating appliances or other sources of high temperature shall refer to material conforming to Item 1. No material shall be classified as noncombustible that is subject to increase in combustibility or flame spread index, beyond the limits herein established, through the effects of age, moisture or other atmospheric condition.~~

Reason: This proposal attempts to serve three purposes, all editorial and clarifying in nature:

1. Harmonize definitions found throughout multiple ICC codes (IBC, IRC, IFC, IWUIC, IMC, IFGC, IEBC)

2. Addresses the recent practice that ICC Codes Definitions should not contain requirements

3. Attempts to offer clarity between often-used, and often-confused terms used throughout ICC Codes: specifically, the difference between "Fire-Resistance Rating" (IFC, IBC, IWUIC) "Ignition-Resistant Building Material" (IWUIC), "Flame-Spread Index" (IBC, IRC, IFC, IWUIC, IMC), "Flammable Material" (IBC, IFC) , and "Noncombustible Material" (IRC, IWUIC, IMC, IFGC, IEBC)

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal focusses on terminology harmonization, and does not add any requirements or change exiting requirements.

G12-24 Part V

G13-24

IBC: SECTION 202

Proponents: Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org)

THIS CODE CHANGE WILL BE HEARD BY THE IBC EGRESS COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEE.

2024 International Building Code

Revise as follows:

[BE] RESTRICTED ENTRANCE. An entrance that is made available for *common use* on a controlled basis, but not public use, and that is not a *service entrance*. <u>A controlled basis is where entry access is verified by security personnel and entry is limited to authorized occupants and excludes their guests or companions.</u>

Reason: With the current definition of restricted entrances, there is a misinterpretation that locking a door and requiring a card or key for access makes the entrance a restricted entrance. With the requirement for automatic doors added to the codes for all public entrances, we are seeing this becoming even more of an issues for hotels and office buildings.

The following is from the guidance for the US Access Board.

Restricted Entrances [§206.4.7] If entrances are restricted to certain occupants on a controlled basis, at least one must comply in addition to public entrances required to be accessible. This applies to those entrances where entry access is verified by security personnel and is strictly limited to certain occupants, but no one else, including guests or companions of authorized individuals. All other types of entrances, excluding service entrances, are considered “public entrances” under the Standards, including employee-only entrances requiring keys or access cards or codes but that lack the level of security of restricted entrances.

Please refer the the definitions for 'public entrance', 'service entrance' and the requirements in Section 1105.1.1 Power-operated doors at public entrances.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC webpage.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is a clarification for where Section 1105.1 is applicable. There are no changes to construction requirements.

G13-24

G14-24

IBC: SECTION 202; IFC: SECTION 202

Proponents: David Cooper, Stair Manufacturing and Design Consultants, Stairbuilders and Manufacturers Association, SMA (coderep@stairways.org)

THIS CODE CHANGE WILL BE HEARD BY THE IBC EGRESS COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEE.

2024 International Building Code

Revise as follows:

[BE] SCISSOR STAIRWAY. ~~Two interlocking~~Independent *stairways* located within a common exit enclosure, providing not less than two separate paths of egress located within one *exit* enclosure.

2024 International Fire Code

Revise as follows:

[BE] SCISSOR STAIRWAY. ~~Two interlocking~~ Independent *stairways* located within a common exit enclosure, providing not less than two separate paths of egress located within one *exit* enclosure.

Reason: The term interlocking as defined in most dictionaries implies connection, and is defined as:

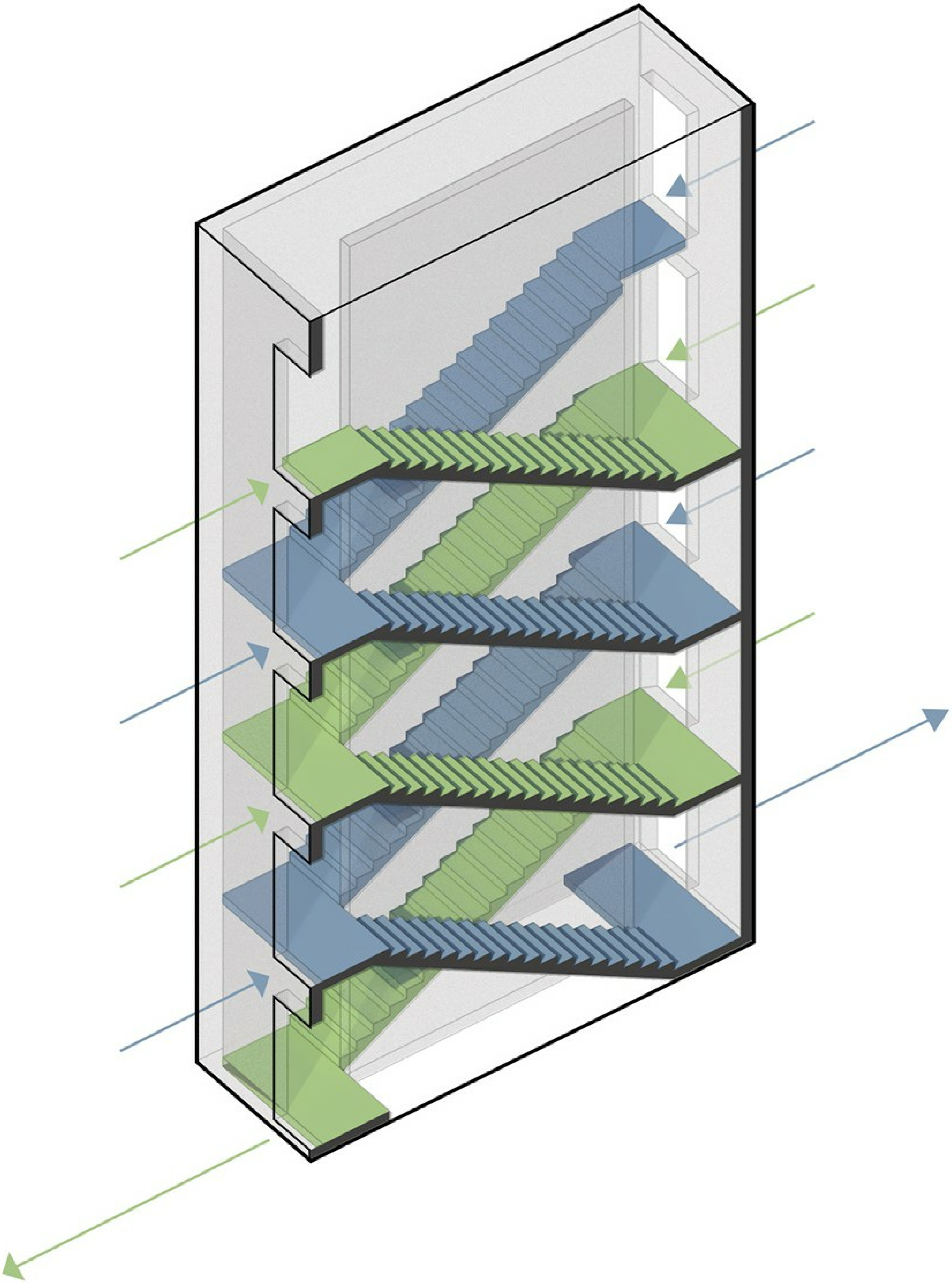
- Webster: 1. to lock together; join with one another. 2. to connect or be connected so that neither part can be operated independently.
- Merriam-Webster: 1. locked together. 2. to connect so that the motion or operation of any part is constrained by another.

A scissor stairway consists of separate stairways that are not connected. Each stairway serves the same function within a common enclosure, but they do so independently without constraining the other. Deleting the term interlocking and inserting independent offers a clearer description. The limit of "two" stairways is incorrect and must be deleted. Figure 1 shows an example of a scissor stairway with 8 stairways as the term stairway is defined in the IBC:

> **Stairway.** One or more flights of stairs, either exterior or interior, with the necessary landings and platforms connecting them, to form a continuous and uninterrupted passage from one level to another.

Please support approval as submitted. This proposal offers clarification and will promote consistent interpretation.

Graphic courtesy of Chris Johns, ThoughtCraft Architects LLC



Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal modifies the descriptive language by providing a more appropriate adjective, adds clarifying language and corrects the numerical error within the definition to align with the ICC defined terms used in the definition. It will have no impact on the cost of construction as it makes no technical changes relative to construction or the cost thereof.

G14-24

G15-24

IBC: [F] 307.1; IFC: 203.6

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Robert J Davidson, Davidson Code Concepts LLC, Self (rjd@davidsoncodeconcepts.com); Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C., Self (jbengineer@aol.com); Kevin Scott, KH Scott & Associates LLC, self (khscottassoc@gmail.com)

THIS CODE CHANGE WILL BE HEARD BY THE FIRE CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEE.

2024 International Building Code

Revise as follows:

[F] 307.1 High-hazard Group H.
High-hazard Group H occupancy includes, among others, the use of a *building* or *structure*, or a portion thereof, that involves the manufacturing, processing, generation or storage of materials that constitute a physical or *health hazard* in quantities in excess of those allowed in *control areas* complying with Section 414, based on the maximum allowable quantity limits for *control areas* set forth in Tables 307.1(1) and 307.1(2). Hazardous occupancies are classified in Groups H-1, H-2, H-3, H-4 and H-5 and shall be in accordance with this section, the requirements of Section 415 and the *International Fire Code* . *Hazardous materials* stored or used on top of roofs or *canopies* shall be classified as rooftop storage or use and shall comply with the *International Fire Code*. For retail and wholesale storage and display in Group M occupancies and Group S storage, see Section 414.2.5.

2024 International Fire Code

Revise as follows:

203.6 High-hazard Group H.
High-hazard Group H occupancy includes, among others, the use of a building or structure, or a portion thereof, that involves the manufacturing, processing, generation or storage of materials that constitute a physical or *health hazard* in quantities in excess of those allowed in *control areas* complying with Section 5003.8.3, based on the maximum allowable quantity limits for *control areas* set forth in Tables 5003.1.1(1) and 5003.1.1(2). Hazardous occupancies are classified in Groups H-1, H-2, H-3, H-4 and H-5 and shall be in accordance with this code and the requirements of Section 415 of the *International Building Code*. Hazardous materials stored or used on top of roofs or canopies shall be classified as rooftop storage or use and shall comply with this code. For retail and wholesale storage and display in Group M occupancies and Group S storage, see Section 414.2.5 of the *International Building Code*.

Reason: MARSHALL: This is an editorial correlation proposal. The goal over the past few code cycles has been to correlate the MAQ tables in the IBC and IFC. This proposal simply adds a reference to the MAQs allowed in retail and wholesale occupancies with specific storage configurations. Without this sentence, there is no obvious route from this MAQ table to the tables for retail and wholesale. This fills a void and does not provide any new requirements. This sentence is duplicated from IFC Section 5003.1.1. With this additional sentence the directions for use of the MAQ tables is the same in the IBC and IFC.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

SCOTT: When evaluating the allowable quantities, the IBC does not currently contain a reference to Table 414.2.5 as does the IFC. This proposal simply adds this reference so the code user reaches the appropriate requirements for retail facilities.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

MARSHALL: There is no new technical requirement language. Simply a pointer to assist the code user.

SCOTT: This proposal is editorial and clarifies the application of the provisions.

G15-24

G16-24

IBC: [F] 403.3.3; IFC: 914.3.2

Proponents: Jeffrey Shapiro, International Code Consultants, National Fire Sprinkler Association (jeff.shapiro@intlcodeconsultants.com)

THIS CODE CHANGE WILL BE HEARD BY THE FIRE CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEE.

2024 International Building Code

SECTION 403 HIGH-RISE BUILDINGS

Revise as follows:

[F] 403.3.3 Secondary water supply.
An *automatic* secondary on-site water supply having a capacity not less than the hydraulically calculated sprinkler demand~~, including the hose stream requirement,~~ in accordance with Section 903.3.1.1, shall be provided for *high-rise buildings* assigned to *Seismic Design Category* C, D, E or F as determined by Section 1613. The calculated sprinkler demand used to determine the volume of the secondary on-site water supply shall not be required to include any allowance for water to supply standpipes or inside or outside hoses connected to an *automatic sprinkler system*.
An additional fire pump shall not be required for the secondary water supply unless needed to provide the minimum design intake pressure at the suction side of the fire pump supplying the *automatic sprinkler system*. The secondary water supply shall have a duration of not less than 30 minutes as determined by the occupancy hazard classification in accordance with Section 903.3.1.1 .

2024 International Fire Code

Revise as follows:

914.3.2 Secondary water supply.
An automatic secondary on-site water supply having a capacity not less than the hydraulically calculated sprinkler demand~~, including the hose stream requirement,~~ shall be provided for high-rise buildings assigned to Seismic Design Category C, D, E or F as determined by the *International Building Code*. The calculated sprinkler demand used to determine the volume of the secondary on-site water supply shall not be required to include any allowance for water to supply standpipes or inside or outside hoses connected to an *automatic sprinkler system*.
An additional fire pump shall not be required for the secondary water supply unless needed to provide the minimum design intake pressure at the suction side of the fire pump supplying the *automatic sprinkler system*. The secondary water supply shall have a duration of not less than 30 minutes as determined by the occupancy hazard classification in accordance with NFPA 13.

Reason: Although at first glance this might appear to constitute a significant change to the code, it is not. In preparing this proposal, I tracked the topic back to its origin in the 1973 UBC and followed the provisions forward to the 2024 IBC, evaluating every change and reviewing each version of the code text. I will include a summary, albeit a long one, of that research below. But, the bottom line is that the volume of secondary water required for hoses in the 2024 code is minimal, and a system design that follows all applicable code requirements provides no way for anyone outside of the building to access water from the secondary water supply for outside hose demand.

Specifically, the code now says to add a volume of water for hoses that is sufficient to supply the hose stream demand specified in NFPA 13 (not NFPA 14) for a 30 minute duration. For a high-rise building, likely designed as light hazard under NFPA 13, Section 19.1.6.3 and Table 19.2.3.1.2 require "0" gpm for inside hoses if hoses will not be installed. Given that occupant use hoses are not required by the IBC and would not typically be found in a fully sprinklered high-rise building built today, that equates to "0" gpm being added for inside hoses. Next, Table 19.2.3.1.2 specifies a combined inside and outside hose demand of 100 gpm for light hazard with a 30 minute duration that matches the IBC duration requirement. Doing the math, you end up with a required additional storage capacity of 3,000 gallons, beyond what is needed for sprinklers, to be stored onsite.

However, given that the 3,000 gallons is entirely for outside hoses, remembering that the inside hose demand is "0," one must question how anyone would get access to this water even if it were a scenario where it might be used. The stored water is going to be in or near the building, and there is no requirement for exterior hose connections or hydrants supplied by the secondary water supply to access water designated for outside hoses.

All of this aside, there's the bigger question of "in what scenario might this additional water be helpful?" If the primary water supply to a high-rise building has been lost interrupted due to a seismic event (note that the trigger for storing a secondary water supply is limited entirely to buildings that are assigned to Seismic Design Category C, D, E, or F so the water is only there for an earthquake induced failure of the primary water supply), does anyone really think that 3,000 gallons of additional water for outside hoses at a high-rise will make a difference to emergency responders who will be dealing with countless emergencies from an earthquake of that magnitude?

Does it really hurt anything to leave this in the code as a safety factor? In a word, yes. The current provision adds roughly 27,000 pounds of concentrated water load in a building that has to be carried by the structure, nearly doubling what would otherwise be required for sprinklers alone, and that additional weight comes at a cost for the size of the tank and the structure that must carry it. With no legitimate justification, it wastes funds to continue an outdated code requirement that was originally added to codes when it was uncommon for high-rise buildings to have sprinklers.

Background:

Uniform Building Code (International Conference of Building Officials – ICBO): 1973 and 1976 UBC

An on-site supply of water equal to a 20-minute demand or 15,000 gallons on a combined sprinkler and standpipe, whichever is the smaller, shall be provided. This supply shall be available automatically if the principal supply fails.

The origin of the requirement for a secondary water supply for high-rise buildings in areas with an elevated risk of a seismic event traces back to the original high-rise building requirements in the Uniform Building Code (UBC), published in 1973 (Section 1807). At the time, an option of using either compartmentation or sprinklers was offered. The code also provided a variety of sprinkler incentives, such as reducing the structural fire-resistance rating. For areas with seismic risk, the code added a requirement to provide a secondary water supply to qualify for the incentives, based on an assumption that the public water supply serving sprinklers might fail in response to an earthquake.

Gus Degenkolb, one of the original contributors to Section 1807, wrote an article for ICBO's Building Standards Magazine titled "The Reasoning Behind The Requirements for High Rise Buildings," which documented the early thought on this topic. Gus' article conveyed that, at the time, there was a deliberate disagreement between the UBC and NFPA 13's new Chapter 8 on high-rise buildings, published in the 1972 edition. It also conveyed that there was a misinterpretation of the NFPA 13 provisions that led to additional divergence.

The group that put UBC Section 1807 together established the UBC's secondary water supply volume by taking the 500 gpm water supply requirement for standpipe systems from NFPA 14 and multiplying that flow rate by 30-minutes, which was the required water supply duration for sprinklers under NFPA 13. That yielded a secondary/backup storage volume requirement of 15,000 gallons. However, the ICBO group did not initially consider that NFPA 13's minimum 30-minute water supply was not associated with secondary/backup storage. Subsequent debate considered adjusting the 15,000 gallon figure, but the proposal retained that initially-derived figure as the base requirement.

The group later revisited the issue of flow duration and decided that 20 minutes, rather than 30 minutes, was a more reasonable basis for a secondary/backup water supply. This decision was based on an assumption that, in areas where high-rise buildings would be constructed, fire engines should be capable of supplying fire department connections within 20 minutes of an incident report. In the end, the code provided an option of selecting the lesser of a 20-minute supply for the NFPA 14 standpipe demand or 15,000 gallons as the required secondary water supply.

It is important to note that there was no mandate to provide a secondary water supply at that time, because sprinklers weren't mandatory. The secondary water supply requirement only applied when sprinkler protection was chosen in lieu of providing compartmentation, presumably with the intent of using the incentive of a reduced structural fire-resistance rating.

1979 to 1997 UBC

In Seismic Zones No. 2, No. 3 and No. 4, in addition to the main water supply, a secondary on-site supply of water equal to the hydraulically calculated sprinkler design demand plus 100 gallons per minute additional for the total standpipe system shall be provided. This supply shall be automatically available if the principal supply fails and shall have a duration of 30 minutes.

The reasonableness of the UBC secondary water supply requirement was subsequently reconsidered during the development process for the 1979 edition, and the basis of the requirement was revised to focus on supplying the fire sprinkler system demand rather than the standpipe system demand.

In lieu of 20 minutes or 15,000 gallons of water focused on a sufficient supply for standpipe hoses, the 1979 UBC required the much lesser amount, sufficient to only meet the hydraulically calculated sprinkler demand plus 100 GPM (as the entire volume of water needed for standpipe hose connections) for 30 minutes duration. The basis for this change was included in ICBO's publication "*1979 Uniform Codes Analysis of Revisions*" as follows:

…clarifies the intent of the required sprinkler systems and more reliance is placed on the design of the systems based on UBC Standard No. 38-1 (NFPA 13). The requirement to provide on-site water supply has been revised so that it would not apply in Seismic Zones 0 and 1. The quantity of on-site water required in Seismic Zones Nos. 2, 3 and 4 has been revised so that the quantity of water is based on performance criteria and a minimum of a 30-minute supply is required rather than a 20-minute supply. The 30-minute supply agrees with requirements of nationally recognized standards.

<u>With this change, the focus of the secondary water supply requirement for high-rise buildings in seismic zones changed from: 1) Providing the water supply associated with the standpipe demand for manual firefighting; to 2) Providing the water supply associated with the sprinkler system demand, including a modest additional volume of water required to supply a hose that is consistent with NFPA 13 provisions for light hazard occupancies.</u>

It is also noteworthy that the compartmentation option was eliminated from the UBC in the 1988 edition. Beginning with that edition, sprinklers became mandatory for all newly constructed high-rise buildings. Accordingly, the secondary water supply requirement became mandatory for all high-rise buildings in seismic zones 2, 3 and 4 because there was no longer an option to use compartmentation in lieu of sprinklers.

IBC Working Draft

903.3.8.3 A secondary on-site water supply equal to the hydraulically calculated sprinkler demand plus 100 gpm shall be provided for high-rise buildings located in seismic event areas where the effective short-period peak velocity related acceleration (A) from the 500 year seismic event is greater than 0.2 in accordance with Chapter 16. The secondary water supply shall have a duration not less than 30 minutes.

A NFSA public comment on the IBC Working Draft (Comment 903.3.8.2-2) by Gene Endthoff changed "plus 100 gallons per minute…" to "including hose stream requirements" during the IBC development process, which involved bringing the former UBC provision into the IBC. The reason offered by NFSA for this change was ensuring that the previous "plus 100 gpm" wasn't treated as additive to the volume of water already required by NFPA 13 for hose streams as part of the "hydraulically calculated sprinkler demand." That public comment was accepted, and the change it proposed was included in the 2000 (first) edition of the International Building Code (IBC).

2000 IBC

903.3.5.2 Secondary water supply. A secondary on-site water supply equal to the hydraulically calculated sprinkler demand, including the hose stream requirement, shall be provided for high-rise buildings in Seismic Design Category C, D, E or F as determined by Section 1616.3. The secondary water supply shall have a duration of not less than 30 minutes.

Between the 2000 and 2003 editions of the IBC, proposal F43-01, submitted by the Los Angeles Basin Chapter of ICBO added additional text to the last sentence, "*as determined by the occupancy hazard classification in accordance with NFPA 13*," which further tied the secondary water supply provision to NFPA 13, including the hose demand. The reason statement offered by the proponent makes this clear, "*This will clearly distinguish the requirement from the previous UBC requirement of 30 minutes. Water duration is based on the hazard classification in accordance with NFPA 13 which is an IBC referenced standard. Duration varies based upon hazard classification."*

2003 IBC (essentially unchanged in 2006 and 2009)

903.3.5.2 Secondary water supply. A secondary on-site water supply equal to the hydraulically calculated sprinkler demand, including the hose stream requirement, shall be provided for high-rise buildings in Seismic Design Category C, D, E or F as determined by the International Building Code. The secondary water supply shall have a duration not less than 30 minutes as determined by the occupancy hazard classification in accordance with NFPA 13.

In the 2006 and 2009 editions of the IBC, this section remained essentially unchanged, with the exception of an editorial style revision. In 2012, two revisions were made by Proposal F83-09/10, submitted by AFSA, one of which was further modified by a public comment submitted by The Code Consortium. The AFSA change added a requirements for the secondary water supply to be "automatic" and a statement that an additional dedicated fire pump was not required for the secondary water supply. The public comment further modified the allowance to have a single fire pump for both the primary and secondary water supply, by limiting that allowance to cases where an additional pump wasn't needed to relay water from the secondary water supply to the intake of the primary fire pump.

2012 IBC (essentially unchanged in the 2015 through 2021 editions, other than the text being relocated)

903.3.5.2 Secondary water supply. An automatic secondary on-site water supply having a capacity not less than the hydraulically calculated sprinkler demand, including the hose stream requirement, shall be provided for high-rise buildings assigned to Seismic Design Category C, D, E or F as determined by the International Building Code. An additional fire pump shall not be required for the secondary water supply unless needed to provide the minimum design intake pressure at the suction side of the fire pump supplying the automatic sprinkler system. The secondary water supply shall have a duration of not less than 30 minutes as determined by the occupancy hazard classification in accordance with NFPA 13.

In the 2015 editions of the IBC and IFC, the secondary water supply requirements were relocated out of the general installation requirements in 903.3 to sections that were specifically scoped to high-rise buildings, since secondary water supply requirements did not apply to any other structures. In the IBC, the section was moved to IBC Section 403.3, and in the IFC, it was moved to IFC Section 914.3.3. This change was accomplished by Proposal F139-13, which was submitted by NFSA. No technical changes were made. It was simply a relocation of the provisions. A flaw in that proposal, which failed to correlate the IFC and IBC text when the relocation occurred, was later corrected by NFSA Proposal F175-18.

In the 2024 edition code cycle, NFSA Proposal G58-21 revised the text to further improve the connection between the secondary water supply provisions for hydraulic calculations, hose stream demand and water supply duration in the IBC associated with seismic risk and NFPA 13. And, it specifically intends to clarify that hose demand to be included in the secondary water supply calculation is that required by NFPA 13 and not NFPA 14.

2024 IBC

403.3.3 Secondary water supply. An automatic secondary on-site water supply having a capacity not less than the hydraulically calculated sprinkler demand, including the hose stream requirement in accordance with Section 903.3.1.1, shall be provided for high-rise buildings assigned to Seismic Design Category C, D, E or F as determined by Section 1613. An additional fire pump shall not be required for the secondary water supply unless needed to provide the minimum design intake pressure at the suction side of the fire pump supplying the automatic sprinkler system. The secondary water supply shall have a duration of not less than 30 minutes as determined by the occupancy hazard classification in accordance with Section 903.3.1.1.

NFSA's reason statement emphasized this important point as follows: *"The purpose of this proposal is to clarify the intent of the code section. High-rise buildings will be subject to both NFPA 13 provisions, which have a hose stream requirement, as well as NFPA 14 provisions, which set forth the total hose demand for the standpipe system. The current wording does not clarify which hose demand is to be used in calculating the volume of the secondary water supply. There is significant difference in the required flow rate between the two hose demands. The proposal seeks to clarify that secondary water supply volume is to incorporate the hose stream demand from NFPA 13 only and is not required to satisfy the hose demand from NFPA 14."*

Conclusion:

The 2024 International Code text on secondary water supplies remains consistent with the longstanding intent of the IBC, which is rooted in the legacy UBC provision dating to the 1979 edition. However, an objective fresh look at where the code is and where it came from, including changes that have taken place in NFPA 13 over the past 5 decades, led me to the conclusion that there is no valid justification for continuing the existing requirement to store secondary water for hose streams to be used after a major seismic event.

It should be noted that it is general protocol in the IBC to use references to Section 903.3.1.1 as the means to point to NFPA 13 versus directly pointing to the NFPA standard. NFPA 13 is adopted by reference in Section 903.3.1.1, and that section includes some modifications to the NFPA standard that would otherwise be missed if other sections of the code were to directly reference NFPA 13.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

The reduced tank size could directly save $4,000 to $10,000 in direct savings. There are too many variables with respect to tank location and associated structural design to be able to assign a dollar value to the structural cost impact.

Estimated Immediate Cost Impact Justification (methodology and variables):

ChatGPT provided an estimated tank cost savings that seemed reasonable. It wasn't smart enough to provide a number for the structural savings impact. I can ask again before the code hearing.

G16-24

G17-24

IBC: 406.5.9 (New)

Proponents: Steve Skalko, Stephen V. Skalko, P.E. & Associates LLC, Precast/Prestressed Concrete Institute (svskalko@svskalko-pe.com)

THIS CODE CHANGE WILL BE HEARD BY THE FIRE CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEE.

2024 International Building Code

SECTION 406
MOTOR-VEHICLE-RELATED OCCUPANCIES

Add new text as follows:

406.5.9 Automatic sprinkler system. An *open parking garage* shall be equipped with an *automatic sprinkler system* where required by Section 903.2.10

Reason: This change provides a cross-reference to guide the code user to the requirements in Section 903.2.10 for sprinkler protection in open parking garages. This is similar to the cross-reference in existing Section 406.5.8 for standpipe systems.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

It only places a cross-reference to Section 903.2.10 for automatic sprinklers in open parking garages

G17-24

G18-24

IBC: [BE] 412.2.2.3, [BE] 412.2.2.3.1

Proponents: William Cooper, Protection Engineers, LLC, FAA Fire Protection Engineering Code Team (wacooper@protengineers.com); David Clark, Protection Engineers, LLC, FAA Fire Protection Engineering Code Team (dwclark@protengineers.com)

THIS CODE CHANGE WILL BE HEARD BY THE IBC EGRESS COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEE.

2024 International Building Code

SECTION 412 AIRCRAFT-RELATED OCCUPANCIES

Revise as follows:

[BE] 412.2.2.3 Number of exits.
Airport traffic control towers shall be permitted to be served by ~~Not less than one~~a single *exit stairway* ~~shall be permitted for airport traffic control towers of any height~~ provided ~~that~~ the *occupant load* of each ~~per~~ floor is not greater than 15~~ and the area per floor does not exceed 1,500 square feet (140 m²)~~.

[BE] 412.2.2.3.1 Interior finish.
Where an airport traffic control tower is provided with only ~~one~~a single *exit stairway*, *interior wall and ceiling finishes* shall be either Class A or Class B.

Reason: (1) The revision is in part intended to restructure the provision into a positive statement in lieu of the current negative statement. This restructuring is not intended to change the intent of the provision.

(2) The “single exit stairway” terminology is provided in the revision, in lieu of the current "one exit stairway" language, to better align language with other sections of the codes. This alignment of language is proposed for consistency with other code sections and not intended to change the intent of the provision.

(3) The revision proposes to remove the 1,500 sq. ft. limit. The current 1500 sq. ft. limit aligned with the previously applied business use occupant load factor of 100 sf per person gross. The business use occupant load factor has since been increased to 150 sf per person gross. The 1,500 sq. ft. limitation in the current code is now arbitrarily limiting the floor area of airport traffic control towers where the safety of the specific number of occupants is secured by the robust safety measures required by the IBC and not by limiting the floor area to a fixed number.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The code change proposal generally should provide no cost impact. The code change proposal removes the prescriptive square footage area limitation for single stair airport traffic control towers, which allows designers more freedom in design and space allocation of airport traffic control towers. However, the floor areas of single stair airport traffic control towers are still limited overall by limiting the occupant load per floor.

G18-24

G19-24

IBC: [F] 412.2.3.3

Proponents: William Cooper, Protection Engineers, LLC, FAA Fire Protection Engineering Code Team (wacooper@protengineers.com); David Clark, Protection Engineers, LLC, FAA Fire Protection Engineering Code Team (dwclark@protengineers.com)

THIS CODE CHANGE WILL BE HEARD BY THE FIRE CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEE.

2024 International Building Code

SECTION 412
AIRCRAFT-RELATED OCCUPANCIES

Revise as follows:

[F] 412.2.3.3 Smoke removal.
To facilitate smoke ~~Smoke~~ removal in post-fire salvage and overhaul operations, smoke removal in airport traffic control towers shall be provided in accordance with Section 403.4.7.

Reason: This proposal incorporates language from the already referenced code section (IBC 403.4.7) to clarify the intent of the code section to mandate inclusion of post-fire smoke removal features and not automatic smoke control features per IBC 909, as is incorrectly being included by a number of designers. This proposal is not intended to alter the intent of the code section.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The change just includes some of the language from the already referenced IBC 403.4.7 section. No change in intent is intended.

G19-24

G20-24

IBC: [F] 412.3.6; IFC: 914.8.3

Proponents: Douglas Fisher, Fisher Engineering, Inc., National Air Transportation Association

THIS CODE CHANGE WILL BE HEARD BY THE FIRE CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEE.

2024 International Building Code

SECTION 412
AIRCRAFT-RELATED OCCUPANCIES

Revise as follows:

[F] 412.3.6 Fire suppression.
Aircraft hangars shall be provided with a fire suppression system designed in accordance with NFPA 409, based on the classification for the hangar given in Table 412.3.6.

> **Exception:** ~~Where a *fixed base operator* has separate repair *facilities* on site,~~ Group II hangars operated by a *fixed base operator* used for storage or non-hazardous maintenance of ~~*transient*~~ *aircraft* ~~only~~ shall have a fire ~~suppression~~ sprinkler system, but the system is exempt from foam requirements. Hazardous operations are those defined in Section 412.3.6.1.

2024 International Fire Code

Revise as follows:

914.8.3 Fire suppression for aircraft hangars.
Aircraft hangars shall be provided with a fire suppression system designed in accordance with NFPA 409, based on the classification for the hangar given in Table 914.8.3.

> **Exception:** ~~Where a fixed base operator has separate repair facilities on-site,~~ Group II hangars operated by a fixed base operator used for storage or non-hazardous maintenance of ~~transient~~ aircraft ~~only~~ shall have a fire sprinkler~~suppression~~ system, but the system shall be exempt from foam requirements. Hazardous operations are those defined in Section 914.8.3.1

Reason: The current exception was added to the 2009 edition through code change G25-07/08. In an attempt to clarify previous language, the change actually has caused more confusion. "Where a fixed base operator has separate repair facilities on-site" has been interpreted to mean that the FBO actually owns a repair facility at that airport. This leaves out 1) any aircraft hangar at an airport that doesn't have maintenance facilities and 2) any aircraft hangar that does not perform maintenance. For example, a corporate aircraft hangar that stores corporate aircraft and performs line maintenance and A/B checks (all non-hazardous maintenance operations) cannot comply with this exception because they do not own a separate maintenance facility at the airport. The vast majority of maintenance performed on aircraft is scheduled maintenance. Aircraft owners can fly the aircraft to another maintenance facility to have any hazardous maintenance operations performed. To counter the argument that the fire department cannot enforce no hazardous maintenance, it should be noted that maintenance performed on aircraft is limited by FAA certification. An aircraft maintenance operator cannot simply change what type of maintenance is performed at their facility without achieving FAA approval.

Further, the term "fire suppression" has also caused confusion as fire sprinkler systems for aircraft hangars are not designed for suppression. The intent of the code change was to provide a fire sprinkler system, therefore, that term should be used.

The term "transient" has also caused confusion, penalizes aircraft that are based at that location (charter, corporate, privately owned) and has no bearing on whether a fuel spill will occur. It should be noted that the reason for a foam fire suppression system is due to the potential for a fuel spill that ignites. Simply because the aircraft is only located at the facility but not fully based there does not reduce the potential for a fuel spill. Only the level of maintenance performed on an aircraft has an effect on the risk of a fuel spill.

Finally, NFPA 409 has recently revised the requirements for foam fire suppression systems in Group II hangars. The proposed revisions will better align with NFPA 409 to reduce confusion. As currently written, an aircraft hangar that does not meet the exception in the IFC would still meet the exception in NFPA 409. In that instance, which requirement governs? The IFC would require a fire suppression system in accordance with NFPA 409 but NFPA 409 would exempt a Group II hangar that does not perform hazardous operations.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposed change is editorial in nature to clarify the intent of the exception. Where used, this exception will have no cost impact. It may, however, permit more facilities to utilize the exception that were previously not permitted to utilize the exception due to the unclear text.

G20-24

G21-24

IBC: [F] 412.3.6; IFC: 914.8.3

Proponents: Douglas Fisher, Fisher Engineering, Inc., National Air Transportation Association (doug.fisher@feifire.com)

2024 International Building Code

SECTION 412
AIRCRAFT-RELATED OCCUPANCIES

Revise as follows:

[F] 412.3.6 Fire suppression.
Aircraft hangars shall be provided with a fire suppression system designed in accordance with NFPA 409, based on the classification for the hangar given in Table 412.3.6.

> **Exception:** Where a *fixed base operator* has separate repair *facilities* on site, ~~Group II hangars~~ Hangars operated by a *fixed base operator* used for storage of *transient aircraft* only shall have a fire suppression system, but the system is exempt from foam requirements.

2024 International Fire Code

Revise as follows:

914.8.3 Fire suppression for aircraft hangars.
Aircraft hangars shall be provided with a fire suppression system designed in accordance with NFPA 409, based on the classification for the hangar given in Table 914.8.3.

> **Exception:** Where a fixed base operator has separate repair facilities on-site, ~~Group II hangars~~ Hangars operated by a fixed base operator used for storage of transient aircraft only shall have a fire suppression system, but the system shall be exempt from foam requirements.

Attached Files

- **NFPA 409 Research Report (Revised).pdf**
  https://www.cdpaccess.com/proposal/10614/30731/files/download/4816/

Reason: The purpose of this exception, as noted in the original code change proposal G25-07/08 is to provide an allowance for aircraft hangars where the risk of fuel spill is limited. If the risk of a fuel spill, and subsequent ignition, is limited, then a foam fire suppression system is not necessary. This is a similar approach to that taken by NFPA 409 in the 2022 edition.The proposed revision removes the limitation on Group II hangars. If the exception limits the risk of a fuel spill, it should not matter what hangar group it applies to. The following research report provides an analysis of how hangar groups do not correlate to hazard. There are a number of aircraft that have a tail height to fit in a Group II hangar that have the same fuel capacity as aircraft whose tail height would require them to be located in a Group I hangar.

NFPA 409 Research Report

In addition, there are aircraft that must be located in a Group I hangar due to tail height that have significantly less fuel capacity than aircraft that would be located in a Group II hangar.Foam fire suppression is necessary to provide fire suppression of a fuel spill fire. Aircraft in storage or those where maintenance is performed that is unrelated to the fuel system (tire changes, avionics repair or similar), have a limited risk of a fuel spill as indicated by NFPA 409, 2022 edition. The tail height has no bearing on the risk of a fuel spill and, therefore, the limitation to Group II should be deleted.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

If enacted, this exception will be permitted to be used for Group I hangars in addition to Group II hangars (as already permitted). If this exception is used for a facility, it will reduce the initial construction cost between $500,000 and $1M depending on the size of the hangar bay.

Estimated Immediate Cost Impact Justification (methodology and variables):

The estimated cost reduction is based on the cost of the foam equipment only and is based on historical cost data for foam fire suppression systems (high-expansion foam systems). Additional savings could be realized with reduced fire pump sizes and number. The actual cost savings is dependent upon the size of the hangar bay. A group I hangar is typically at least 40,000 sf but could be up to 130,000 sf or larger depending on the aircraft. A more detailed cost estimate cannot be performed due to the variability in hangar bay sizes.

Estimated Life Cycle Cost Impact:

Life cycle cost impact would also be reduced as inspection, testing and maintenance of a foam fire suppression system would not be required. The annual cost of foam system ITM (not including any possible reduction in cost due to the elimination of a foam releasing system) can range from $10,000 - $25,000 per year depending on hangar bay size.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

The estimated reduction in cost of ITM for a foam fire suppression system is based on historical data from similar aircraft hangars where all required ITM is being performed. The LCC will vary based on hangar bay size, type of foam system and local regulations related to disposal of any test liquid.

G21-24

G22-24

IBC: [F] 412.3.6.1; IFC: 914.8.3.1

Proponents: Douglas Fisher, Fisher Engineering, Inc., National Air Transportation Association

2024 International Building Code

SECTION 412
AIRCRAFT-RELATED OCCUPANCIES

Revise as follows:

[F] 412.3.6.1 Hazardous operations.
Any Group III aircraft hangar according to Table 412.3.6 that contains hazardous operations including, but not limited to, the following shall be provided with a Group I or II fire suppression system in accordance with NFPA 409 as applicable:

1. Doping.
2. Hot work including, but not limited to, welding, torch cutting and torch soldering.
3. Fuel transfer.
4. Fuel tank repair or maintenance not including defueled tanks in accordance with NFPA 409, inerted tanks or tanks that have never been fueled.
5. Spray finishing operations.
6. Total fuel capacity of all aircraft within the unsprinklered single *fire area* in excess of 1,600 gallons (6057 L).
7. ~~Total fuel capacity of all aircraft within the maximum single *fire area* in excess of 7,500 gallons (28 390 L) for a hangar with an *automatic sprinkler system* in accordance with Section 903.3.1.1.~~

2024 International Fire Code

Revise as follows:

914.8.3.1 Hazardous operations.
Any Group III aircraft hangar in accordance with Table 914.8.3 that contains hazardous operations including, but not limited to, the following shall be provided with a Group I or II fire suppression system in accordance with NFPA 409 as applicable:

1. Doping.
2. *Hot work* including, but not limited to, welding, torch cutting and torch soldering.
3. Fuel transfer.
4. Fuel tank repair or maintenance not including defueled tanks in accordance with NFPA 409, inerted tanks or tanks that have never been fueled.
5. Spray finishing operations.
6. Total fuel capacity of all aircraft within the unsprinklered single *fire area* in excess of 1,600 gallons (6057 L).
7. ~~Total fuel capacity of all aircraft within the maximum single *fire area* in excess of 7,500 gallons (28 390 L) for a hangar equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1.~~

Attached Files

- **NFPA 409 Research Report (Revised).pdf**
  https://www.cdpaccess.com/proposal/10621/30742/files/download/4817/

Reason: Section 914.8.3.1 was added to the 2009 edition via code change G25-07/08. In reviewing the substantiation for the code change, there is no discussion or justification for the 7,500 gallon capacity limitation. Total fuel capacity is misleading. Most aircraft are kept within a hangar at minimum or reserve levels (typically 10-15% of total capacity). Since fuel is stored in the wings, fuel is weight which provides stress on the wings. After a flight, aircraft will typically enter the hangar without refueling to reduce the stress on the wings and structural frame. When the aircraft maintenance is complete and/or aircraft is ready for flight, it leaves the hangar and is fueled.

Limiting fuel capacity to 7500 gallons equates to actual fuel in aircraft of 750 - 1,125 gallons. However, the quantity of fuel in the aircraft does not correlate to a risk of a fuel spill. The risk of a fuel spill is a function of the maintenance operations. If the risk of a fuel spill, and subsequent ignition, is limited, then a foam fire suppression system is not necessary. This is a similar approach to that taken by NFPA 409 in the 2022 edition.

If the exception to 914.8.3 is compared to this section, it is possible to have a Group II hangar that is not required to have a foam fire suppression system regardless of fuel capacity. For this example, the total fuel capacity of all aircraft in the hangar is 8000 gallons. If that same hangar is classified as a Group III, a foam fire suppression system would be required simply because the total fuel capacity is 8000 gallons. If the risk of a fuel spill is limited in the exception to 914.8.3 so that a foam system is not required, why is a foam system required in a Group III hangar simply because the aircraft have a fuel capacity greater than 7500 gallons.

The attached research report provides an analysis of how hangar groups do not correlate to hazard.NFPA 409 Research Report

There are a number of aircraft that have a tail height to fit in a Group II hangar that have the same fuel capacity as aircraft whose tail height would require them to be located in a Group I hangar. In addition, there are aircraft that must be located in a Group I hangar due to tail height that have significantly less fuel capacity than aircraft that would be located in a Group II hangar. Foam fire suppression is necessary to provide fire suppression of a fuel spill fire. Aircraft in storage or those where maintenance is performed that is unrelated to the fuel system (tire changes, avionics repair or similar), have a limited risk of a fuel spill as indicated by NFPA 409, 2022 edition. Fuel capacity has no correlation to the risk of a fuel spill and, therefore, the limitation to should be deleted.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

If this exception is used for a facility, it will reduce the initial construction cost between $200,000 and $500,000 depending on the size of the hangar bay, local requirements and fire pump sizes.

Estimated Immediate Cost Impact Justification (methodology and variables):

The estimated cost reduction is based on the cost of the foam equipment only and is based on historical cost data for foam fire suppression systems (high-expansion foam systems). Additional savings could be realized with reduced fire pump sizes and number. The actual cost savings is dependent upon the size of the hangar bay. A more detailed cost estimate cannot be performed due to the variability in hangar bay sizes and local environmental regulations.

Estimated Life Cycle Cost Impact:

Life cycle cost impact would also be reduced as inspection, testing and maintenance of a foam fire suppression system would not be required. The annual cost of foam system ITM (not including any possible reduction in cost due to the elimination of a foam releasing system) can range from $2,500 - $5,000 per year for a Group III hangar with foam. The variability depends on hangar bay size.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

The estimated reduction in cost of ITM for a foam fire suppression system is based on historical data from similar aircraft hangars where all required ITM is being performed. The LCC will vary based on hangar bay size, type of foam system and local regulations related to disposal of any test liquid.

G22-24

G23-24

Proponents: Douglas Fisher, Fisher Engineering, Inc., National Air Transportation Association

THIS CODE CHANGE WILL BE HEARD BY THE FIRE CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEE.

2024 International Building Code

SECTION 412
AIRCRAFT-RELATED OCCUPANCIES

Revise as follows:

[F] 412.3.6.2 Separation of maximum single fire areas.
Maximum single *fire areas* established in accordance with hangar classification and construction type in Table 412.3.6 shall be separated by 2-hour *fire barriers* ~~*fire walls*~~ constructed in accordance with Section 707~~706~~. In determining the maximum single *fire area* as set forth in Table 412.3.6, ancillary uses that are separated from aircraft servicing areas by a *fire barrier* of not less than 1 hour, constructed in accordance with Section 707, shall not be included in the area.

2024 International Fire Code

Revise as follows:

914.8.3.2 Separation of maximum single fire areas.
Maximum single *fire areas* established in accordance with hangar classification and construction type in Table 914.8.3 shall be separated by 2-hour *fire barriers* ~~*fire walls*~~ constructed in accordance with Section 707~~706~~ of the International Building Code. In determining the maximum single *fire area* as set forth in Table 914.8.3, ancillary uses that are separated from aircraft servicing areas by not less than a 1-hour *fire barrier* constructed in accordance with Section 707 of the International Building Code shall not be included in the area.

Reason: The addition of 2-hour fire walls was added in the 2009 edition via code change G25-07/08. The substantiation for "fire walls" vs. fire barriers is limited. The substantiation states "NFPA handles the lack of required separation of hangar buildings by requiring two two-hour wall on each hangar building. This seems to be like a "fire wall" as defined by IBC Section 705. This proposal thus adds this requirement for separation of single hangar buildings with a fire wall as defined by ICB Section 705 in lieu of the NFAP 409 requirement of two 2-hour walls."

This substantiation is no longer valid and the code requirement causes confusion. Two 2-hour fire barrier walls, while meeting the intent of a fire wall in that one wall might fall while leaving the other standing, do not meet the requirements of a fire wall.
NFPA 409, 2022 edition, section 7.3.1 states "Where aircraft storage and servicing areas are subdivided into separate fire areas, the separation shall be by a fire barrier wall having not less than a 2-hour fire resistance rating." As currently written, NFPA 409 requires fire areas to be separated by a 2-hour fire barrier wall whereas IFC section 914.8.3.2 requires fire areas to be separated by a 2-hour fire wall. This difference creates significant confusion where both the IFC and NFPA 409 are adopted by a jurisdiction. If NFPA 409 has defined fire protection criteria based on a hangar fire area separated by a 2-hour fire barrier, what justification does the IFC have to increase the separation requirements?

The requirement for a fire wall is not justified by the original code change substantiation and does not align with the current edition of NFPA 409. The use of a fire barrier for separation of hangar fire areas aligns with NFPA 409.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

A decrease in construction cost is expected in a reduction from fire wall to fire barrier, mostly due to elimination of special foundations and required structural stability of the wall. The actual cost is difficult to quantify as it will vary based on length of wall and height of wall as well as how many hangars this would apply to. There will be a cost decrease but it is difficult to quantify, therefore for the purpose of this proposal, the cost decrease is $0

Estimated Immediate Cost Impact Justification (methodology and variables):

As noted above, a cost impact (other than a decrease) is difficult to quantify as the length of wall and height of wall would be different from hangar to hangar. Changing from a fire wall to a fire barrier eliminates the requirement for a foundation and, in many cases, would eliminate additional columns to support the report on either side of the fire wall.

Estimated Life Cycle Cost Impact:

No change.

G23-24

G24-24

IBC: [F] 415.11, [F] 415.11.1, [F] 415.11.1.1, [F]TABLE 415.11.1.1, [F] 415.11.1.2, [F] 415.11.1.3, [F] 415.11.1.4, [F] 415.11.1.5, [F] 415.11.1.6, [F] 415.11.1.7, [F] 415.11.1.8, [F] 415.11.1.8.1, [F] 415.11.2, [F] 415.11.3, [F] 415.11.3.1, [F] 415.11.3.2, [F] 415.11.3.3, [F] 415.11.3.4, [F] 415.11.4, [F] 415.11.4.1, [F] 415.11.4.2, [F] 415.11.4.3, [F] 415.11.4.4, [F] 415.11.4.5, [F] 415.11.5, [F] 415.11.6, [F] 415.11.6.1, [F] 415.11.6.2, [F] 415.11.6.3, [F] 415.11.6.4, [F] 415.11.6.5, [F] 415.11.6.6, [F] 415.11.6.7, [F] 415.11.6.8, [F] 415.11.6.9, [F] 415.11.7, [F] 415.11.7.1, [F] 415.11.7.2, [F] 415.11.7.3, [F] 415.11.7.4, [F] 415.11.7.5, [F] 415.11.8, [F] 415.11.8.1, [F] 415.11.8.1.1, [F] 415.11.8.1.2, [F] 415.11.8.1.3, [F] 415.11.8.1.4, [F] 415.11.8.2, [F] 415.11.8.2.1, [F] 415.11.8.2.2, [F] 415.11.9, [F] 415.11.10, [F] 415.11.10.1, [F] 415.11.10.2, [F] 415.11.10.3, [F] 415.11.11, [F] 415.11.11.1, [F] 415.11.11.2, [F] 415.11.12, [F] 415.11.12.1, [F] 415.11.12.2, [F] 415.11.12.3, NFPA Chapter 35 (New)

Proponents: William Koffel, Koffel Associates, Inc., Semiconductor Industry Association (wkoffel@koffel.com)

THIS CODE CHANGE WILL BE HEARD BY THE FIRE CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEE.

2024 International Building Code

SECTION 415
GROUPS H-1, H-2, H-3, H-4 AND H-5

Revise as follows:

[F] 415.11 Group H-5.
In addition to the requirements set forth elsewhere in this code, Group H-5 shall comply with the provisions of NFPA 318 ~~Sections 415.11.1 through 415.11.12~~ and the *International Fire Code* .

Delete without substitution:

~~**[F] 415.11.1 Fabrication areas.**~~
~~*Fabrication areas* shall comply with Sections 415.11.1.1 through 415.11.1.8.~~

~~**[F] 415.11.1.1 Hazardous materials.**~~
~~The aggregate quantities of *hazardous materials* stored and used in a single *fabrication area* shall not exceed the quantities set forth in Table 415.11.1.1.~~

> ~~**Exception:** The quantity limitations for any hazard category in Table 415.11.1.1 shall not apply where the *fabrication area* contains quantities of hazardous materials not exceeding the maximum allowable quantities per *control area* established by Tables 307.1(1) and 307.1(2).~~

~~**[F]TABLE 415.11.1.1 QUANTITY LIMITS FOR HAZARDOUS MATERIALS IN A SINGLE FABRICATION AREA IN GROUP H-5[a]**~~

HAZARD CATEGORY		SOLIDS (pounds per square foot)	LIQUIDS (gallons per square foot)	GAS (cubic feet @ NTP/square foot)
PHYSICAL-HAZARD MATERIALS				
Combustible dust		Note b	Not Applicable	Not Applicable
Combustible fiber	Loose	Note b	Not Applicable	Not Applicable
	Baled	Notes b and c		
Combustible liquid	II	Not Applicable	0.02	Not Applicable

HAZARD CATEGORY		SOLIDS (pounds per square foot)	LIQUIDS (gallons per square foot)	GAS (cubic feet @ NTP/square foot)
	IIIA		0.04	
	IIIB		Not Limited	
Combination Class	I, II and IIIA		0.08	
Cryogenic gas	Flammable	Not Applicable	Not Applicable	Note d
	Oxidizing			2.5
Explosives		Note b	Note b	Note b
Flammable gas	Gaseous	Not Applicable	Not Applicable	Note d
	Liquefied			Note d
Flammable liquid	IA	Not Applicable	0.005	Not Applicable
	IB		0.05	
	IC		0.05	
Combination Class	IA, IB and IC		0.05	
Combination Class	I, II and IIIA		0.08	
Flammable solid		0.002	Not Applicable	Not Applicable
Organic peroxide	Unclassified detonable	Note b	Note b	Not Applicable
	Class I	Note b	Note b	
	Class II	0.05	0.0025	
	Class III	0.2	0.02	
	Class IV	Not Limited	Not Limited	
	Class V	Not Limited	Not Limited	
Oxidizing gas	Gaseous	Not Applicable	Not Applicable	2.5
	Liquefied			2.5
Combination of gaseous and liquefied				2.5
Oxidizer	Class 4	Note b	Note b	Not Applicable
	Class 3	0.006	0.06	
	Class 2	0.006	0.06	
	Class 1	0.006	0.06	
Combination Class	1, 2, 3	0.006	0.06	
Pyrophoric materials		Note b	0.0025	Notes d and e
Unstable (reactive)	Class 4	Note b	Note b	Note b
	Class 3	0.05	0.005	Note b
	Class 2	0.2	0.02	Note b
	Class 1	Not Limited	Not Limited	Not Limited
Water reactive	Class 3	0.02 [f]	0.0025	Not Applicable
	Class 2	0.5	0.05	
	Class 1	Not Limited	Not Limited	

HAZARD CATEGORY		SOLIDS (pounds per square foot)	LIQUIDS (gallons per square foot)	GAS (cubic feet @ NTP/square foot)
HEALTH-HAZARD MATERIALS				
Corrosives		Not Limited	Not Limited	Not Limited
Highly toxic		Not Limited	Not Limited	Note d
Toxics		Not Limited	Not Limited	Note d

~~For SI: 1 pound = 0.454 kg, 1 pound per square foot = 4.882 kg/m^2, 1 gallon per square foot = 40.7 L/m^2, 1 cubic foot @ *NTP*/square foot = 0.305 m^3 @ *NTP*/m^2, 1 cubic foot = 0.02832 m^3.~~

- ~~a. Hazardous materials within piping shall not be included in the calculated quantities.~~
- ~~b. Quantity of hazardous materials in a single fabrication shall not exceed the maximum allowable quantities per control area in Tables 307.1(1) and 307.1(2).~~
- ~~c. Densely packed baled cotton that complies with the packing requirements of ISO 8115 shall not be included in this material class.~~
- ~~d. The aggregate quantity of flammable, pyrophoric, toxic and highly toxic gases shall not exceed the greater of 0.2 cubic feet at *NTP*/square foot or 9,000 cubic feet at *NTP*.~~
- ~~e. The aggregate quantity of pyrophoric gases in the building shall not exceed the amounts set forth in Table 415.6.5.~~
- ~~f. Quantity of Class 3 water-reactive solids in a single tool shall not exceed 1 pound.~~

~~[F] 415.11.1.2 Separation~~.

~~*Fabrication areas*, whose sizes are limited by the quantity of *hazardous materials* allowed by Table 415.11.1.1, shall be separated from each other, from *corridors* and from other parts of the *building* by not less than 1-hour *fire barriers* constructed in accordance with Section 707 or *horizontal assemblies* constructed in accordance with Section 711, or both.~~

~~Exceptions:~~

1. ~~Doors within such *fire barrier* walls, including doors to *corridors*, shall be only *self-closing fire door assemblies* having a *fire protection rating* of not less than $^3/_4$ hour.~~
2. ~~Windows between *fabrication areas* and *corridors* are permitted to be fixed glazing *listed* and *labeled* for a *fire protection rating* of not less than $^3/_4$ hour in accordance with Section 716.~~

~~[F] 415.11.1.3 Location of occupied levels~~.

~~Occupied levels of *fabrication areas* shall be located at or above the first *story above grade plane*.~~

~~[F] 415.11.1.4 Floors~~.

~~Except for surfacing, floors within *fabrication areas* shall be of noncombustible construction.~~
~~Openings through floors of *fabrication areas* are permitted to be unprotected where the interconnected levels are used solely for mechanical equipment directly related to such *fabrication areas* (see Section 415.11.1.5).~~

~~Floors forming a part of an occupancy separation shall be liquid tight.~~

~~[F] 415.11.1.5 Shafts and openings through floors~~.

~~Elevator hoistways, vent *shafts* and other openings through floors shall be enclosed where required by Sections 712 and 713. Mechanical, duct and piping penetrations within a *fabrication area* shall not extend through more than two floors. The *annular space*~~

~~around penetrations for cables, cable trays, tubing, piping, conduit or ducts shall be sealed at the floor level to restrict the movement of air. The *fabrication area*, including the areas through which the ductwork and piping extend, shall be considered to be a single conditioned environment.~~

~~[F] 415.11.1.6 Ventilation.~~

~~Mechanical exhaust *ventilation* at the rate of not less than 1 cubic foot per minute per square foot [0.0051 $m^3/(s \times m^2)$] of floor area shall be provided throughout the portions of the *fabrication area* where *HPM* are used or stored. The exhaust air duct system of one *fabrication area* shall not connect to another duct system outside that *fabrication area* within the *building*.~~

~~A *ventilation* system shall be provided to capture and exhaust gases, fumes and vapors at *workstations*.~~

~~Two or more operations at a *workstation* shall not be connected to the same exhaust system where either one or the combination of the substances removed could constitute a fire, *explosion* or hazardous chemical reaction within the exhaust duct system.~~

~~Exhaust ducts penetrating *fire barriers* constructed in accordance with Section 707 or *horizontal assemblies* constructed in accordance with Section 711 shall be contained in a *shaft* of equivalent fire-resistance-rated construction. Exhaust ducts shall not penetrate *fire walls*.~~

~~*Fire dampers* shall not be installed in exhaust ducts.~~

~~[F] 415.11.1.7 Transporting hazardous production materials to fabrication areas.~~

~~*HPM* shall be transported to *fabrication areas* through enclosed piping or tubing systems that comply with Section 415.11.7, through *service corridors* complying with Section 415.11.3, or in *corridors* as permitted in the exception to Section 415.11.2. The *handling* or transporting of *HPM* within *service corridors* shall comply with the *International Fire Code* .~~

~~[F] 415.11.1.8 Electrical.~~

~~Electrical equipment and devices within the *fabrication area* shall comply with NFPA 70. The requirements for hazardous locations need not be applied where the average air change is not less than four times that set forth in Section 415.11.1.6 and where the number of air changes at any location is not less than three times that required by Section 415.11.1.6. The use of recirculated air shall be permitted.~~

~~[F] 415.11.1.8.1 Workstations.~~

~~*Workstations* shall not be energized without adequate exhaust *ventilation*. See Section 415.11.1.6 for *workstation* exhaust *ventilation requirements*.~~

~~[F] 415.11.2 Corridors.~~

~~*Corridors* shall comply with Chapter 10 and shall be separated from *fabrication areas* as specified in Section 415.11.1.2. *Corridors* shall not contain *HPM* and shall not be used for transporting such materials except through closed piping systems as provided in Section 415.11.7.4.~~

> ~~**Exception:** Where existing *fabrication areas* are altered or modified, *HPM* is allowed to be transported in existing *corridors*, subject to the following conditions:~~
>
> 1. ~~Nonproduction *HPM* is allowed to be transported in *corridors* if utilized for maintenance, lab work and testing.~~

2. ~~Where existing *fabrication areas* are altered or modified, *HPM* is allowed to be transported in existing *corridors*, subject to the following conditions:~~
   2.1. ~~Corridors. *Corridors* adjacent to the *fabrication area* where the *alteration* work is to be done shall comply with Section 1020 for a length determined as follows:~~
      2.1.1. ~~The length of the common wall of the *corridor* and the *fabrication area*; and~~

      2.1.2. ~~For the distance along the *corridor* to the point of entry of *HPM* into the *corridor* serving that *fabrication area.*~~

   2.2. ~~*Emergency alarm system.* There shall be an emergency telephone system, a local manual alarm station or other *approved* alarm-*initiating device* within corridors at not more than 150-foot (45 720 mm) intervals and at each exit and doorway. The signal shall be relayed to an *approved* central, proprietary or remote station service or the *emergency control station* and shall initiate a local audible alarm.~~
   2.3. ~~Pass-throughs. *Self-closing* doors having a *fire protection rating* of not less than 1 hour shall separate pass-throughs from existing *corridors.* Pass-throughs shall be constructed as required for the *corridors* and protected by an *approved automatic sprinkler system.*~~

~~[F] 415.11.3 Service corridors.~~
~~*Service corridors* within a Group H-5 occupancy shall comply with Sections 415.11.3.1 through 415.11.3.4.~~

~~[F] 415.11.3.1 Use conditions.~~
~~*Service corridors* shall be separated from *corridors* as required by Section 415.11.1.2. *Service corridors* shall not be used as a required *corridor.*~~

~~[F] 415.11.3.2 Mechanical ventilation.~~
~~*Service corridors* shall be mechanically ventilated as required by Section 415.11.1.6 or at not less than six air changes per hour.~~

~~[F] 415.11.3.3 Means of egress.~~
~~The distance of travel from any point in a *service corridor* to an *exit* , *exit access corridor* or door into a *fabrication area* shall be not greater than 75 feet (22 860 mm). Dead ends shall be not greater than 4 feet (1219 mm) in length. There shall be not less than two *exits*, and not more than one-half of the required *means of egress* shall require travel into a *fabrication area.* Doors from *service corridors* shall swing in the direction of egress travel and shall be *self-closing.*~~

~~[F] 415.11.3.4 Minimum width.~~
~~The clear width of a *service corridor* shall be not less than 5 feet (1524 mm), or 33 inches (838 mm) wider than the widest cart or truck used in the *service corridor*, whichever is greater.~~

~~[F] 415.11.4 Emergency alarm system.~~
~~*Emergency alarm systems* shall be provided in accordance with this section and Sections 415.5.1 and 415.5.2. The maximum allowable quantity per *control area* provisions shall not apply to *emergency alarm systems* required for *HPM.*~~

~~[F] 415.11.4.1 Service corridors.~~

~~An *emergency alarm system* shall be provided in *service corridors*, with not fewer than one alarm device in each *service corridor.*~~

~~[F] 415.11.4.2 Corridors and interior exit stairways and ramps.~~

~~Emergency alarms for *corridors, interior exit stairways* and *ramps* and *exit passageways* shall comply with Section 415.5.2.~~

~~[F] 415.11.4.3 Liquid storage rooms, HPM rooms and gas rooms.~~

~~Emergency alarms for *liquid storage rooms*, *HPM* rooms and *gas rooms* shall comply with Section 415.5.1.~~

~~[F] 415.11.4.4 Alarm-initiating devices.~~

~~An *approved* emergency telephone system, local alarm manual pull stations, or other *approved* alarm-*initiating devices* are allowed to be used as emergency alarm-*initiating devices.*~~

~~[F] 415.11.4.5 Alarm signals.~~

~~Activation of the *emergency alarm system* shall sound a local alarm and transmit a signal to the *emergency control station.*~~

~~[F] 415.11.5 Storage of hazardous production materials.~~

~~Storage of *hazardous production materials* (*HPM*) in *fabrication areas* shall be within *approved* or *listed* storage cabinets or *gas cabinets* or within a *workstation*. The storage of HPM in quantities greater than those specified in Section 5004.2 of the International Fire Code shall be in *liquid storage rooms*, *HPM* rooms or *gas rooms* as appropriate for the materials stored. The storage of other *hazardous materials* shall be in accordance with other applicable provisions of this code and the *International Fire Code* .~~

~~[F] 415.11.6 HPM rooms, gas rooms, liquid storage room construction.~~

~~*HPM* rooms, *gas rooms* and liquid storage rooms shall be constructed in accordance with Sections 415.11.6.1 through 415.11.6.9.~~

~~[F] 415.11.6.1 HPM rooms and gas rooms.~~

~~*HPM* rooms and *gas rooms* shall be separated from other areas by *fire barriers* constructed in accordance with Section 707 or *horizontal assemblies* constructed in accordance with Section 711, or both. The *fire-resistance rating* shall be not less than 2 hours where the area is 300 square feet (27.9 m^2) or more and not less than 1 hour where the area is less than 300 square feet (27.9 m^2).~~

~~[F] 415.11.6.2 Liquid storage rooms.~~

~~*Liquid storage rooms* shall be constructed in accordance with the following requirements:~~

1. ~~Rooms greater than 500 square feet (46.5 m^2) in area, shall have not fewer than one exterior door *approved* for fire department access.~~
2. ~~Rooms shall be separated from other areas by *fire barriers* constructed in accordance with Section 707 or *horizontal assemblies* constructed in accordance with Section 711, or both. The *fire-resistance rating* shall be not less than 1 hour for rooms up to 150 square feet (13.9 m^2) in area and not less than 2 hours where the room is more than 150 square feet (13.9 m^2) in area.~~
3. ~~Shelving, racks and wainscotting in such areas shall be of noncombustible construction or wood of not less than 1-inch (25 mm) nominal thickness or *fire-retardant-treated wood* complying with Section 2303.2.~~
4. ~~Rooms used for the storage of Class I *flammable liquids* shall not be located in a *basement*.~~

~~[F] 415.11.6.3 Floors.~~

~~Except for surfacing, floors of *HPM* rooms and *liquid storage rooms* shall be of noncombustible liquid-tight construction. Raised grating over floors shall be of noncombustible materials.~~

~~[F] 415.11.6.4 Location~~.

~~Where *HPM* rooms, *liquid storage rooms* and *gas rooms* are provided, they shall have not fewer than one *exterior wall* and such wall shall be not less than 30 feet (9144 mm) from *lot lines*, including *lot lines* adjacent to *public ways*.~~

~~[F] 415.11.6.5 Explosion control~~.

~~*Explosion* control shall be provided where required by Section 414.5.1.~~

~~[F] 415.11.6.6 Exits~~.

~~Where two *exits* are required from *HPM* rooms, *liquid storage rooms* and *gas rooms*, one shall be directly to the outside of the *building*.~~

~~[F] 415.11.6.7 Doors~~.

~~Doors in a *fire barrier* wall, including doors to *corridors*, shall be *self-closing fire door assemblies* having a *fire protection rating* of not less than $^{3}/_{4}$ hour.~~

~~[F] 415.11.6.8 Ventilation~~.

~~Mechanical exhaust ventilation shall be provided in *liquid storage rooms*, *HPM* rooms and *gas rooms* at the rate of not less than 1 cubic foot per minute per square foot (0.044 L/s/m^2) of floor area or six air changes per hour.~~

~~Exhaust ventilation for *gas rooms* shall be designed to operate at a negative pressure in relation to the surrounding areas and direct the exhaust ventilation to an exhaust system.~~

~~[F] 415.11.6.9 Emergency alarm system~~.

~~An *approved emergency alarm system* shall be provided for *HPM* rooms, *liquid storage rooms* and *gas rooms*.~~

~~Emergency alarm *initiating devices* shall be installed outside of each interior exit door of such rooms.~~

~~Activation of an emergency alarm *initiating device* shall sound a local alarm and transmit a signal to the *emergency control station*.~~

~~An *approved* emergency telephone system, local alarm manual pull stations or other *approved* alarm *initiating devices* are allowed to be used as emergency alarm *initiating devices*.~~

~~[F] 415.11.7 Piping and tubing~~.

~~*Hazardous production materials* piping and tubing shall comply with this section and ASME B31.3.~~

~~[F] 415.11.7.1 HPM having a health-hazard ranking of 3 or 4~~.

~~Systems supplying *HPM* liquids or gases having a health-hazard ranking of 3 or 4 shall be welded throughout, except for connections, to the systems that are within a ventilated enclosure if the material is a gas, or an *approved* method of drainage or containment is provided for the connections if the material is a *liquid*.~~

~~[F] 415.11.7.2 Location in service corridors~~.

~~*Hazardous production materials* supply piping or tubing in *service corridors* shall be exposed to view.~~

~~[F] 415.11.7.3 Excess flow control~~.

~~Where *HPM* gases or liquids are carried in pressurized piping above 15 pounds per square inch gauge (psig) (103.4 kPa), excess flow control shall be provided. Where the piping originates from within a *liquid storage room*, *HPM room* or gas room, the excess flow control shall be located within the *liquid storage room*, *HPM room* or gas room. Where the piping originates from a bulk source, the excess flow control shall be located as close to the bulk source as practical.~~

~~[F] 415.11.7.4 Installations in corridors and above other occupancies~~.

~~The installation of *HPM* piping and tubing within the space defined by the walls of *corridors* and the floor or roof above, or in concealed spaces above other occupancies, shall be in accordance with Sections 415.11.7.1 through 415.11.7.3 and the following conditions:~~

1. ~~Automatic sprinklers shall be installed within the space unless the space is less than 6 inches (152 mm) in the least dimension.~~
2. ~~*Ventilation* not less than six air changes per hour shall be provided. The space shall not be used to convey air from any other area.~~
3. ~~Where the piping or tubing is used to transport *HPM* liquids, a receptor shall be installed below such piping or tubing. The receptor shall be designed to collect any discharge or leakage and drain it to an *approved* location. The 1-hour enclosure shall not be used as part of the receptor.~~
4. ~~*HPM* supply piping and tubing and nonmetallic waste lines shall be separated from the corridor and from occupancies other than Group H-5 by *fire barriers* or by an *approved* method or assembly that has a *fire-resistance rating* of not less than 1 hour. Access openings into the enclosure shall be protected by *approved* fire-protection-rated assemblies.~~
5. ~~Ready access to manual or automatic remotely activated fail-safe emergency shutoff valves shall be installed on piping and tubing other than waste lines at the following locations:~~
   - ~~5.1. At branch connections into the *fabrication area.*~~
   - ~~5.2. At entries into *corridors.*~~

~~**Exception:** Transverse crossings of the *corridors* by supply piping that is enclosed within a ferrous pipe or tube for the width of the *corridor* need not comply with Items 1 through 5.~~

~~[F] 415.11.7.5 Identification.~~

~~Piping, tubing and *HPM* waste lines shall be identified in accordance with ANSI A13.1 to indicate the material being transported.~~

~~[F] 415.11.8 Gas detection systems~~.

~~A *gas detection system* complying with Section 916 shall be provided for *HPM* gases where the *physiological warning threshold level* of the gas is at a higher level than the accepted permissible exposure limit (PEL) for the gas and for flammable gases in accordance with Sections 415.11.8.1 through 415.11.8.2.~~

~~[F] 415.11.8.1 Where required~~.

~~A *gas detection system* shall be provided in the areas identified in Sections 415.11.8.1.1 through 415.11.8.1.4.~~

~~[F] 415.11.8.1.1 Fabrication areas~~.

~~A *gas detection system* shall be provided in *fabrication areas* where *HPM* gas is used in the *fabrication area*.~~

~~[F] 415.11.8.1.2 HPM rooms~~.

~~A *continuous gas detection system* shall be provided in *HPM* rooms where *HPM* gas is used in the room.~~

~~**[F] 415.11.8.1.3 Gas cabinets, exhausted enclosures and gas rooms**~~.

~~A *gas detection system* shall be provided in *gas cabinets* and *exhausted enclosures* for *HPM* gas. A *gas detection system* shall be provided in *gas rooms* where *HPM* gases are not located in *gas cabinets* or *exhausted enclosures*.~~

~~**[F] 415.11.8.1.4 Corridors**~~.

~~Where *HPM* gases are transported in piping placed within the space defined by the walls of a *corridor* and the floor or roof above the *corridor*, a *gas detection system* shall be provided where piping is located and in the *corridor*.~~

~~**Exception:** A *gas detection system* is not required for occasional transverse *crossings* of the *corridors* by supply piping that is enclosed in a ferrous pipe or tube for the width of the *corridor*.~~

~~**[F] 415.11.8.2 Gas detection system operation**~~.

~~The *gas detection system* shall be capable of monitoring the room, area or equipment in which the *HPM* gas is located at or below all the following gas concentrations:~~

1. ~~Immediately dangerous to life and health (*IDLH*) values where the monitoring point is within an *exhausted enclosure*, ventilated enclosure or *gas cabinet*.~~
2. ~~Permissible exposure limit (PEL) levels where the monitoring point is in an area outside an *exhausted enclosure*, ventilated enclosure or *gas cabinet*.~~
3. ~~For flammable gases, the monitoring detection threshold level shall be vapor concentrations in excess of 25 percent of the lower flammable limit (*LFL*) where the monitoring is within or outside an *exhausted enclosure*, ventilated enclosure or *gas cabinet*.~~
4. ~~Except as noted in this section, monitoring for *highly toxic* and toxic gases shall also comply with Chapter 60 of the International Fire Code.~~

~~**[F] 415.11.8.2.1 Alarms**~~.

~~The *gas detection system* shall initiate a local alarm and transmit a signal to the *emergency control station* when a short-term hazard condition is detected. The alarm shall be both visual and audible and shall provide warning both inside and outside the area where the gas is detected. The audible alarm shall be distinct from all other alarms.~~

~~**[F] 415.11.8.2.2 Shutoff of gas supply**~~.

~~The *gas detection system* shall automatically close the shutoff valve at the source on gas supply piping and tubing related to the system being monitored for which gas is detected when a short-term hazard condition is detected. Automatic closure of shutoff valves shall comply with the following:~~

1. ~~Where the gas detection sampling point initiating the *gas detection system* alarm is within a *gas cabinet* or *exhausted enclosure*, the shutoff valve in the *gas cabinet* or *exhausted enclosure* for the specific gas detected shall automatically close.~~
2. ~~Where the gas detection sampling point initiating the *gas detection system* alarm is within a room and *compressed gas* containers are not in *gas cabinets* or an *exhausted enclosure*, the shutoff valves on all gas lines for the specific gas detected shall automatically close.~~
3. ~~Where the gas detection sampling point initiating the *gas detection system* alarm is within a piping distribution manifold enclosure, the shutoff valve supplying the manifold for the *compressed gas* container of the specific gas detected shall automatically close.~~

~~**Exception:** Where the gas detection sampling point initiating the *gas detection system* alarm is at the use location or within a gas valve enclosure of a branch line downstream of a piping distribution manifold, the shutoff valve for the branch line located in the piping distribution manifold enclosure shall automatically close.~~

~~**[F] 415.11.9 Manual fire alarm system**~~.

~~An *approved* manual *fire alarm* system shall be provided throughout *buildings* containing Group H-5. Activation of the alarm system shall initiate a local alarm and transmit a signal to the *emergency control station*. The *fire alarm* system shall be designed and installed in accordance with Section 907.~~

~~[F] 415.11.10 Emergency control station~~.

~~An *emergency control station* shall be provided in accordance with Sections 415.11.10.1 through 415.11.10.3.~~

~~[F] 415.11.10.1 Location~~.

~~The *emergency control station* shall be located on the premises at an *approved* location outside the *fabrication area*.~~

~~[F] 415.11.10.2 Staffing~~.

~~Trained personnel shall continuously staff the *emergency control station*.~~

~~[F] 415.11.10.3 Signals~~.

~~The *emergency control station* shall receive signals from emergency equipment and alarm and detection systems. Such emergency equipment and alarm and detection systems shall include, but not be limited to, the following where such equipment or systems are required to be provided either in this chapter or elsewhere in this code:~~

1. ~~*Automatic sprinkler system* alarm and monitoring systems.~~
2. ~~Manual *fire alarm* systems.~~
3. ~~*Emergency alarm systems*.~~
4. ~~*Gas detection systems*.~~
5. ~~Smoke detection systems.~~
6. ~~*Emergency power system*.~~
7. ~~Automatic detection and alarm systems for *pyrophoric* liquids and Class 3 water-reactive liquids required in Section 2705.2.3.4 of the International Fire Code.~~
8. ~~Exhaust *ventilation* flow alarm devices for *pyrophoric* liquids and Class 3 water-reactive liquids cabinet exhaust *ventilation* systems required in Section 2705.2.3.4 of the International Fire Code.~~

~~[F] 415.11.11 Emergency power system~~.

~~An *emergency power system* shall be provided in Group H-5 occupancies in accordance with Section 2702. The *emergency power system* shall supply power automatically to the electrical systems specified in Section 415.11.11.1 when the normal electrical supply system is interrupted.~~

~~[F] 415.11.11.1 Required electrical systems~~.

~~Emergency power shall be provided for electrically operated equipment and connected control circuits for the following systems:~~

1. ~~*HPM* exhaust *ventilation systems*.~~
2. ~~*HPM gas cabinet ventilation systems*.~~
3. ~~*HPM exhausted enclosure ventilation systems*.~~
4. ~~*HPM gas room ventilation systems*.~~
5. ~~*HPM gas detection systems*.~~

6. ~~*Emergency alarm systems*.~~

7. ~~Manual and automatic *fire alarm systems*.~~

8. ~~*Automatic sprinkler system* monitoring and alarm systems.~~

9. ~~Automatic alarm and detection systems for *pyrophoric* liquids and Class 3 water-reactive liquids required in Section 2705.2.3.4 of the International Fire Code.~~

10. ~~Flow alarm switches for *pyrophoric* liquids and Class 3 water-reactive liquids cabinet exhaust *ventilation systems* required in Section 2705.2.3.4 of the International Fire Code.~~

11. ~~Electrically operated systems required elsewhere in this code or in the *International Fire Code* applicable to the use, storage or *handling* of *HPM*.~~

~~[F] 415.11.11.2 Exhaust ventilation systems.~~
~~Exhaust *ventilation* systems are allowed to be designed to operate at not less than one-half the normal fan speed on the *emergency power system* where it is demonstrated that the level of exhaust will maintain a safe atmosphere.~~

~~[F] 415.11.12 Automatic sprinkler system protection in exhaust ducts for HPM.~~
~~An *approved automatic sprinkler system* shall be provided in exhaust ducts conveying gases, vapors, fumes, mists or dusts generated from *HPM* in accordance with Sections 415.11.12.1 through 415.11.12.3 and the *International Mechanical Code* .~~

~~[F] 415.11.12.1 Metallic and noncombustible nonmetallic exhaust ducts.~~
~~An *approved automatic sprinkler system* shall be provided in metallic and noncombustible nonmetallic exhaust ducts where all of the following conditions apply:~~

1. ~~Where the largest cross-sectional diameter is equal to or greater than 10 inches (254 mm).~~

2. ~~The ducts are within the *building*.~~

3. ~~The ducts are conveying flammable gases, vapors or fumes.~~

~~[F] 415.11.12.2 Combustible nonmetallic exhaust ducts.~~
~~*Automatic sprinkler system* protection shall be provided in combustible nonmetallic exhaust ducts where the largest cross-sectional diameter of the duct is equal to or greater than 10 inches (254 mm).~~

~~**Exception:** Ducts need not be provided with automatic sprinkler protection as follows:~~

1. ~~Ducts *listed* or *approved* for applications without *automatic sprinkler system* protection.~~

2. ~~Ducts not more than 12 feet (3658 mm) in length installed below ceiling level.~~

~~[F] 415.11.12.3 Automatic sprinkler locations.~~
~~Automatic sprinklers shall be installed at 12-foot (3658 mm) intervals in horizontal ducts and at changes in direction. In vertical ducts, sprinklers shall be installed at the top and at alternate floor levels.~~

Add new standard(s) as follows:

NFPA

National Fire Protection Association
1 Batterymarch Park
Quincy, MA 02169-7471

318-22 Standard for the Protection of Semiconductor Fabrication Facilities

Reason: The overall intent of this proposal is to be more reliant on the nationally recognized standard, NFPA 318. Similar to a proposal submitted for the IFC, since the provisions in this section are design and construction related are proposed for deletion. Some of the provisions in the IFC have been retained in that proposal for several reasons, one of which is that the requirements of NFPA 318 do not apply to existing facilities. The MAQ tables that are proposed for deletion have been the subject of several proposals submitted almost every cycle to correlate the tables in the IBC with the tables in NFPA 318. Due to the different revision cycles, the tables in a particular edition of the IBC will not necessarily correlate with the tables in the edition of NFPA 318 that is referenced. Lastly, the deletion of text will reduce the likelihood of potential claims regarding copyright infringement issues.

For the most part, the proposal is not intended to be a technical change. The text that is proposed for deletion is covered in NFPA 318 or the IFC. For example, sprinkler protection will still be required for semiconductor facilities based upon the requirements of NFPA 318. The installation requirements that currently are contained in the IFC are also contained in either NFPA 318 or NFPA 13, which also references NFPA 318. NFPA 318 requires electrical systems to comply with NFPA 70 in addition to a requirement in the IFC for electrical systems to comply with NFPA 70.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

While not editorial or a clarification, the proposal does result in better correlation between the IBC and NFPA 318. The proposal may decrease the cost of construction in instances where NFPA 318 contains a provision that is not currently specifically permitted by the IBC.

G24-24

G25-24

IBC: [F] 415.11.1.2

Proponents: William Koffel, Koffel Associates, Inc., Semiconductor Industry Association (wkoffel@koffel.com)

THIS CODE CHANGE WILL BE HEARD BY THE FIRE CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEE.

2024 International Building Code

SECTION 415
GROUPS H-1, H-2, H-3, H-4 AND H-5

Revise as follows:

[F] 415.11.1.2 Separation.
Fabrication areas, whose sizes are limited by the quantity of *hazardous materials* allowed by Table 415.11.1.1, shall be separated from each other, from *corridors* and from other parts of the *building* by not less than 1-hour *fire barriers* constructed in accordance with Section 707 or *horizontal assemblies* constructed in accordance with Section 711, or both.

Exceptions:

1. Doors within such *fire barrier* walls, including doors to *corridors*, shall be ~~only~~ self- or automatic-closing *fire door assemblies* having a *fire protection rating* of not less than $^3/_4$ hour.
2. Windows between *fabrication areas* and *corridors* are permitted to be fixed glazing *listed* and *labeled* for a *fire protection rating* of not less than $^3/_4$ hour in accordance with Section 716.

Reason: The original intent of the code provision was to keep the doors to the adjacent areas closed. With the growth of semiconductor buildings, there is a need for multiple fabrication areas in the same building. The proposed change will allow the doors between these similar use spaces to be on hold-open devices but be automatic-closing to protect the rated compartment during a fire event. As fabrication areas have the same table for quantities of materials, the use of automatic-closing doors would allow for automatic material handling systems (AMHS) to move between fabrication areas, while still protecting the compartment during a fire event.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

While the cost of automatic-closing doors is higher than self-closing doors, the proposed change allows automatic-closing fire doors as an alternative compliance option.

G25-24

G26-24

IBC: [F] 427.2, [F] TABLE 427.2 (New)

Proponents: Richard Williams, Washington Association of Building Officials Technical Code Development Committee (richard@cwaconsultants.net); Micah Chappell, Seattle Department of Construction and Inspections, Washington Association of Building Officials Technical Code Development Committee (micah.chappell@seattle.gov); Quyen Thai, City of Tacoma, Washington Association of Building Officials Technical Code Development Committee (qthai@cityoftacoma.org)

THIS CODE CHANGE WILL BE HEARD BY THE FIRE CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEE.

2024 International Building Code

SECTION 427 MEDICAL GAS SYSTEMS

Revise as follows:

[F] 427.2 Interior supply location.
Medical gases shall be located in areas dedicated to the storage of such gases without other storage or uses. Where containers of medical gases in quantities greater than the ~~permitted amount~~ amounts specified per Table 427.2 are located inside ~~the~~ buildings, they shall be located in a 1-hour exterior room, 1-hour interior room or a *gas cabinet* in accordance with Section 427.2.1, 427.2.2 or 427.2.3, respectively. Rooms or areas where medical gases are stored or used in quantities exceeding the maximum allowable quantity per control area as set forth in Tables 307.1(1) and 307.1(2) shall be in accordance with Group H occupancies.

Add new text as follows:

[F] TABLE 427.2 PERMIT AMOUNTS FOR COMPRESSED GASES

TYPE OF GAS	AMOUNT (cubic feet at NTP)
Carbon dioxide used in carbon dioxide enrichment systems	875 (100 lb)
Carbon dioxide used in insulated liquid carbon dioxide beverage dispensing applications	875 (100 lb)
Corrosive	200
Flammable (except cryogenic fluids and liquefied petroleum gases)	200
Highly toxic	Any Amount
Inert and simple asphyxiant	6,000
Oxidizing (including oxygen)	504
Pyrophoric	Any Amount
Toxic	Any Amount

Reason: The IBC commentary for Section 427.2 mentions IFC Section 105, which deals with permits for various materials. Without the commentary, it is not clear that IFC Section 105 applies in this case, because there is no mention of it in the body of the code section. Also, the IFC and the IMC both specifically state "**permit** amounts", not "**permitted** amounts". The word permitted in this context suggests an allowable amount, not an amount allowed by permit. It is also confusing because maximum allowable quantities are listed later in this section and also deal with allowable (permitted) amounts, but are referring to a completely different set of requirements - maximum allowable quantities for a control area.

The proposed change will bring over Table 105.5.9 from the IFC and will rename it Table 427.2. In our opinion it is cleaner to bring the table over rather than referencing individual sections in the IFC (Sections 105.5.9 and 105.6.3 both reference Table 105.5.9). This change will help to make clear when one-hour rooms (and sprinklers) or gas cabinets are required for medical gas installations.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal does not impact the cost of construction because it does not change existing requirements - it only attempts to clarify them. However, this clarification may in some cases result in situations where it is determined that fire rated construction, sprinklers and gas cabinets that would have previously been provided are no longer required.

G26-24

G27-24

IBC: [F] TABLE 509.1

Proponents: Allison Cook, Arlington, Virginia (acook1@arlingtonva.us)

THIS CODE CHANGE WILL BE HEARD BY THE FIRE CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEE.

2024 International Building Code

Revise as follows:

[F] TABLE 509.1 INCIDENTAL USES

ROOM OR AREA	SEPARATION AND/OR PROTECTION[a]
Furnace room where any piece of equipment is over 400,000 Btu per hour input	1 hour or provide automatic sprinkler system
Rooms with boilers where the largest piece of equipment is over 15 psi and 10 horsepower	1 hour or provide automatic sprinkler system
Refrigerant machinery room	1 hour or provide automatic sprinkler system
Hydrogen fuel gas rooms, not classified as Group H	1 hour in Group B, F, M, S and U occupancies; 2 hours in Group A, E, I and R occupancies.
Incinerator rooms	2 hours and provide automatic sprinkler system
Paint shops, not classified as Group H, located in occupancies other than Group F	2 hours; or 1 hour and provide automatic sprinkler system
In Group E occupancies, laboratories and vocational shops not classified as Group H	1 hour or provide automatic sprinkler system
In Group I-2 occupancies, laboratories not classified as Group H	1 hour and provide automatic sprinkler system
In ambulatory care facilities, laboratories not classified as Group H	1 hour or provide automatic sprinkler system
Laundry rooms over 100 square feet	1 hour or provide automatic sprinkler system
In Group I-2, laundry rooms over 100 square feet	1 hour and provide automatic sprinkler system
Group I-3 cells and Group I-2 patient rooms equipped with padded surfaces	1 hour and provide automatic sprinkler system
In Group I-2, physical plant maintenance shops	1 hour and provide automatic sprinkler system
In ambulatory care facilities or Group I-2 occupancies, waste and linen collection rooms with containers that have an aggregate volume of 8.67cubic feet or greater	1 hour and provide automatic sprinkler system
In other than ambulatory care facilities and Group I-2 occupancies, waste and linen collection rooms over 100 square feet	1 hour or provide automatic sprinkler system
In ambulatory care facilities or Group I-2 occupancies, storage rooms greater than 50 square feet	1 hour and provide automatic sprinkler system
Electrical installations and transformers	See Sections 110.26 through 110.34 and Sections 450.8 through 450.48 of NFPA 70 for protection and separation requirements.

For SI: 1 square foot = 0.0929 m^2, 1 pound per square inch (psi) = 6.9 kPa, 1 British thermal unit (Btu) per hour = 0.293 watts, 1 horsepower = 746 watts, 1 gallon = 3.785 L, 1 cubic foot = 0.0283 m^3.

a. <u>Where an automatic sprinkler system is used without a fire barrier, the incidental uses shall comply with the requirements of Section 509.4.2</u>

Reason: As written, it is very easy to not understand that in addition to an automatic sprinkler system, the incidental use is required to be separated from the remainder of the building by construction capable of resisting the passage of smoke and has specific requirements for the doors and any transfer opening into that room or space per section 509.4.2

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

There is no change in cost because this is strictly editorial to provide a "pointer" to better assist design professionals and code officials.

G27-24

G28-24

IBC: [P] 1210.2.2, [P] 1210.3, [P] 1210.3.1, [P] 1210.3.2, Chapter 35 IAPMO (New)

Proponents: Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C., Bradley Corp. (jbengineer@aol.com)

THIS CODE CHANGE WILL BE HEARD BY THE PLUMBING COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEES.

2024 International Building Code

SECTION 1210
TOILET AND BATHROOM REQUIREMENTS

Revise as follows:

[P] 1210.2.2 Walls and partitions.
Walls and partitions within 2 feet (610 mm) of service sinks, urinals and water closets shall have a smooth, hard, nonabsorbent surface, to a height of not less than 4 feet (1219 mm) above the floor, and except for structural elements, the materials used in such walls shall be of a type that is not adversely affected by moisture. Premanufactured partitions for water closets or urinals shall comply with IAPMO Z124.10.

Exception: This section does not apply to the following *buildings* and spaces:

1. *Dwelling units* and *sleeping units*.
2. Toilet rooms that are not for use by the general public and that have not more than one water closet.

Accessories such as grab bars, towel bars, paper dispensers and soap dishes, provided on or within walls, shall be installed and sealed to protect structural elements from moisture.

[P] 1210.3 Privacy.
Public restrooms shall ~~be visually screened from outside entry or exit doorways to ensure user privacy within the restroom. This provision shall also apply where mirrors would compromise personal privacy. Privacy at~~ provide privacy for water closets and urinals ~~shall be provided~~ in accordance with Sections 1210.3.1 and 1210.3.2.

~~**Exception:** Visual screening shall not be required for single-occupant toilet rooms with a lockable door.~~

[P] 1210.3.1 Water closet compartment.
Each water closet utilized by the public or employees shall occupy a separate compartment with walls or partitions and a door enclosing the fixtures to ensure privacy. Premanufactured partitions for water closets located in separate gender toilet or bathing rooms shall comply with the Type B privacy requirements of IAPMO Z124.10. Premanufactured partitions for water closets located in all gender toilet rooms shall comply with the Type A privacy requirements of IAPMO Z124.10 or the water closet shall be located in separate room with a lockable door.

Exceptions:

1. Water closet compartments shall not be required in a single-occupant toilet room with a lockable door.
2. Toilet rooms located in child day care *facilities* and containing two or more water closets shall be permitted to have one water closet without an enclosing compartment.
3. This provision is not applicable to toilet areas located within Group I-3 occupancy housing areas.

[P] 1210.3.2 Urinal partitions.
Each urinal utilized by the public or employees shall occupy a separate area with walls or partitions to provide privacy. Premanufactured partitions for urinals located in separate gender toilet or bathing rooms shall comply with the Type C privacy requirements of IAPMO Z124.10. The horizontal dimension between walls or partitions at each urinal shall be not less than 30 inches (762 mm). The walls ~~or~~

~~partitions~~ shall ~~begin at a height not more than 12 inches (305 mm) from and~~ extend not less than 60 inches (1524 mm) above the finished floor surface. The walls ~~or partitions~~ shall extend from the wall surface at each side of the urinal not less than 18 inches (457 mm) or to a point not less than 6 inches (152 mm) beyond the outermost front lip of the urinal measured from the finished backwall surface, whichever is greater. Urinals located in all gender toilet rooms shall be enclosed by premanufactured partitions complying with the Type A privacy requirements of IAPMO Z124.10 or the urinals shall be located in a separate room.

Exceptions:

1. Urinal partitions shall not be required in a single-occupant or family or assisted-use toilet room with a lockable door.
2. Toilet rooms located in child day care *facilities* and containing two or more urinals shall be permitted to have one urinal without partitions.

Add new text as follows:

IAPMO ANSI/CAN Z124.10-2022. Water Closets And Urinal Partitions

Staff Analysis: A review of the standard proposed for inclusion in the code, IAPMO ANSI/CAN Z124.10-2022, Water Closets And Urinal Partitions, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: IAPMO Z124.10 is a new standard that regulates water closet and urinal partitions. The standard was published in 2022. The standard specified three different privacy ratings. In addition, there are tests for the quality of the partition. The tests include load, coating, surface examination, subsurface, colorfastness, stain resistance, wear and cleanability, chemical resistance, and stress test to name a few.

Type A privacy partitions are intended for all gender toilet rooms and provide the highest level of privacy. The standard states the following privacy requirements, “The bottom edge of the partition including the door shall be located less than or equal to 100 mm (4 in) off the finished floor. The top edge of the partition including the door shall be located greater than or equal to 2.13 m (84 in) above the finished floor. The full height of the door to the partitions on both sides shall prevent any visual observation from the outside of the partition enclosure. Doors shall be lockable from the inside of the partition enclosure. The door locking device shall be readily distinguishable as locked from the outside of the partition enclosure.” Furthermore, the standard requires a visual indication that the compartment is occupied when the partition door lock is activated.

Type B privacy partitions are standard water closet partitions found in separate gender toilet rooms. The standard states the following for privacy, “The bottom edge of the partition including the door shall be located within 406 mm (16 in) of the finished floor. The top edge of the partition including the door shall be located greater than or equal to 1.75 m (69 in) above the finished floor. The door to the partitions shall have a maximum of 13 mm (½ in) gap between the edge of the door and the wall of the partition. Doors shall be lockable from the inside of the partition enclosure.”

Type C privacy partitions are urinal partitions. The standard specifies the following requirements, “The bottom of the urinal partition shall be located a maximum of 406 mm (16 in) above the finished floor. The top of the urinal partition shall be a minimum of 1.5 m (60 in) above the finished floor. The urinal partition shall extend a minimum of 457 mm (18 in) from the wall.”

With the increase in the number of all gender toilet rooms, it is important to have proper privacy requirements to assure both privacy and security. This proposed change will require water closets and urinals in all gender toilet rooms to be enclosed in Type A privacy partitions or be located in a separate room. This will provide the highest level of privacy and security. Because of the added high level of privacy and security, the exception to Section 1210.3 becomes unnecessary. All of the privacy requirements are listed in the following two sections.

Type B privacy partitions are standard water closet partitions found in men’s and ladies’ rooms today. However, the gap between partition sections or between the door and frame have been reduced to ½ inch. Currently, there is no regulation on the gap in partitions nor are there any regulations for the quality of the partitions.

Type C privacy partitions are urinal partitions currently found in men’s rooms. Type C partitions are only intended for separate gender toilet rooms. In all gender toilet rooms, urinals are located similar to water closets to ensure privacy.

Cost Impact: Increase

Estimated Immediate Cost Impact:

This change could increase the cost of construction $0.12 to $6.04 per partition, dependent on partition production volume. Compliance with the standard will add a cost to manufacturers for the testing and listing of partitions. That cost may or may not be added to the cost of the product.

Estimated Immediate Cost Impact Justification (methodology and variables):

If a design professional intended to select a standard partition for an all gender toilet room, this change will increase the cost of construction by mandating a higher level of privacy and security. It should be noted that manufacturers are prohibited by Federal Law to discuss prices. That being stated, one can review the cost of listing a product on-line. Compliance with the standard will add a cost to manufacturers for the testing and listing of partitions. In an attempt to find out the listing costs, one can check the ICC-ES website. The questions of what a cost of a listing is results in the following answer: Fees may vary. Contact us for a Statement of Work and/or an initial estimate. Similarly, IAPMO R&T does not publish fees. One can only request a quote for a listing. A Google search for the cost of a UL listing identified the cost as ranging between $5,000 and $50,000. Intertek advertises an annual listing fee of $6,040 for a single sanitary product, which is what a partition would likely be classified as. Hence, the exact dollar amount for a listing is unknown. That listing cost may or may not be added to the cost of the product. If it is added to the cost of the product, that additional cost will add to the cost of construction. However, manufacturers do not indicate if listing costs increase the cost of the product (construction). Hence, the impact is unknown. If one assumes the Intertek price for a listing and further assumes that the manufacturer sells 50,000 partitions a year, the increase cost of construction per partition could be assumed to be $0.12. If they only sell 1,000 partitions, the increased cost per partition would be $6.04.

Estimated Life Cycle Cost Impact:

Once installed, privacy partitions do not have any impact on life cycle costs.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

Once installed, privacy partitions do not have any impact on life cycle costs.

G28-24

G29-24

IBC: [F] 3003.1.4

Proponents: Kevin Brinkman, NEI, NEII (klbrinkman@neii.org)

THIS CODE CHANGE WILL BE HEARD BY THE FIRE CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEE.

2024 International Building Code

SECTION 3003 EMERGENCY OPERATIONS

Revise as follows:

[F] 3003.1.4 Temperature Control ~~Venting~~. Where standby power is connected to elevators~~, the machine room *ventilation* or air conditioning~~ and a temperature control means is provided per Section 3005.2, the temperature control means shall be connected to the standby power source.

Reason: To correlate the title and requirements with IBC Section 3005.2. The current titles and language are misleading because the real purpose is to provide standby power for the means to control the temperature for proper operation of the elevator equipment. This public comment to modify the proposal correlates with the public comment and proposal for IFC 604.3.4.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

There is no change in the requirement for standby power, only a clarification to better align with another section in IBC.

G29-24

IBC Structural Code Change Proposals

The following code change proposals are labeled as structural code change proposals because they are proposals for changes to sections in chapters of the International Building Code that are designated as the responsibility of the IBC-Structural Code Development Committee (see page iv of the Introductory pages of this monograph), which meets in the Group B cycle in 2025. However the changes included in this Group A code development cycle are to sections of the code that have been prefaced with a [BF], meaning that they are the responsibility of a different IBC Code Development Committee— the IBC-Fire Safety Committee [BF].

The committee assigned for each code change proposal is indicated in a banner statement near the beginning of the proposal. See the IBC-Fire Safety hearing orders.

S1-24

IBC: [BF] 1505.8

Proponents: Jonathan Roberts, UL Solutions, UL Solutions (jonathan.roberts@ul.com)

THIS CODE CHANGE WILL BE HEARD BY THE IBC - FIRE SAFETY CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2024 International Building Code

Revise as follows:

[BF] 1505.8 Building-integrated photovoltaic (BIPV) systems.
Building-integrated photovoltaic (BIPV) systems installed as the *roof covering* shall be tested, *listed*, ~~and~~ *labeled*, *and* identified with a ~~for~~ fire classification in accordance with ~~Section 1505.1~~ UL 7103. Listed systems shall be installed in accordance with the manufacturer's installation instructions and their listing. The fire classification shall comply with Table 1505.1 based on the type of construction of the building.

Reason: UL 7103 is the standard used to test and certify BIPV systems installed as the roof covering. This standard includes the fire tests in UL 790 used to establish a fire classification of Class A, B, or C. This correlates with the fire testing for rooftop mounted PV panel systems in Section 1505.9.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This clarifies the standard used to establish the fire classification for BIPV systems installed as the roof covering.

S1-24

S2-24

IBC: [BF] 1705.15, [BF] 1705.15.1, [BF] 1705.15.2, [BF] 1705.15.3, [BF] 1705.15.4, [BF] 1705.15.4.1, [BF] 1705.15.4.2, [BF] 1705.15.4.3, [BF] 1705.15.4.4, [BF] 1705.15.4.5, [BF] 1705.15.4.6, [BF] 1705.15.4.7, [BF] 1705.15.4.8, [BF] 1705.15.4.9, [BF] 1705.15.5, [BF] 1705.15.6, [BF] 1705.15.6.1, [BF] 1705.15.6.2, [BF] 1705.15.6.3, ASTM Chapter 35 (New)

Proponents: Bill McHugh, CM Services, National Fireproofing Contractors Association (bill@mc-hugh.us)

THIS CODE CHANGE WILL BE HEARD BY THE IBC - FIRE SAFETY CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2024 International Building Code

Revise as follows:

[BF] 1705.15 Sprayed fire-resistive materials (SFRM).
Special inspections and tests of *sprayed fire-resistive materials* (*SFRM*) applied to floor, roof and wall assemblies and structural members shall be performed in accordance with Sections 1705.15.1 through 1705.15.6 <u>and ASTM WK70851.</u> *Special inspections* shall be based on the fire-resistance design. as designated in the *approved construction documents* The tests set forth in this section shall be based on samplings from specific floor, roof and wall assemblies and structural members. *Special inspections* and tests shall be performed during construction with an additional visual inspection after the rough installation of electrical, *automatic sprinkler systems* , mechanical and plumbing systems and suspension systems for ceilings, and before concealment where applicable. The required sample size shall not exceed 110 percent of that specified by the referenced standards in Sections 1705.15.4.1 through 1705.15.4.9.

[BF] 1705.15.1 Physical and visual tests.
The *special inspections* and tests shall include the following to demonstrate compliance with the listing and the *fire-resistance rating*:

1. Condition of substrates.
2. Thickness of application.
3. Density in pounds per cubic foot (kg/m^3).
4. Bond strength adhesion/cohesion.
5. Condition of finished application.

[BF] 1705.15.2 Structural member surface conditions. The surfaces shall be prepared in accordance with the *approved* fire-resistance design and the written instructions of *approved* manufacturers. The prepared surface of structural members to be sprayed shall be inspected by the *special inspector* before the application of the *SFRM* .

Revise as follows:

[BF] 1705.15.3 ~~Application~~ <u>Substrate temperature verification and ventilation</u>. The substrate shall have a minimum ambient temperature before and after application as specified in the written instructions of *approved* manufacturers. The area for application shall be ventilated during and after application as required by the written instructions of *approved* manufacturers.

[BF] 1705.15.4 Thickness.
<u>*SFRM* thickness shall be no less than allowed by ASTM E605.</u> Not more than 10 percent of the thickness measurements of the *SFRM* applied to floor, roof and wall assemblies and structural members shall be less than the thickness required by the *approved* fire-resistance design, and none shall be less than the minimum allowable thickness required by Section 1705.15.4.1.

[BF] 1705.15.4.1 Minimum allowable thickness.
For design thicknesses 1 inch (25 mm) or greater, the minimum allowable individual thickness shall be the design thickness minus 1/4 inch (6.4 mm). For design thicknesses less than 1 inch (25 mm), the minimum allowable individual thickness shall be the design thickness minus 25 percent. Thickness shall be determined in accordance with ASTM E605. Samples of the *SFRM* shall be selected in accordance with Sections 1705.15.4.2 and 1705.15.4.3.

[BF] 1705.15.4.2 Floor, roof and wall assemblies.
The thickness of the *SFRM* applied to floor, roof and wall assemblies shall be determined in accordance with ASTM E605, making not less than four measurements for each 1,000 square feet (93 m^2) of the sprayed area, or portion thereof, in each *story*.

Revise as follows:

[BF] ~~1705.15.4.3 Cellular decks~~.
~~Thickness measurements shall be selected from a square area, 12 inches by 12 inches (305 mm by 305 mm) in size. Not fewer than four measurements shall be made, located symmetrically within the square area.~~

[BF] ~~1705.15.4.4 Fluted decks~~.
~~Thickness measurements shall be selected from a square area, 12 inches by 12 inches (305 mm by 305 mm) in size. Not fewer than four measurements shall be made, located symmetrically within the square area, including one each of the following: valley, crest and sides. The average of the measurements shall be reported.~~

[BF] 1705.15.4.5 Structural members.
The thickness of the *SFRM* applied to structural members shall be determined in accordance with ASTM E605. Thickness testing shall be performed in accordance with acceptance criteria in ASTM E605, or on not less than 25 percent of the structural members on each floor , whichever is greater.

[BF] ~~1705.15.4.6 Beams and girders.~~ ~~At beams and girders thickness measurements shall be made at nine locations around the beam or girder at each end of a 12-inch (305 mm) length.~~

[BF] ~~1705.15.4.7 Joists and trusses.~~ ~~At joists and trusses, thickness measurements shall be made at seven locations around the joist or truss at each end of a 12-inch (305 mm) length.~~

[BF] ~~1705.15.4.8 Wide-flanged columns.~~ ~~At wide-flanged columns, thickness measurements shall be made at 12 locations around the column at each end of a 12-inch (305 mm) length.~~

[BF] 1705.15.4.9 Hollow structural section and pipe columns. At hollow structural section and pipe columns, thickness measurements shall be made at not fewer than four locations around the column at each end of a 12-inch (305 mm) length.

[BF] 1705.15.5 Density.
The density of the *SFRM* shall be not less than the density specified in the *approved* fire-resistance design. Density of the *SFRM* shall be determined in accordance with ASTM E605. The test ~~samples~~ sample quantities for determining the density of the *SFRM* shall be selected as follows:

1. From each floor, roof and wall assembly at the rate of not less than one sample for every 2,500 square feet (232 m^2) or portion thereof of the sprayed area in each *story*.
2. From beams, girders, trusses and columns at the rate of not less than one sample for each type of structural member for each 2,500 square feet (232 m^2) of floor area or portion thereof in each *story*.

[BF] 1705.15.6 Bond strength.
The cohesive/adhesive bond strength of the cured *SFRM* applied to floor, roof and wall assemblies and structural members shall be not less than 150 pounds per square foot (psf) (7.18 kN/m^2) for buildings with occupied floors up to 75' (22.86 m) above lowest fire department access. For buildings greater with occupied floors equal to or greater than 75' (22.86 m) above lowest fire department access shall be installed in accordance with bond strengths as listed in Table 403.2.3. The cohesive/adhesive bond strength shall be determined in accordance with the field test specified in ASTM E736 by testing in-place samples of the *SFRM* selected in accordance with Sections 1705.15.6.1 through 1705.15.6.3.

[BF] 1705.15.6.1 Floor, roof and wall assemblies. The test samples for determining the cohesive/adhesive bond strength of the *SFRM* shall be selected from each floor, roof and wall assembly at the rate of not less than one sample for every 2,500 square feet (232 m^2) of the sprayed area, or portion thereof, in each *story*.

[BF] 1705.15.6.2 Structural members. The test samples for determining the cohesive/adhesive bond strength of the *SFRM* shall be selected from beams, girders, trusses, columns and other structural members at the rate of not less than one sample for each type of structural member for each 2,500 square feet (232 m^2) of floor area or portion thereof in each *story* .

[BF] 1705.15.6.3 Primer, paint and encapsulant bond tests. Bond tests to qualify a primer, paint or encapsulant shall be conducted where the *SFRM* is applied to a primed, painted or encapsulated surface for which acceptable bond-strength performance between these coatings and the *SFRM* has not been determined. A bonding agent approved by the *SFRM* manufacturer shall be applied to a primed, painted or encapsulated surface where the bond strengths are found to be less than required values.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

WK70851	New Practice for Standard Practice for the On-Site Inspection of Installed Spray-Applied Fire Resistive Materials

Staff Analysis: A review of the new standard proposed for inclusion in the code, ASTM WK70851 *New Practice for Standard Practice for the On-Site Inspection of Installed Spray-Applied Fire Resistive Materials*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: This change deals with Spray Fire-Resistive Material installation special inspections. The proposal's purpose is threefold.

1. Introduce a new ASTM document to SFRM Special Inspection, WK70851 Practice for On-Site Inspection of Installed Spray Fire-Resistive Materials.
2. Clean up the language so that it speaks more inspection than application.
3. Eliminate duplications from IBC 1705.15 code sections and ASTM E605 and E736, standards. Where there was duplicate language from ASTM E605 or ASTM E736, the duplications were deleted from the code. Where the code acceptance criteria is more stringent than the inspection practices/standards, the code requirement language is retained.

The ICC Adhoc Committee on Terrorism Resistant Buildings (ICC TRB) added several items to this section to provide performance of installed SFRM fireproofing during the building life cycle. In preparing this proposal, we respected that legacy and left the increased inspection over and above the ASTM E605 and ASTM E736 alone.

In the interest of making this review easier, we kept several sections in the proposal that had no changes for easy reference and comparison of the code change to existing text. We have also highlighted below the changes and a short reason for each change.

- 1705.15 – Inserted new ASTM Work Item, practice for SFRM inspections on jobsites.
- 1705.15.1 – No change. It’s important charging language.
- 1705.15.2 – No change.
- 1705.15.3 – Changed title from Application to Substrate temperature verification and ventilation, to reflect that the inspection standard is an inspection standard, not an application standard.
- 1705.15.4 – Thickness, added in the charging language that the inspection thicknesses are not less than what is in ASTM E605, and left the rest of the section alone, which is not in E605.
- 1705.15.4.1 – Minimum allowable thickness. No change, as the code is more restrictive than the E605.
- 1705.15.4.2 – No change, as the code is more restrictive than the E605.
- 1705.15.4.3 – Cellular decks, deleted, the section is duplicated in E605.
- 1705.15.4.4 – Fluted Decks, deleted, the section is duplicated in E605.
- 1705.15.4.5 – Structural Members – Slight change, that the measurement is to be in accordance with E605 or the code, whichever is greater. The code is more restrictive than the E605.
- 1705.15.4.6 – Beams and girders, deleted, duplicated in E605
- 1705.15.4.7 – Joists and trusses, deleted, duplicated in E605
- 1705.15.4.8 – Wide Flanged Columns - deleted, duplicated in E605…a wide flange column is a column, and all thicknesses for

columns regardless of size are measured the same.

- 1705.15.4.9 – Hollow Structural section and pipe columns – not in E605, no change.
- 1705.15.5 – Density – slight edit, 'sample quantities', and left sample quantity at the more stringent code mandated amount.
- 1705.15.6 – Bond Strength – Added reference to table 403.2.3 for inspection, highlighting differences of bond strength for buildings between 0-74', 75'-420' and 420'+ in height. The bond strength issue was found by the ICC TRB to be a significant factor in SFRM being able to stay on substrates for the life of the building, hence the 430 PSF and 1,000 PSF that exists in the code today.
- 1705.15.6.1 – Floor, roof and wall assy. - No change, code more stringent than E736 standard.
- 1705.15.6.2 – Structural members - No change, code more stringent than E736 standard.
- 1705.15.6.3 – Primer, paint and encapsulant bond strength - No change, this section is not in E736.

As the ASTM SFRM inspection practice evolves and creates more duplications between the code and the standards, we'll propose more deletions at that time.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is not a change in requirements to SFRM Special Inspection procedures. The new WK 70851 Practice for the On-Site Inspection of Installed Spray Fire-Resistive Materials actually adds text making the administration of the inspection easier for jurisdictions.

The result of the code change should be that the inspection requirements are easier to handle for all involved, inspection agency, building official and contractors involved with inspections.

S2-24

S3-24

IBC: [BF] 1705.15

Proponents: Bill McHugh, CM Services, National Fireproofing Contractors Association (bill@mc-hugh.us)

THIS CODE CHANGE WILL BE HEARD BY THE IBC - FIRE SAFETY CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2024 International Building Code

Revise as follows:

[BF] 1705.15 Sprayed fire-resistive materials (SFRM).
Special inspections and tests of *sprayed fire-resistive materials* (*SFRM*) applied to floor, roof and wall assemblies and structural members shall be performed in accordance with Sections 1705.15.1 through 1705.15.6. *Special inspections* shall be based on the fire-resistance design as designated in the *approved construction documents* <u>and manufacturers installation instructions</u>. The tests set forth in this section shall be based on samplings from specific floor, roof and wall assemblies and structural members. *Special inspections* and tests shall be performed during construction with an additional visual inspection after the rough installation of electrical, *automatic sprinkler systems* , mechanical and plumbing systems and suspension systems for ceilings, and before concealment where applicable. The required sample size shall not exceed 110 percent of that specified by the referenced standards in Sections 1705.15.4.1 through 1705.15.4.9.

Reason: The reason for this proposal is to be consistent with what is stated in Chapter 7 - in two sections - 703.12.1 and 703.12.2 clearly. SFRM installation to achieve a fire-resistance-rating is in accordance with the listing (704.12.2) and the manufacturers installation instructions 704.12.2).

The inspection needs to be in accordance with both the listing and manufacturers instructions as well. Many details needed for installation and inspection are found on the manufacturers installation instructions. Surface preparation, temperature, ventilation air changes per hour, and much more is found in the manufacturers instructions and not in the listings.

In Section 1705.15,3, there is a directive to check ambient temperatures and air changes per hour. That information is found on the manufacturers installation instructions, not the listing.

The manufacturers installation instructions need to be listed in the charging language of this section to be consistent with Chapter 7 and Chapter 17 requirements.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is meant to clarify what's required in the code so it matches what is done in the field. That's why there is no impact on the cost of construction.

S3-24

S4-25

IBC: 1705.17 (New), ASTM Chapter 35 (New)

Proponents: Bill McHugh, CM Services, National Fireproofing Contractors Association (bill@mc-hugh.us)

THIS CODE CHANGE WILL BE HEARD BY THE IBC - FIRE SAFETY CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2024 International Building Code

Add new text as follows:

1705.17 Board and Wrap Fire-Resistive Materials. *Special inspections* and tests for board and wrap fire-resistive materials applied to structural elements and decks shall be performed in accordance with ASTM WK70807. *Special inspections* and tests shall be based on the fire-resistance design as designated in the *approved construction documents* and the manufacturers installation instructions. *Special inspections* and tests shall be performed during construction. Additional visual inspection shall be performed after the rough installation and, where applicable, prior to the concealment of electrical, automatic sprinkler, mechanical and plumbing systems.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

WK70807	New Practice for the On-Site Inspection of Installed Board and Wrap Type Fireproofing

Staff Analysis: A review of the new standard proposed for inclusion in the code, ASTM WK70807 *New Practice for the On-Site Inspection of Installed Board and Wrap Type Fireproofing*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: For decades, there has been special inspection for Spray Fire-Resistive Materials (SFRM) and Intumescent Fire-Resistive Materials (IFRM). However, board and wrap materials used for fireproofing structural building elements and assemblies have not been specifically named in their own section. The only place to find where special inspection for these materials might be is in section 1705.1 General. In 1705.1, General, it seems to assume that these items would get special inspections.

1705.1.1 Special cases. *Special inspections and tests shall be required for proposed work that is, in the opinion of the building official, unusual in its nature, such as, but not limited to, the following examples:*

1. Construction materials and systems that are alternatives to materials and systems prescribed by this

code.

2. Unusual design applications of materials described in this code.

3. Materials and systems required to be installed in accordance with additional manufacturer's instructions

that prescribe requirements not contained in this code or in standards referenced by this code

In section 1705.1.1(1) the IBC states 'alternatives to materials and systems prescribed in the code' should also get special inspections. Boards and wraps come in various types.

The board materials used can include gypsum panels, calcium silicate, mineral wool, composite metals with ceramic filling, or ceramic fiber type board protection. Wraps include ceramic fiber insulation, endothermic wraps. The common element of these is that they are installed in accordance with a listing and manufacturer's installation instructions to result in a fire-resistance-rated building element or assembly.

This new section is needed to assure fire-resistance and structural integrity is maintained during fire conditions regardless of material type.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This code change is adding a standard practice to the code that regulates how the inspection is conducted - that is already done. Based on section 1705.1.1, Special Cases, the materials are alternatives to materials and systems prescribed in the code.

S4-25

S5-24

IBC: [BF] 1705.16, ASTM Chapter 35 (New)

Proponents: Bill McHugh, CM Services, National Fireproofing Contractors Association (bill@mc-hugh.us)

THIS CODE CHANGE WILL BE HEARD BY THE IBC - FIRE SAFETY CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2024 International Building Code

Revise as follows:

[BF] 1705.16 Intumescent fire-resistive materials.
Special inspections and tests for *intumescent fire-resistive materials* applied to structural elements and decks shall be performed in accordance with ASTM WK70852 ~~AWCI 12-B~~. *Special inspections* and tests shall be based on the fire-resistance design as designated in the *approved construction documents*. *Special inspections* and tests shall be performed during construction. Additional visual inspection shall be performed after the rough installation and, where applicable, prior to the concealment of electrical, automatic sprinkler, mechanical and plumbing systems.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

WK70852 New Practice for the On-Site Inspection of Installed Intumescent Fire Resistive Materials

Staff Analysis: A review of the new standard proposed for inclusion in the code, ASTM WK70852 *New Practice for the On-Site Inspection of Installed Intumescent Fire Resistive Materials*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: For decades, there has been special inspection required in IBC's Chapter 17 for Intumescent Fire-Resistive Materials (IFRM). A new industry consensus standard is being balloted at E06 Main Committee, on its last few negatives. The consensus standard, ASTM, WK 70852, Practice for On-Site Inspection of Installed Intumescent Fire-Resistive Material, has been collaboratively developed with input from many stakeholders. When the standard is approved, we will submit a floor modification to insert the new standard number.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This code change will have no effect on the cost of construction. The methods used are similar to what is currently written in the code.

S5-24

S6-24

IBC: [BF] 1705.18, [BF] 1705.18.1, [BF] 1705.18.2 (New)

Proponents: William Koffel, Koffel Associates, Inc., Firestop Contractors International Association (FCIA) (wkoffel@koffel.com)

THIS CODE CHANGE WILL BE HEARD BY THE IBC - FIRE SAFETY CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2024 International Building Code

[BF] 1705.18 Fire-resistant penetrations and joints.
In *high-rise buildings*, in *buildings* assigned to *Risk Category* III or IV, or in *fire areas* containing Group R occupancies with an *occupant load* greater than 250*, special inspections* for *through-penetrations*, *membrane penetration firestops*, *fire-resistant joint systems* and perimeter fire containment systems that are tested and *listed* in accordance with Sections 714.4.1.2, 714.5.1.2, 715.3.1 and 715.4 shall be in accordance with Section 1705.18.1 or 1705.18.2.

[BF] 1705.18.1 Penetration firestops.
Inspections of *penetration firestop* systems that are tested and *listed* in accordance with Sections 714.4.1.2 and 714.5.1.2 shall be conducted by an *approved agency* in accordance with ASTM E2174.

Add new text as follows:

[BF] 1705.18.3 Qualifications. Special inspectors who perform *special inspections* of *penetration firestop systems* and *fire-resistant joint systems* shall have expertise in listings and manufacturer's installation instructions, demonstrated by passing a firestop examination conducted by a Nationally Recognized Testing Laboratory, trade-association, or an *approved* equivalent.

Reason: Special inspections for fire-resistant penetrations, joints, and voids have been required by the IBC since the 2012 version of the Code. Firestopping used to protect breaches in penetrations or joints is complex to install and inspect. Firestopping installations are typically installed in accordance with listings from nationally recognized testing laboratories and manufacturer's installation instructions. It is very different from other construction disciplines in that the listings dictate and there are no deviations allowed.

Firestop installation contractors understand listings and manufacturers installation instructions. Therefore, it is critical that the approved inspection agency’s inspectors have exceptional knowledge of the same systems being installed. There are firestop exams offered by Nationally Recognized Testing Laboratories, trade-associations and states.

It is important that the firestopping be installed in accordance with the listing and manufacturer’s instructions to protect people in buildings. This proposal provides assurance that the inspector has proven, quantified knowledge to efficiently analyze the firestop installation contractor’s work – and judge it acceptable or unacceptable.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Many special inspectors for fire-resistant penetrations and joints have already passed an examination and many design professionals and code officials are requiring some documentation that the special inspector. If anything, competent special inspectors may decrease the cost of construction by avoiding remediation actions that have been required by special inspectors who are not competent.

S6-24

S7-24

IBC: [BF] 2303.2, [BF] 2303.2.1, 2303.2.2 (New), [BF] 2303.2.2, [BF] 2303.2.3, [BF] 2303.2.4, [BF] 2303.2.5, 2303.2.6, 2303.2.6.1, 2303.2.6.2, 2303.2.6.3, [BF] 2303.2.7, 2303.2.8, 2303.2.9, 2303.2.10

Proponents: Marcelo Hirschler, GBH International, GBH International (mmh@gbhint.com)

THIS CODE CHANGE WILL BE HEARD BY THE IBC - FIRE SAFETY CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2024 International Building Code

[BF] 2303.2 Fire-retardant-treated wood.
Fire-retardant-treated wood is any wood product that, when impregnated with chemicals by a pressure process or other means during manufacture, shall have, when tested in accordance with ASTM E84 or UL 723, a *listed flame spread index* of 25 or less. The ASTM E84 or UL 723 test shall be continued for an additional 20-minute period and the flame front shall not progress more than 10.5 feet (3200 mm) beyond the centerline of the burners at any time during the test.

[BF] 2303.2.1 Alternate fire testing.
Fire-retardant-treated wood is also any wood product that, when impregnated with chemicals by a pressure process or other means during manufacture, shall have, when tested in accordance with ASTM E2768, a *listed flame spread index* of 25 or less and where the flame front does not progress more than 10.5 feet (3200 mm) beyond the centerline of the burners at any time during the test.

Add new text as follows:

2303.2.2 Specimen preparation and mounting. When testing a wood product for compliance with Section 2303.2 or with Section 2303.2.1, specimen preparation and mounting shall be in accordance with ASTM E2579.

Revise as follows:

[BF] ~~2303.2.2~~ 2303.2.3 Pressure process.
For wood products impregnated with chemicals by a pressure process, the process shall be performed in closed vessels under pressures not less than 50 pounds per square inch gauge (psig) (345 kPa).

[BF] ~~2303.2.3~~ 2303.2.4 Other means during manufacture.
For wood products impregnated with chemicals by other means during manufacture, the treatment shall be an integral part of the manufacturing process of the wood product. The treatment shall provide permanent protection to all surfaces of the wood product. The use of paints, coating, stains or other surface treatments is not an *approved* method of protection as required in this section.

[BF] ~~2303.2.4~~ 2303,2,5 Fire testing of wood structural panels.
Wood structural panels shall be tested with a ripped or cut longitudinal gap of $^1/_8$ inch (3.2 mm).

[BF] ~~2303.2.5~~ 2303.2.6 Labeling.
In addition to the labels required in Section 2303.1.1 for sawn lumber and Section 2303.1.5 for *wood structural panels*, each piece of fire-retardant-treated lumber and *wood structural panels* shall be *labeled*. The *label* shall contain the following items:

1. The identification *mark* of an *approved agency* in accordance with Section 1703.5.
2. Identification of the treating manufacturer.
3. The name of the fire-retardant treatment.
4. The species of wood treated.
5. *Flame spread* and *smoke-developed index*.
6. Method of drying after treatment.

7. Conformance with appropriate standards in accordance with Sections ~~2303.2.6 through 2303.2.9~~ 2303.2.7 through 2303.2.10.
8. For *fire-retardant-treated wood* exposed to weather, damp or wet locations, include the words "No increase in the *listed* classification when subjected to the Standard Rain Test" (ASTM D2898).

~~2303.2.6~~ 2303.2.7 Design values.

Design values for *fire-retardant-treated wood*, including connection design values, shall be subject to all adjustments applicable to untreated wood as specified in this chapter and shall be further adjusted to account for the effects of the fire-retardant treatment. Adjustments to design values for the effects of the fire-retardant treatment shall be based on an *approved* method of investigation that takes into consideration the anticipated temperature and humidity to which the *fire-retardant-treated wood* will be subjected, the type of treatment and redrying procedures. Adjustments to flexural design values for fire-retardant-treated plywood shall be determined in accordance with Section 2303.2.7.1 ~~2303.2.6.1~~. Adjustments to flexural, tension, compression and shear design values for fire-retardant-treated lumber shall be determined in accordance with Section 2303.2.7.2 ~~2303.2.6.2~~. Design values and treatment adjustment factors for fire-retardant-treated laminated veneer lumber shall be determined in accordance with Section 2303.2.7.3 ~~2303.2.6.3~~.

~~2303.2.6.1~~ 2303.2.7.1 Fire-retardant-treated plywood.

The effect of treatment and redrying after treatment, and any treatment-based effects due to exposure to high temperatures and high humidities on the flexure properties of fire-retardant-treated softwood *plywood* shall be determined in accordance with ASTM D5516. The test data developed in accordance with ASTM D5516 shall be used to develop treatment adjustment factors in accordance with ASTM D6305. Each manufacturer shall publish the allowable maximum *loads* and spans for service as floor and roof sheathing for its treatment based on the adjusted design values and taking into account the climatological location.

~~2303.2.6.2~~ 2303.2.7.2 Fire-retardant-treated lumber.

For each species of wood that is treated, the effect of treatment and redrying after treatment and any treatment-based effects due to exposure to high temperatures and high humidities on the allowable design properties of fire-retardant-treated lumber shall be determined in accordance with ASTM D5664. The test data developed in accordance with ASTM D5664 shall be used to develop treatment adjustment factors for use at or near room temperature and at elevated temperatures and humidity in accordance with ASTM D6841. Each manufacturer shall publish the treatment adjustment factors for service at maximum temperatures of not less than 80°F (27°C) and for roof framing. The roof framing modification factors shall take into consideration the climatological location.

~~2303.2.6.3~~ 2303.2.7.3 Fire-retardant-treated laminated veneer lumber.

The effect of treatment and redrying after treatment and any treatment-based effects due to exposure to high temperatures and high humidities on the allowable design properties of fire-retardant-treated laminated veneer lumber shall be determined in accordance with ASTM D8223. Each manufacturer shall publish reference design values and treatment-based design value adjustment factors in accordance with ASTM D8223, taking into account the climatological location.

[BF] ~~2303.2.7~~ 2303.2.8 Exposure to weather, damp or wet locations.

Where *fire-retardant-treated wood* is exposed to weather, or damp or wet locations, it shall be identified as "Exterior" to indicate there is no increase in the *listed flame spread index* as defined in Section 2303.2 when subjected to ASTM D2898.

~~2303.2.8~~ 2303.2.9 Interior applications.

Interior *fire-retardant-treated wood* shall have moisture content of not over 28 percent when tested in accordance with ASTM D3201 procedures at 92-percent relative humidity. Interior *fire-retardant-treated wood* shall be tested in accordance with Section 2303.2.7.1 or 2303.2.7.2 ~~2303.2.6.1 or 2303.2.6.2~~. Interior *fire-retardant-treated wood* designated as Type A shall be tested in accordance with the provisions of this section.

~~2303.2.9~~ 2303.2.10 Moisture content.

Fire-retardant-treated wood shall be dried to a moisture content of 19 percent or less for lumber and 15 percent or less for *wood structural panels* before use. For wood kiln-dried after treatment (KDAT), the kiln temperatures shall not exceed those used in kiln drying the lumber and *plywood* submitted for the tests described in Section 2303.2.7.1 ~~2303.2.6.1~~ for *plywood* and 2303.2.7.2 ~~2303.2.6.2~~ for lumber.

~~2303.2.10~~ 2303.2.11 Types I and II construction applications.
See Section 603.1 for limitations on the use of *fire-retardant-treated wood* in *buildings* of Type I or II construction.

Reason: It is important to clarify the method by which ASTM E84 or ASTM E2768 FRTW specimens are to be prepared and mounted as this has been an item of debate and clarifying this is consistent with the way such mounting practices are referenced in other code locations. ASTM E2579 is the appropriate standard practice for specimen preparation and mounting of wood products, including fire-retardant treated wood. It has been shown that different testing labs have been using different mounting methods for this purpose. Note that ASTM E2579 is a mounting practice that is already referenced in the IBC in chapter 8 (section 803.11) for testing laminated products factory produced with a wood substrate.

Note that this proposal adds a new section while not deleting any existing sections.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The code is silent on the mounting method and clarification is important.

S7-24

S8-24

IBC: [BF] 2510.6, [BF] 2510.6.1, [BF] 2510.6.2, TABLE 2510.6 (New)

Proponents: Michael Gardner, MGardnerServices, LLC, Wall and Ceiling Conference (michael@mgardnerservices.com); Don Allen, Association of the Wall and Ceiling Industry (AWCI) (allen@awci.org)

THIS CODE CHANGE WILL BE HEARD BY THE IBC - FIRE SAFETY CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2024 International Building Code

Revise as follows:

[BF] 2510.6 Water-resistive barriers.
Water-resistive barriers shall be installed as required in Section 1403.2 and shall comply with one of the methods in Table 2510.6 as prescribed by the appropriate climate regime. A means of drainage shall be installed with the *water-resistive barrier* where required by Table 2510.6.~~Section 2510.6.1 or 2510.6.2.~~

Exception: Table 2510.6 ~~Sections 2510.6.1 and 2510.6.2~~ shall not apply to construction where accumulation, condensation or freezing of moisture will not damage the materials.

Delete and substitute as follows:

~~**[BF] 2510.6.1 Dry climates.**~~
~~One of the following shall apply for dry (B) climate zones:~~

1. ~~The *water-resistive barrier* shall be two layers of 10-minute Grade D paper or have a water resistance equal to or greater than two layers of *water-resistive barrier* complying with ASTM E2556, Type I. The individual layers shall be installed independently such that each layer provides a separate continuous plane and any flashing, installed in accordance with Section 1404.4 and intended to drain to the *water-resistive barrier*, is directed between the layers.~~
2. ~~The *water-resistive barrier* shall be 60-minute Grade D paper or have a water resistance equal to or greater than one layer of *water-resistive barrier* complying with ASTM E2556, Type II. The *water-resistive barrier* shall be separated from the stucco by a layer of foam plastic insulating sheathing or other nonwater absorbing layer, or a drainage space or means of drainage complying with Section 2510.6.2. Flashing installed in accordance with Section 1404.4 and intended to drain to the *water-resistive barrier* shall be directed to the exterior side of the *water-resistive barrier*.~~

[BF] 2510.6.1 .
Installation. Where 2-layer *water-resistive barrier* systems are installed in compliance with Table 2510.6 without a supplemental material or drainage space, the individual layers shall be installed such that each layer creates a separate continuous plane and any flashing installed, in accordance with Section 1404.4 and intended to drain to the *water-resistive barrier*, is directed between the layers. Where a drainage space is incorporated in the assembly, flashing installed in accordance with Section 1404.4 and intended to drain to the *water-resistive barrier* shall be directed to the exterior side of the *water-resistive barrier*.

Delete without substitution:

~~**[BF] 2510.6.2 Moist or marine climates.**~~
~~In moist (A) or marine (C) climate zones, *water-resistive barrier* shall comply with one of the following:~~

1. ~~In addition to complying with Item 1 or 2 of Section 2510.6.1, a space or drainage material not less than $^3/_{16}$ inch (4.8 mm) in depth shall be applied to the exterior side of the *water-resistive barrier*.~~

2. ~~In addition to complying with Item 2 of Section 2510.6.1, drainage on the exterior side of the *water-resistive barrier* shall have a minimum drainage efficiency of 90 percent as measured in accordance with ASTM E2273 or Annex A2 of ASTM E2925.~~

Add new text as follows:

TABLE 2510.6 WATER-RESISTIVE BARRIER METHODS FOR CEMENT PLASTER (STUCCO)

CLIMATE REGIME	METHOD	WATER-RESISTIVE BARRIER (WRB)	SUPPLEMENTAL MATERIAL REQUIRED OVER WRB	MEANS OF DRAINAGE
DRY (B)	D1	2 layers 10-minute Grade D paper or 2-layers ASTM E2556 Type I material or equivalent	No supplemental material required	No drainage space required
DRY (B)	D2	One layer 60-minute grade D paper or one layer ASTM E2556 Type II material or equivalent	Foam plastic insulated sheathing or other non-water absorbing material	No drainage space required
DRY (B)	D3	One layer 60-minute grade D paper or one layer ASTM E2556 Type II material or equivalent	No supplemental material required	Drainage space required
DRY (B)	D4	One layer 60-minute grade D paper or one layer ASTM E2556 Type II material or equivalent	No supplemental material required	Designed drainage system with drainage efficiency of not less than 90% per ASTM E2273 or Annex A2 of ASTM E2925
MOIST (A) OR MARINE (C)	M1	2 layers 10-minute Grade D paper or 2-layers ASTM E2556 Type I material or equivalent	No supplemental material required	Drainage space or drainage material not less than 3/16 in. (4.6mm) in depth
MOIST (A) OR MARINE (C)	M2	One layer 60-minute grade D paper or one layer ASTM E2556 Type II material or equivalent	Foam plastic insulated sheathing or other non-water absorbing material	Drainage space or drainage material not less than 3/16 in. (4.6mm) in depth
MOIST (A) OR MARINE (C)	M3	One layer 60-minute grade D paper or one layer ASTM E2556 Type II material or equivalent	Foam plastic insulated sheathing or other non-water absorbing material	Designed drainage system with drainage efficiency of not less than 90% per ASTM E2273 or Annex A2 of ASTM E2925

Staff Analysis: CC# S8-24 and CC# S9-24 addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

Reason: The text in Section 2510.6.2. overlays on the concepts in Section 2510.6.1. The migration between the two sections is, unfortunately, not fully clear in every instance. As an example, when Section 2510.6.1. option 2 refers to Section 2150.6.2., it creates a scenario that permits a drainage space to be used as a means of drainage but does not clearly define the size of the drainage space, permitting both an undefined and a specifically width-defined drainage space. That is not the intent of the original language.

In addition, three years of experience with the current text has revealed issues with user understanding of the progressive nature of the text format, so a clearer presentation incorporating a table is suggested.

This proposal clarifies the existing language as noted and places the specific water-resistant barrier and drainage requirements in existing Sections 2510.6.1. and 2510.6.2. into a table, so that the requirements for compliance are more easily understood. It retains specific language not appropriate for a table in Section 2510.6.1. while moving specific requirements from that section into the table. All of the existing language in Section 2510.6.2. is moved into the same table. The proposal does not intend to add any new concepts to Section 2510.6.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposal clarifies some prescriptive language requirements and re-formats the text into a table. It makes no technical changes to the content.

S8-24

S9-24

IBC: SECTION 202 (New), [BF] 2510.6, [BF] 2510.6.1, [BF] 2510.6.2, 2510.6.1 (New), 2510.6.2 (New), 2510.6.3 (New), TABLE 2510.6 (New)

Proponents: Jay Crandell, P.E., ABTG / ARES Consulting, Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz)

THIS CODE CHANGE WILL BE HEARD BY THE IBC - FIRE SAFETY CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2024 International Building Code

Add new definition as follows:

STUCCO BOND BREAK. A substantially nonwater-absorbing layer placed directly behind stucco to prevent adhesion of the stucco to the surface of the *water-resistive barrier*, to serve as a protective layer over the *water-resistive barrier*, to provide a capillary break, and to promote drainage; examples include 10-min Grade D paper, No.15 felt, foam plastic insulating sheathing, polymeric building wraps, and other similar materials.

DRAINAGE PLANE. A continuous surface within a building assembly, such as created by a *water-resistive barrier* and flashing, installed in a manner that is capable of draining water by gravity flow downward and to the exterior.

DRAINAGE SPACE. A cavity in an *exterior wall* assembly, located between the *water-resistive barrier* and other exterior materials such as cladding or *stucco bond break*, used to enhance the drainage performance of the *drainage plane*.Examples include cavities formed by a furred gap, channels, a porous material or matrix, or other means to enhance drainage performance.

Revise as follows:

[BF] 2510.6 Water-resistive barriers.
A w~~W~~ater-resistive barrier~~s~~,a *stucco bond break*, and a means of drainage shall be provided in accordance with one of the methods in Table 2510.6 or an *approved design* complying with Section 1402.2. ~~shall be installed as required in Section 1403.2 and shall comply with Section 2510.6.1 or 2510.6.2.~~

Exception: ~~Sections 2510.6.1 and 2510.6.2 shall not apply to c~~Construction where accumulation, condensation or freezing of moisture will not damage the materials.

Delete without substitution:

~~**[BF] 2510.6.1 Dry climates.**~~
~~One of the following shall apply for dry (B) climate zones:~~

1. ~~The *water-resistive barrier* shall be two layers of 10-minute Grade D paper or have a water resistance equal to or greater than two layers of *water-resistive barrier* complying with ASTM E2556, Type I. The individual layers shall be installed independently such that each layer provides a separate continuous plane and any flashing, installed in accordance with Section 1404.4 and intended to drain to the *water-resistive barrier*, is directed between the layers.~~
2. ~~The *water-resistive barrier* shall be 60-minute Grade D paper or have a water resistance equal to or greater than one layer of *water-resistive barrier* complying with ASTM E2556, Type II. The *water-resistive barrier* shall be separated from the stucco by a layer of foam plastic insulating sheathing or other nonwater absorbing layer, or a drainage space or means of drainage complying with Section 2510.6.2. Flashing installed in accordance with Section 1404.4 and intended to drain to the *water-resistive barrier* shall be directed to the exterior side of the *water-resistive barrier*.~~

~~**[BF] 2510.6.2 Moist or marine climates.**~~
~~In moist (A) or marine (C) climate zones, *water-resistive barrier* shall comply with one of the following:~~

1. ~~In addition to complying with Item 1 or 2 of Section 2510.6.1, a space or drainage material not less than 3/16 inch (4.8 mm) in depth shall be applied to the exterior side of the *water-resistive barrier*.~~
2. ~~In addition to complying with Item 2 of Section 2510.6.1, drainage on the exterior side of the *water-resistive barrier* shall have a minimum drainage efficiency of 90 percent as measured in accordance with ASTM E2273 or Annex A2 of ASTM E2925.~~

Add new text as follows:

2510.6.1 Installation. The *water-resistive barrier* shall be installed in accordance with Section 1403.2. The *water-resistive barrier*, *stucco bond break*, and means of drainage as required by Table 2510.6 shall be installed such that a continuous *drainage plane* is maintained. Water shall be directed to the exterior at the base of the stucco application and at any transition between building stories or other conditions where the *drainage plane* or *drainage space* terminates.

2510.6.2 Combination of materials. Materials or systems that create a continuous plane and combine functions of *water-resistive barrier*, *stucco bond break*, or *drainage space* shall be permitted.

2510.6.3 Flashing. Flashing installed in accordance with Section 1404.4 and intended to drain to the *water-resistive barrier*, shall be directed to the *drainage plane* on the exterior side of the *water-resistive barrier*.

TABLE 2510.6 WATER-RESISTIVE BARRIER, STUCCO BOND BREAK, AND MEANS OF DRAINAGE FOR EXTERIOR PLASTER (STUCCO)

MOISTURE REGIME[a]	METHOD	WATER-RESISTIVE BARRIER (WRB)	STUCCO BOND BREAK (SBB)	MEANS OF DRAINAGE
Dry (B)	D1	10-minute Grade D paper or WRB with water resistance equal to or greater than one layer of ASTM E2556, Type I	10-minute Grade D paper or any material meeting definition of a *stucco bond break*	*Drainage plane* is located between adjacent WRB and SBB layers. *Drainage space* separating the layers not required
	D2	60-minute Grade D paper or WRB with water resistance equal to or greater than one layer of ASTM E2556, Type II	Foam plastic insulating sheathing or other nonwater-absorbing material meeting definition of a *stucco bond break*	
	D3		Not Required	*Drainage space* with means to separate stucco from direct contact with WRB
Moist (A) and Marine (C)[b]	M1	10-minute Grade D paper or WRB with water resistance equal to or greater than one layer of ASTM E2556, Type I	10-minute Grade D paper or any material meeting definition of a *stucco bond break*	*Drainage space* with min 3/16-inch (4.6 mm) depth
	M2	60-minute Grade D paper or WRB with water resistance equal to or greater than one layer of ASTM E2556, Type II	Foam plastic insulating sheathing or other nonwater-absorbing material meeting definition of a *stucco bond break*	
	M3		Not Required	*Drainage space* with min. 3/16-inch (4.6 mm) depth and means to separate stucco from direct contact with WRB
	M4	60-minute Grade D paper or WRB with water resistance equal to or greater than one layer of ASTM E2556, Type II	Foam plastic insulating sheathing or other nonwater-absorbing material meeting definition of a *stucco bond break*	Drainage plane or drainage space with drainage efficiency of at least 90% per ASTM E2273 or Annex A2 of ASTM E2925

a. The appropriate moisture regime shall be selected in accordance with Chapter 3 of the *International Energy Conservation Code.*

b. Requirements for Moist (A) and Marine (C) moisture regimes shall be permitted to be applied in the Dry (B) moisture regime.

Staff Analysis: CC# S8-24 and CC# S9-24 addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

Reason: The previous two code cycles resulted in technical improvements to Section 2510.6 to address water management of conventional 3-coat stucco installations in moist (A) and marine (C) climate regimes. However, these changes brought about increased complexity of the provisions that vary based on wall assembly conditions and climate conditions with options and requirements that are cross-referenced between the two subsections (existing 2510.6.1 and 2510.6.2 shown as deleted). This formatting approach made determining a particular solution difficult and confusing. Therefore, this proposal clarifies the existing technical requirements and options by making them more “visual” in a table format without changing the technical intent of the code. The multiple requirements and inter-related options of Sections 2510.6.1 and 2510.6.2 (deleted) are now incorporated in Table 2510.6 in a straightforward manner. Also, new definitions for “STUCCO BOND BREAK”, “DRAINAGE PLANE”, and “DRAINAGE SPACE” are provided to facilitate clarity and accuracy in code reading and understanding of different components (and their functions) currently required for 3-coat stucco applications but vaguely described within the code text. The drainage plane and drainage space definitions can also be used for other exterior wall covering applications in the code.

Beyond the overall formatting changes and definitions described above, some specific clarifications addressed by this proposal are as follows:

Section 2510.6 Water-resistive barriers.

New Table 2510.6 is referenced for requirements instead of the existing two subsections (proposed for deletion). The ability to use an approved design is also provided as a clarification that other solutions than identified in this section and Table 2510.6 are possible.

Section 2510.6.1 Installation. This new subsection consolidates installation requirements that were not addressed consistently across the existing code subsections 2510.6.1 and 2510.6.2. Also, a sentence is added to require drainage to the exterior at the base of the stucco application and at transitions between stories or other conditions where the drainage plane or drainage space terminates. This was based on stucco performance field research in Florida (see Bibliography).

Section 2510.6.2 Combination of Materials. This new subsection clarifies that materials which combine the required functions into a single product can be used rather than having to provide each of the required functions by separate materials. While this may be implied, the intent is to clarify it for transparency and to avoid different interpretations on this matter.

Section 2510.6.3 Flashing. This new subsection simply captures existing code content related to installation of flashing and its integration with the intended drainage plane.

Table 2510.6. This new table replaces the inter-twined and cross-referenced requirements of existing subsections 2510.6.1 and 2510.6.2 (shown as deleted). The requirements of these subsections are now mapped in Table 2510.6 as distinctly different solutions or methods for combining the various required components and options for those components (one combination of components is shown for each row of the table). Therefore, the user simply determines the correct climate “moisture regime” (see footnote a) and then selects an appropriate (or preferred) method and follows the required combination of components in that row of the table. This eliminates the need for a user to decipher the existing code text and cross-referenced requirements between different subsections of code to determine what is required. Finally, a footnote ‘b’ is added to the table to clarify that the more stringent moist/marine solutions can also be applied to the less stringent dry climate moisture regime (something the code inadvertently did not enable but which was intended to be permitted).

Bibliography: Lstiburek, J.W. (2005). Rainwater Management Performance of Newly Constructed Residential Building Enclosures During August and Septemeber 2004. Prepared for Home Builders Association of Metro Orlando and the Florida Home Builders Association by: Building Science Corporation, Westord, MA. January 11, 2005

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal strives to make no technical changes to the requirements in 2510.6 and focuses on formatting improvements and clarifications to better convey the various inter-related requirements and options in 2510.6 and particularly the cross-referenced requirements in subsections 2510.6.1 and 2510.6.2 for dry and moist/marine climates. The primary change is to reformat the subsections to address topics that apply regardless of the climate moisture regime and to place specific requirements and options (methods) in a table format where they can be easily visualized and selected without having to decipher the logic of the current code language.

S9-24

2024 GROUP A – PROPOSED CHANGES TO THE INTERNATIONAL FIRE CODE

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TENTATIVE ORDER OF DISCUSSION
2024 PROPOSED CHANGES TO THE
INTERNATIONAL FIRE CODE

The following is the tentative order in which the proposed changes to the code will be discussed at the public hearings. Proposed changes which impact the same subject have been grouped to permit consideration in consecutive changes.

Proposed change numbers that are indented are those which are being heard out of numerical order. Indentation does not necessarily indicate that one change is related to another. Proposed changes may be grouped for purposes of discussion at the hearing at the discretion of the chair. Note that some F code change proposals may not be included on this list, as they are being heard by another committee.

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IFC Definitions

Proponents: Kevin Scott, KH Scott & Associates LLC, self (khscottassoc@gmail.com)

2024 International Fire Code

CHAPTER 3 GENERAL REQUIREMENTS

Revise as follows:

SECTION 302
~~DEFINITIONS~~ PERMITS

Delete without substitution:

~~302.1 Definitions~~.
~~The following terms are defined in Chapter 2:~~

~~3D PRINTER.~~

~~ADDITIVE MANUFACTURING.~~

~~BONFIRE.~~

~~HI-BOY.~~

~~HIGH-VOLTAGE TRANSMISSION LINE.~~

~~OPEN BURNING.~~

~~PORTABLE OUTDOOR FIREPLACE.~~

~~POWERED INDUSTRIAL TRUCK.~~

~~RECREATIONAL FIRE.~~

~~SKY LANTERN.~~

~~VALET TRASH COLLECTION.~~

Revise as follows:

~~301.2~~ 302.1 Permits.
Permits shall be required as set forth in Section 105.5 for the activities or uses regulated by Sections 306, 307, 308, 315, 320 and 321.

CHAPTER 4 EMERGENCY PLANNING AND PREPAREDNESS

Revise as follows:

SECTION 402
~~DEFINITIONS~~ EMERGENCY PROCEDURES

Delete without substitution:

~~402.1 Definitions~~.
~~The following terms are defined in Chapter 2:~~

~~**EMERGENCY EVACUATION DRILL.**~~

~~**LOCKDOWN.**~~

Revise as follows:

~~**401.2**~~ **402.1** **Approval.** Where required by this code, fire safety plans, emergency procedures and employee training programs shall be *approved* by the *fire code official*.

~~**401.3**~~ **402.2** **Emergency responder notification.**
Notification of emergency responders shall be in accordance with Sections 401.3.1 through 401.3.3.

~~**401.3.1**~~ **402.2.1** **Fire events.** In the event an unwanted fire occurs on a property, the *owner* or occupant shall immediately report such condition to the fire department.

~~**401.3.2**~~ **402.2.2** **Alarm activations.** Upon activation of a fire alarm signal, employees or staff shall immediately notify the fire department.

~~**401.3.3**~~ **402.2.3** **Delayed notification.** A person shall not, by verbal or written directive, require any delay in the reporting of a fire to the fire department.

~~**401.4**~~ **402.3** **Required plan implementation.** In the event an unwanted fire is detected in a building or a fire alarm activates, the emergency plan shall be implemented.

~~**401.5**~~ **402.4** **Making false report.** A person shall not give, signal or transmit a false alarm.

~~**401.6**~~ **402.5** **Emergency evacuation drills.**
The sounding of a fire alarm signal and the carrying out of an emergency evacuation drill in accordance with the provisions of Section 405 shall be allowed.

~~**401.7**~~ **402.6** **Unplanned evacuation.** Evacuations made necessary by the unplanned activation of a *fire alarm system* or by any other emergency shall not be substituted for a required evacuation drill.

~~**401.8**~~ **402.7** **Interference with fire department operations.** It shall be unlawful to interfere with, attempt to interfere with, conspire to interfere with, obstruct or restrict the mobility of or block the path of travel of a fire department emergency vehicle in any way, or to interfere with, attempt to interfere with, conspire to interfere with, obstruct or hamper any fire department operation.

CHAPTER 5 FIRE SERVICE FEATURES

Revise as follows:

SECTION 502
~~DEFINITIONS~~ TIMING OF INSTALLATION

Delete without substitution:

~~**502.1 Definitions**~~.
~~The following terms are defined in Chapter 2:~~
~~**AGENCY.**~~

~~**FIRE APPARATUS ACCESS ROAD.**~~

~~**FIRE COMMAND CENTER.**~~

~~**FIRE DEPARTMENT MASTER KEY.**~~

~~**FIRE LANE.**~~

~~**KEY BOX.**~~

~~**TRAFFIC CALMING DEVICES.**~~

Revise as follows:

~~501.4~~ 502.1 ~~Timing of installation~~ Access roads and water supply.
Where fire apparatus access roads or a water supply for fire protection are required to be installed, such protection shall be installed and made serviceable prior to and during the time of construction except where *approved* alternative methods of protection are provided. ~~Temporary street signs shall be installed at each street intersection where construction of new roadways allows passage by vehicles in accordance with Section 505.2.~~

CHAPTER 6 BUILDING SERVICES AND SYSTEMS

Revise as follows:

SECTION 602
~~DEFINITIONS~~ UNSAFE CONDITIONS

Delete without substitution:

~~602.1 Definitions~~.
~~The following terms are defined in Chapter 2:~~
~~**COMMERCIAL COOKING APPLIANCES.**~~

~~**HOOD.**~~

~~**Type I.**~~

~~**REFRIGERANT.**~~
~~**REFRIGERATING (REFRIGERATION) SYSTEM.**~~

Revise as follows:

~~601.2~~ 602.1 Hazard abatement.
Operations or conditions deemed unsafe or hazardous by the *fire code official*shall be abated. Equipment, appliances, materials and systems that are modified or damaged and constitute an electrical shock or fire hazard shall not be used.

~~601.2.1~~ 602.2 Correction of unsafe conditions.
The *fire code official* shall be authorized to require the *owner*, the *owner's* authorized agent, operator or occupant of a building or premises to abate or cause to be abated or corrected such unsafe operations or conditions either by repair, rehabilitation, demolition or other *approved*corrective action in compliance with this code.

CHAPTER 7 FIRE AND SMOKE PROTECTION FEATURES

Revise as follows:

SECTION 702

~~DEFINITIONS~~ RATED CONSTRUCTION

Delete without substitution:

~~**702.1 Definitions**~~**.**

~~The following terms are defined in Chapter 2:~~

~~**DRAFTSTOP.**~~

~~**FIREBLOCKING.**~~

~~**MEMBRANE-PENETRATION FIRESTOP SYSTEM.**~~

~~**OPENING PROTECTIVE.**~~

~~**SMOKE BARRIER.**~~

~~**SMOKE PARTITION.**~~

~~**THROUGH-PENETRATION FIRESTOP SYSTEM.**~~

Add new text as follows:

702.1 Construction Requirements. Fire-resistance-rated construction and smoke-limiting construction required by this code shall comply with the following:

1. Fire walls shall be constructed in accordance with Section 706 of the *International Building Code*.
2. Fire barriers shall be constructed in accordance with Section 707 of the *International Building Code.*
3. Fire partitions shall be constructed in accordance with Section 708 of the *International Building Code*.
4. Smoke barriers shall be constructed in accordance with Section 709 of the *International Building Code*.
5. Smoke partitions shall be constructed in accordance with Section 710 of the *International Building Code*.
6. Horizontal assemblies shall be constructed in accordance with Section 711 of the *International Building Code.*

-

Revise as follows:

~~701.2~~ 702.2 Fire-resistance-rated construction.

The *fire-resistance rating* of the following *fire-resistance-rated* construction shall be maintained:

1. Structural members.
2. *Exterior walls*.
3. *Fire walls, fire barriers, fire partitions*.
4. *Horizontal assemblies*.
5. Shaft enclosures.

~~701.2.1~~ 702.2.1 Hanging displays.

The hanging and displaying of salable goods and other decorative materials from acoustical ceiling systems that are part of a *fire-resistance-rated horizontal assembly* shall be prohibited.

~~701.3~~ 702.3 Smoke barriers. The *fire-resistance rating* and smoke-resistant characteristics of *smoke barriers* shall be maintained.

~~701.4~~ 702.4 Smoke partitions. The smoke-resistant characteristics of smoke partitions shall be maintained.

~~701.5~~ 702.5 Maintaining protection.
Materials, systems and devices used to repair or protect breaches and openings in *fire-resistance-rated* construction and construction installed to resist the passage of smoke shall be maintained in accordance with Sections 703 through 707.

CHAPTER 8 INTERIOR FINISH, DECORATIVE MATERIALS AND FURNISHINGS

SECTION 801 GENERAL

Revise as follows:

801.1 Scope.
The provisions of this chapter shall govern interior finish, interior trim, furniture, furnishings, decorative materials and decorative vegetation in buildings. ~~Existing buildings shall comply with Sections 803 through 808. New buildings shall comply with Sections 804 through 808, and Section 803 of the International Building Code.~~

SECTION 802 ~~DEFINITIONS~~ APPLICATION

Delete without substitution:

~~802.1 Definitions~~.
~~The following terms are defined in Chapter 2:~~
~~FLAME SPREAD.~~

~~FLAME SPREAD INDEX.~~

~~INTERIOR FLOOR-WALL BASE.~~

~~SITE-FABRICATED STRETCH SYSTEM.~~

~~SMOKE-DEVELOPED INDEX.~~

Add new text as follows:

802.1 New buildings. New buildings shall comply with Sections 804 through 808, and Section 803 of the International Building Code.

802.2 Existing buildings. Existing buildings shall comply with Sections 803 through 808.

CHAPTER 9 FIRE PROTECTION AND LIFE SAFETY SYSTEMS

Revise as follows:

SECTION 902 ~~DEFINITIONS~~ FIRE PUMP AND RISER ROOMS

Delete without substitution:

~~902.1 Definitions~~.
~~The following terms are defined in Chapter 2:~~
~~ALARM NOTIFICATION APPLIANCE.~~

~~**ALARM SIGNAL.**~~

~~**ALARM VERIFICATION FEATURE.**~~

~~**ANNUNCIATOR.**~~

~~**AUDIBLE ALARM NOTIFICATION APPLIANCE.**~~

~~**AUTOMATIC.**~~

~~**AUTOMATIC FIRE-EXTINGUISHING SYSTEM.**~~

~~**AUTOMATIC SMOKE DETECTION SYSTEM.**~~

~~**AUTOMATIC SPRINKLER SYSTEM.**~~

~~**AUTOMATIC WATER MIST SYSTEM.**~~

~~**AVERAGE AMBIENT SOUND LEVEL.**~~

~~**CARBON DIOXIDE EXTINGUISHING SYSTEM.**~~

~~**CLEAN AGENT.**~~

~~**COMMERCIAL MOTOR VEHICLE.**~~

~~**CONSTANTLY ATTENDED LOCATION.**~~

~~**DELUGE SYSTEM.**~~

~~**DETECTOR, HEAT.**~~

~~**DRY-CHEMICAL EXTINGUISHING AGENT.**~~

~~**ELEVATOR GROUP.**~~

~~**EMERGENCY ALARM SYSTEM.**~~

~~**EMERGENCY VOICE/ALARM COMMUNICATIONS.**~~

~~**FIRE ALARM BOX, MANUAL.**~~

~~**FIRE ALARM CONTROL UNIT.**~~

~~**FIRE ALARM SIGNAL.**~~

~~**FIRE ALARM SYSTEM.**~~

~~**FIRE AREA.**~~

~~**FIRE DETECTOR, AUTOMATIC.**~~

~~**FIRE PROTECTION SYSTEM.**~~

~~**FIRE SAFETY FUNCTIONS.**~~

~~**FIXED BASE OPERATOR (FBO).**~~

~~**FOAM-EXTINGUISHING SYSTEM.**~~

~~**GAS DETECTION SYSTEM.**~~

~~**HALOGENATED EXTINGUISHING SYSTEM.**~~

~~**IMPAIRMENT COORDINATOR.**~~

~~**INITIATING DEVICE.**~~

~~**LIFE SAFETY SYSTEMS.**~~

~~**MANUAL FIRE ALARM BOX.**~~

~~**MULTIPLE-STATION ALARM DEVICE.**~~

~~**MULTIPLE-STATION SMOKE ALARM.**~~

~~**NOTIFICATION ZONE.**~~

~~**NUISANCE ALARM.**~~

~~**PRIVATE GARAGE.**~~

~~**RECORD DRAWINGS.**~~

~~**SINGLE-STATION SMOKE ALARM.**~~

~~**SLEEPING UNIT.**~~

~~**SMOKE ALARM.**~~

~~**SMOKE DETECTOR.**~~

~~**STANDPIPE, TYPES OF.**~~

~~**Automatic dry.**~~
~~**Automatic wet.**~~
~~**Manual dry.**~~
~~**Manual wet.**~~
~~**Semiautomatic dry.**~~

~~STANDPIPE SYSTEM, CLASSES OF.~~
~~**Class I system.**~~
~~**Class II system.**~~
~~**Class III system.**~~

~~**SUPERVISING STATION.**~~
~~**SUPERVISORY SERVICE.**~~

~~**SUPERVISORY SIGNAL.**~~

~~**SUPERVISORY SIGNAL-INITIATING DEVICE.**~~

~~**TIRES, BULK STORAGE OF.**~~

~~**TRANSIENT AIRCRAFT.**~~

~~**TROUBLE SIGNAL.**~~

~~**VISIBLE ALARM NOTIFICATION APPLIANCE.**~~

~~**WET-CHEMICAL EXTINGUISHING AGENT.**~~

~~**WIRELESS PROTECTION SYSTEM.**~~

~~**ZONE.**~~

~~**ZONE, NOTIFICATION.**~~

Revise as follows:

~~**901.4.7**~~ **902.1** **Pump and riser room size.** Where provided, fire pump rooms and *automatic sprinkler system* riser rooms shall be designed with adequate space for all equipment necessary for the installation, as defined by the manufacturer, with sufficient working space around the stationary equipment. Clearances around equipment to elements of permanent construction, including other installed equipment and appliances, shall be sufficient to allow inspection, service, repair or replacement without removing such elements of permanent construction or disabling the function of a required *fire-resistance-rated* assembly. Fire pump and *automatic sprinkler system* riser rooms shall be provided with doors and unobstructed passageways large enough to allow removal of the largest piece of equipment.

~~**901.4.7.1**~~ **902.2** **Access.** Automatic sprinkler system risers, fire pumps and controllers shall be provided with *ready access*. Where located in a fire pump room or *automatic sprinkler system* riser room, the door shall be permitted to be locked provided that the key is available at all times.

~~901.4.7.2~~ 902.3 Marking on access doors. Access doors for *automatic sprinkler system* riser rooms and fire pump rooms shall be labeled with an *approved* sign. The lettering shall be in contrasting color to the background. Letters shall have a minimum height of 2 inches (51 mm) with a minimum stroke of $^3/_8$ inch (10 mm).

~~901.4.7.3~~ 902.4 Environment. *Automatic sprinkler system* riser rooms and fire pump rooms shall be maintained at a temperature of not less than 40°F (4°C). Heating units shall be permanently installed.

~~901.4.7.4~~ 902.5 Lighting. Permanently installed artificial illumination shall be provided in the *automatic sprinkler system* riser rooms and fire pump rooms.

CHAPTER 10 MEANS OF EGRESS

Revise as follows:

SECTION 1002
~~DEFINITIONS~~ MAINTENANCE AND PLANS

Delete without substitution:

~~[BE] 1002.1 Definitions~~.
~~The following terms are defined in Chapter 2:~~
~~ACCESSIBLE MEANS OF EGRESS.~~

~~AISLE.~~

~~AISLE ACCESSWAY.~~

~~ALTERNATING TREAD DEVICE.~~

~~AREA OF REFUGE.~~

~~AUTOMATIC FLUSH BOLT.~~

~~BLEACHERS.~~

~~BREAKOUT.~~

~~CIRCULATION PATH.~~

~~COMMON PATH OF EGRESS TRAVEL.~~

~~CONSTANT LATCHING BOLT.~~

~~CORRIDOR.~~

~~DEAD BOLT.~~

~~DEFEND-IN-PLACE.~~

~~DOOR, BALANCED.~~

~~EGRESS COURT.~~

~~EMERGENCY ESCAPE AND RESCUE OPENING.~~

~~EXIT.~~

~~EXIT ACCESS.~~

~~EXIT ACCESS DOORWAY.~~

~~EXIT ACCESS RAMP.~~

~~EXIT ACCESS STAIRWAY.~~

~~EXIT DISCHARGE.~~

~~EXIT DISCHARGE, LEVEL OF.~~

~~EXIT PASSAGEWAY.~~

~~EXTERIOR EXIT RAMP.~~

~~EXTERIOR EXIT STAIRWAY.~~

~~FIRE EXIT HARDWARE.~~

~~FIXED SEATING.~~

~~FLIGHT.~~

~~FLOOR AREA, GROSS.~~

~~FLOOR AREA, NET.~~

~~FOLDING AND TELESCOPIC SEATING.~~

~~GRADE FLOOR EMERGENCY ESCAPE AND RESCUE OPENINGS.~~

~~GRANDSTAND.~~

~~GUARD.~~

~~HANDRAIL.~~

~~HORIZONTAL EXIT.~~

~~INTERIOR EXIT RAMP.~~

~~INTERIOR EXIT STAIRWAY.~~

~~LOW ENERGY POWER-OPERATED DOOR.~~

~~MANUAL BOLT.~~

~~MEANS OF EGRESS.~~

~~MERCHANDISE PAD.~~

~~NOSING.~~

~~OCCUPANT LOAD.~~

~~OPEN-AIR ASSEMBLY SEATING.~~

~~OPEN-ENDED CORRIDOR.~~

~~OVERHEAD DOORSTOP.~~

~~PANIC HARDWARE.~~

~~PHOTOLUMINESCENT.~~

~~POWER-ASSISTED DOOR.~~

~~POWER-OPERATED DOOR.~~

~~PUBLIC WAY.~~

~~RAMP.~~

~~SCISSOR STAIRWAY.~~

~~SELF-LUMINOUS.~~

~~SMOKE-PROTECTED ASSEMBLY SEATING.~~

~~STAIR.~~

~~STAIRWAY.~~

~~STAIRWAY, INTERIOR EXIT.~~

~~STAIRWAY, SPIRAL.~~

~~**WINDER.**~~

Add new text as follows:

1002.1 Maintenance. Means of egress shall be maintained in accordance with this chapter.

1002.2 Fire safety and evacuation plans. Fire safety and evacuation plans shall be provided for occupancies and buildings where required by Chapter 4.

CHAPTER 11 CONSTRUCTION REQUIREMENTS FOR EXISTING BUILDINGS

Revise as follows:

SECTION 1102
~~DEFINITIONS~~ NOTIFICATION AND TIME SCHEDULE

Delete without substitution:

~~**1102.1 Definitions.**~~
~~The following terms are defined in Chapter 2:~~
~~**DUTCH DOOR.**~~

~~**EXISTING.**~~

Revise as follows:

~~**1101.4**~~ **1102.1 Owner notification.** When a building is found to be in noncompliance with this chapter, the *fire code official* shall duly notify the *owner* of the building. Upon receipt of such notice, the *owner* shall, subject to the following time limits, take necessary actions to comply with the provisions of this chapter.

~~**1101.4.1**~~ **1102.2 Construction documents.** *Construction documents* necessary to comply with this chapter shall be completed and submitted within a time schedule *approved* by the *fire code official*.

~~**1101.4.2**~~ **1102.3 Completion of work.** Work necessary to comply with this chapter shall be completed within a time schedule *approved* by the *fire code official*.

~~**1101.4.3**~~ **1102.4 Extension of time.** The *fire code official* is authorized to grant necessary extensions of time where it can be shown that the specified time periods are not physically practical or pose an undue hardship. The granting of an extension of time for compliance shall be based on the showing of good cause and subject to the filing of an acceptable systematic plan of correction with the *fire code official*.

CHAPTER 12 ENERGY SYSTEMS

Revise as follows:

SECTION 1202
~~DEFINITIONS~~ MIXED SYSTEMS

Delete without substitution:

~~**1202.1 Definitions.**~~
~~The following terms are defined in Chapter 2:~~
~~**BATTERY SYSTEM, STATIONARY STORAGE.**~~

~~**BATTERY TYPES.**~~

~~**CAPACITOR ENERGY STORAGE SYSTEM.**~~

~~**CRITICAL CIRCUIT.**~~

~~**EMERGENCY POWER SYSTEM.**~~

~~**ENERGY STORAGE MANAGEMENT SYSTEMS.**~~

~~**ENERGY STORAGE SYSTEM (ESS).**~~

~~**ENERGY STORAGE SYSTEM, ELECTROCHEMICAL.**~~

~~**ENERGY STORAGE SYSTEM, MOBILE.**~~

~~**ENERGY STORAGE SYSTEM, WALK-IN UNIT.**~~

~~**ENERGY STORAGE SYSTEM CABINET.**~~

~~**ENERGY STORAGE SYSTEM COMMISSIONING.**~~

~~**ENERGY STORAGE SYSTEM DECOMMISSIONING.**~~

~~**FUEL CELL POWER SYSTEM, STATIONARY.**~~

~~**PORTABLE GENERATOR.**~~

~~**STANDBY POWER SYSTEM.**~~

Revise as follows:

~~**1201.3**~~ **1202.1 Mixed system installation.**
Where mixed systems are *approved*, the aggregate nameplate kWh energy of all energy storage systems in a *fire area* shall not exceed the maximum quantity specified for any of the energy systems in this chapter. Where required by the *fire code official*, a hazard mitigation analysis shall be provided and *approved* in accordance with Section 104.2.2 to evaluate any potential adverse interaction between the various energy systems and technologies.

CHAPTER 20 AVIATION FACILITIES

Revise as follows:

SECTION 2002
~~DEFINITIONS~~ OTHER REGULATIONS

Delete without substitution:

~~**2002.1 Definitions.**~~
~~The following terms are defined in Chapter 2:~~
~~**AIRCRAFT OPERATION AREA (AOA).**~~

~~**AIRPORT.**~~

~~**HELIPORT.**~~

~~**HELISTOP.**~~

Revise as follows:

~~**2001.2**~~ <u>2002.1</u> **Regulations not covered.** Regulations not specifically contained herein pertaining to airports, aircraft maintenance, aircraft hangars and appurtenant operations shall be in accordance with nationally recognized standards.

CHAPTER 21 DRY CLEANING

Delete without substitution:

~~SECTION 2102~~
~~DEFINITIONS~~

~~**2102.1 Definitions.**~~
~~The following terms are defined in Chapter 2:~~
~~**DRY CLEANING.**~~

~~**DRY CLEANING PLANT.**~~

~~**DRY CLEANING ROOM.**~~

~~**DRY CLEANING SYSTEM.**~~

~~**SOLVENT OR LIQUID CLASSIFICATIONS.**~~

~~**Class I solvents.**~~
~~**Class II solvents.**~~
~~**Class IIIA solvents.**~~
~~**Class IIIB solvents.**~~
~~**Class IV solvents.**~~

CHAPTER 22 COMBUSTIBLE DUST-PRODUCING OPERATIONS

Delete without substitution:

~~SECTION 2202~~
~~DEFINITIONS~~

~~**2202.1 Definition.**~~
~~The following terms are defined in Chapter 2:~~
~~**COMBUSTIBLE DUST.**~~

~~**DUST COLLECTION SYSTEM.**~~

Revise as follows:

SECTION ~~2204~~ <u>2202</u>
DUST EXPLOSION SCREENING TESTS

~~**2204.1**~~ <u>2202.1</u> **Combustibility and explosivity tests.**
Where combustibility or explosivity screening tests are required to analyze the *combustible dust* as part of compliance with Section 104.9 and Section 414.1.3 of the *International Building Code*, they shall be in accordance with Section 5.4 of NFPA 652.

~~2204.2~~ 2202.2 Samples.

Representative samples for the screening test shall be obtained in accordance with Section 5.5 of NFPA 652.

2203.3.1.1 Location.

Dust collectors shall be located outside of buildings.

Exceptions:

1. Dust collectors inside buildings complying with Section 510 of the *International Mechanical Code*.
2. Wet-type dust collectors specifically *listed* for the type of dust conveyed shall be permitted inside buildings where in accordance with the manufacturer's instructions and specifications.
3. Dust collectors designed to specific NFPA standards listed in Table ~~2205.1~~ 2204.1 for the specific type of dust conveyed.

CHAPTER 23 MOTOR FUEL-DISPENSING FACILITIES AND REPAIR GARAGES

Revise as follows:

SECTION 2302
~~DEFINITIONS~~ DOCUMENTS

Delete without substitution:

~~2302.1 Definitions~~.

~~The following terms are defined in Chapter 2:~~

~~AIRCRAFT MOTOR-VEHICLE FUEL-DISPENSING FACILITY.~~

~~ALCOHOL-BLENDED FUELS.~~

~~AUTOMOTIVE MOTOR FUEL-DISPENSING FACILITY.~~

~~DISPENSING DEVICE, OVERHEAD TYPE.~~

~~FLEET VEHICLE MOTOR FUEL-DISPENSING FACILITY.~~

~~LIQUEFIED NATURAL GAS (LNG).~~

~~MARINE MOTOR FUEL-DISPENSING FACILITY.~~

~~REPAIR GARAGE.~~

~~SELF-SERVICE MOTOR FUEL-DISPENSING FACILITY.~~

Revise as follows:

~~2301.3~~ 2303.1 Construction documents.

Construction documents shall be submitted for review and approval prior to the installation or construction of automotive, marine or fleet vehicle motor fuel-dispensing facilities and repair garages in accordance with Section 106.1.

CHAPTER 24 FLAMMABLE FINISHES

Delete without substitution:

~~SECTION 2402~~
~~DEFINITIONS~~

~~**2402.1 Definitions.**~~
~~The following terms are defined in Chapter 2:~~
~~**DETEARING.**~~

~~**DIP TANK.**~~

~~**ELECTROSTATIC FLUIDIZED BED.**~~

~~**FLAMMABLE FINISHES.**~~

~~**FLAMMABLE VAPOR AREA.**~~

~~**FLUIDIZED BED.**~~

~~**LIMITED SPRAYING SPACE.**~~

~~**RESIN APPLICATION AREA.**~~

~~**ROLL COATING.**~~

~~**SPRAY BOOTH.**~~

~~**SPRAY ROOM.**~~

~~**SPRAYING SPACE.**~~

Revise as follows:

SECTION ~~2410~~ 2402
FLOOR SURFACING AND FINISHING OPERATIONS

~~2410.1~~ 2402.1 Scope.
Floor surfacing and finishing operations exceeding 350 square feet (33 m^2) and using Class I or II liquids shall comply with Sections ~~2410.2~~ 2402.2 through ~~2410.5~~ 2402.5.

~~2410.2~~ 2402.2 Mechanical system operation. Heating, ventilation and air-conditioning systems shall not be operated during resurfacing or refinishing operations or within 4 hours of the application of *flammable* or *combustible liquids*.

~~2410.3~~ 2402.3 Business operation. Floor surfacing and finishing operations shall not be conducted while an establishment is open to the public.

~~2410.4~~ 2402.4 Ignition sources. The power shall be shut down to all electrical sources of ignition within the flammable vapor area, unless those devices are classified for use in Class I, Division 1, hazardous locations.

~~2410.5~~ 2402.5 Ventilation. To prevent the accumulation of flammable vapors, mechanical ventilation at a minimum rate of 1 cubic foot per minute per square foot [0.00508 $m^3/(s \times m^2)$] of area being finished shall be provided. Such exhaust shall be by *approved* temporary or portable means. Vapors shall be exhausted to the exterior of the building.

CHAPTER 25 FRUIT AND CROP RIPENING

Delete without substitution:

~~**2501.3 Ethylene generators.**~~
~~*Approved* ethylene generators shall be operated and maintained in accordance with Section 2506.~~

~~SECTION 2502~~

~~DEFINITIONS~~

~~**2502.1 Terms defined in Chapter 2**~~**.**
~~Words and terms used in this chapter and defined in Chapter 2 shall have the meanings ascribed to them as defined therein.~~

Revise as follows:

SECTION ~~2506~~ <u>2502</u>
ETHYLENE GENERATORS

~~**2506.1**~~ <u>**2502.1**</u> **Ethylene generators.** Ethylene generators shall be *listed* and *labeled* by an *approved* testing laboratory, *approved* by the *fire code official* and used only in *approved* rooms in accordance with the ethylene generator manufacturer's instructions. The listing evaluation shall include documentation that the concentration of ethylene gas does not exceed 25 percent of the lower explosive limit (LEL).

~~**2506.2**~~ <u>**2502.2**</u> **Ethylene generator rooms.** Ethylene generators shall be used in rooms having a volume of not less than 1,000 cubic feet (28 m^3). Rooms shall have air circulation to ensure even distribution of ethylene gas and shall be free from sparks, open flames or other ignition sources.

CHAPTER 26 FUMIGATION AND INSECTICIDAL FOGGING

Revise as follows:

SECTION 2602
~~DEFINITIONS~~ <u>SAFETY</u>

Delete without substitution:

~~**2602.1 Definitions**~~**.**
~~The following terms are defined in Chapter 2:~~
~~**FUMIGANT.**~~

~~**FUMIGATION.**~~

~~**INSECTICIDAL FOGGING.**~~

Revise as follows:

~~**2603.3**~~ <u>**2602.1**</u> **Notification.** The *fire code official* and *fire chief* shall be notified in writing not less than 48 hours before the building, structure or space is to be closed in connection with the utilization of any toxic or flammable fumigant. Notification shall give the location of the enclosed space to be fumigated or fogged, the occupancy, the fumigants or insecticides to be utilized, the person or persons responsible for the operation, and the date and time at which the operation will begin. Written notice of any fumigation or insecticidal fogging operation shall be given to all affected occupants of the building, structure or space in which such operations are to be conducted with sufficient advance notice to allow the occupants to evacuate the building, structure or space. Such notice shall inform the occupants as to the purposes, anticipated duration and hazards associated with the fumigation or insecticidal fogging operation.

~~**2603.3.1**~~ <u>**2602.2**</u> **Warning signs.** *Approved* warning signs indicating the danger, type of chemical involved and necessary precautions shall be posted on all doors and entrances to the affected building, structure or space and on all gangplanks and ladders from the deck, pier or land to a ship. Such notices shall be printed in red ink on a white background. Letters in the headlines shall be not less than 2 inches (51 mm) in height and shall state the date and time of the operation, the name and address of the person, the name of the operator in charge, and a warning stating that the affected building, structure or space shall be vacated not less than 1 hour before the operation begins and shall not be reentered until the danger signs have been removed by the proper authorities.

~~2603.3.2~~ 2602.3 Breathing apparatus. Persons engaged in the business of fumigation or insecticidal fogging shall maintain and have available *approved* protective breathing apparatus.

~~2603.3.3~~ 2602.4 Watch personnel. During the period fumigation is in progress, except where fumigation is conducted in a gastight vault or tank, a responsible watchperson shall remain on duty at the entrance or entrances to the enclosed fumigated space until after the fumigation is completed and the building, structure or space is properly ventilated and safe for occupancy. Sufficient watchers shall be provided to prevent persons from entering the enclosed space under fumigation without being observed.

Delete without substitution:

~~2603.3.4 Evacuation during fumigation.~~ ~~Occupants of the building, structure or space to be fumigated, except the personnel conducting the fumigation, shall be evacuated from such building, structure or space prior to commencing fumigation operations.~~

Revise as follows:

~~2603.3.5~~ 2606.5 Evacuation during ~~insecticidal fogging~~ operations. Occupants in the building, structure or space to be fogged or fumigated, except the personnel conducting the insecticidal fogging or fumigation operations, shall be evacuated from such building, structure or space prior to commencing fogging operations.

CHAPTER 27 SEMICONDUCTOR FABRICATION FACILITIES

SECTION 2701
GENERAL

2701.1 Scope.
Semiconductor fabrication facilities and comparable research and development areas classified as Group H-5 shall comply with this chapter and the *International Building Code*. The use, storage and handling of hazardous materials in Group H-5 shall comply with this chapter, other applicable provisions of this code and the *International Building Code*.

Revise as follows:

~~2701.3~~ 2701.2 Multiple hazards.
Where a material poses multiple hazards, all hazards shall be addressed in accordance with Section 5001.1.

~~2701.5~~ 2701.3 Permits.
Permits shall be required as set forth in Section 105.5.

SECTION 2702
~~DEFINITIONS~~ APPLICATION

Delete without substitution:

~~2702.1 Definitions.~~
~~The following terms are defined in Chapter 2:~~
~~EMERGENCY CONTROL STATION.~~

~~FABRICATION AREA.~~

~~**GAS DETECTION SYSTEM.**~~

~~**HAZARDOUS PRODUCTION MATERIAL (HPM).**~~

~~**HPM.**~~

~~**HPM ROOM.**~~

~~**PASS-THROUGH.**~~

~~**SEMICONDUCTOR FABRICATION FACILITY.**~~

~~**SERVICE CORRIDOR.**~~

~~**TOOL.**~~

~~**WORKSTATION.**~~

Revise as follows:

~~**2701.2**~~ **2702.1 Application.** The requirements set forth in this chapter are requirements specific only to Group H-5 and shall be applied as exceptions or additions to applicable requirements set forth elsewhere in this code.

~~**2701.4**~~ **2702.2 Existing buildings and existing fabrication areas.**
Existing buildings and existing *fabrication areas* shall comply with this chapter, except that transportation and handling of HPM in *corridors* and enclosures for *stairways* and *ramps* shall be allowed where in compliance with Section 2705.3.2 and the *International Building Code*.

CHAPTER 28 LUMBER YARDS AND AGRO-INDUSTRIAL, SOLID BIOMASS AND WOODWORKING FACILITIES

Delete without substitution:

~~SECTION 2802~~
~~DEFINITIONS~~

~~**2802.1 Definitions.**~~
~~The following terms are defined in Chapter 2:~~
~~**AGRO-INDUSTRIAL.**~~

~~**BIOMASS.**~~

~~**COLD DECK.**~~

~~**FINES.**~~

~~**HOGGED MATERIALS.**~~

~~**PLYWOOD AND VENEER MILLS.**~~

~~**RAW PRODUCT.**~~

~~**SOLID BIOFUEL.**~~

~~**SOLID BIOMASS FEEDSTOCK.**~~

~~**STATIC PILES.**~~

~~**TIMBER AND LUMBER PRODUCTION FACILITIES.**~~

CHAPTER 29 MANUFACTURE OF ORGANIC COATINGS

Revise as follows:

SECTION 2902 ~~DEFINITION~~ MAINTENANCE

Delete without substitution:

~~**2902.1 Definition.**~~
~~The following term is defined in Chapter 2:~~
~~**ORGANIC COATING.**~~

Revise as follows:

~~**2901.3**~~ **2902.1 Maintenance.**
Structures and their service equipment shall be maintained in accordance with this code and NFPA 35.

CHAPTER 30 INDUSTRIAL OVENS

SECTION 3001 GENERAL

Revise as follows:

3001.1 Scope.
This chapter shall apply to the installation and operation of industrial ovens and furnaces. ~~Industrial ovens and furnaces shall comply with the applicable provisions of the *International Fuel Gas Code*, the *International Mechanical Code*, NFPA 86, and this chapter.~~ The terms "ovens" and "furnaces" are used interchangeably in this chapter.

SECTION 3002 ~~DEFINITIONS~~ ADDITIONAL REQUIREMENTS

Delete without substitution:

~~**3002.1 Definitions**~~.
~~The following terms are defined in Chapter 2:~~
~~**FURNACE CLASS A.**~~

~~**FURNACE CLASS B.**~~

~~**FURNACE CLASS C.**~~

~~**FURNACE CLASS D.**~~

Add new text as follows:

3002.1 Other regulations. Industrial ovens and furnaces shall also comply with the *International Fuel Gas Code*, the *International Mechanical Code* and NFPA 86.

CHAPTER 31 TENTS, TEMPORARY SPECIAL EVENT STRUCTURES AND OTHER MEMBRANE STRUCTURES

SECTION 3101
GENERAL

Revise as follows:

3101.1 Scope.
Tents, temporary special event structures and *membrane structures* shall comply with this chapter. ~~The provisions of Section 3103 are applicable only to temporary *tents* and *membrane structures*. The provisions of Sections 3104 and 3108 are applicable to temporary and permanent *tents* and *membrane structures*. The provisions of Section 3105 are applicable to temporary special event structures. The provisions of Section 3106 are applicable to inflatable amusement devices. The provisions of Section 3107are applicable to outdoor assembly events. Other temporary structures shall comply with the *International Building Code*.~~

SECTION 3102
~~DEFINITIONS~~ APPLICATION

Delete without substitution:

~~**3102.1 Definitions.**~~
~~The following terms are defined in Chapter 2:~~
~~**AIR-INFLATED STRUCTURE.**~~

~~**AIR-SUPPORTED STRUCTURE.**~~

~~**MEMBRANE STRUCTURE.**~~

~~**TEMPORARY SPECIAL EVENT STRUCTURE.**~~

~~**TENT.**~~

Add new text as follows:

3102.1 Temporary tents, membrane structures and special event structures. The provisions of Sections 3103, 3104 and 3108 are applicable to temporary tents and membrane structures.
The provisions of Section 3105 are applicable to temporary special event structures.

Other temporary structures shall comply with the International Building Code.

3102.2 Permanent tents and membrane structures. The provisions of Sections 3104 and 3108 are applicable to permanent tents and membrane structures.

3102.3 Inflatable amusement devices. The provisions of Section 3106 are applicable to inflatable amusement devices.

3102.4 Outdoor assembly events. The provisions of Section 3107 are applicable to outdoor assembly events.

CHAPTER 32 HIGH-PILED COMBUSTIBLE STORAGE

Revise as follows:

SECTION 3202

~~DEFINITIONS~~ DOCUMENTATION

Delete without substitution:

~~**3202.1 Definitions.**~~
~~The following terms are defined in Chapter 2:~~
~~**ARRAY.**~~

~~**ARRAY, CLOSED.**~~

~~**AUTOMATED RACK STORAGE.**~~

~~**BIN BOX.**~~

~~**COMMODITY.**~~

~~**EARLY SUPPRESSION FAST-RESPONSE (ESFR) SPRINKLER.**~~

~~**EXPANDED PLASTIC.**~~

~~**EXTRA-HIGH-RACK COMBUSTIBLE STORAGE.**~~

~~**HIGH-PILED COMBUSTIBLE STORAGE.**~~

~~**HIGH-PILED STORAGE AREA.**~~

~~**LONGITUDINAL FLUE SPACE.**~~

~~**MANUAL STOCKING METHODS.**~~

~~**MECHANICAL STOCKING METHODS.**~~

~~**SHELF STORAGE.**~~

~~**SOLID SHELVING.**~~

~~**TRANSVERSE FLUE SPACE.**~~

Revise as follows:

~~**3201.3**~~ **3202.1 Construction documents.**
At the time of building permit application for new structures designed to accommodate high-piled storage or for requesting a change of occupancy/use, and at the time of application for a storage permit, plans and specifications shall be submitted for review and approval. In addition to the information required by the *International Building Code*, the storage permit submittal shall include the information specified in this section. The *construction documents* shall include all of the following:

1. Floor plan of the building showing locations and dimensions of *high-piled storage areas*.
2. Usable storage height for each storage area.
3. Number of tiers within each rack, if applicable.
4. Commodity clearance between top of storage and the sprinkler deflector for each storage arrangement.
5. Aisle dimensions between each storage array.
6. Maximum pile volume for each storage array.
7. Location and classification of commodities in accordance with Section 3203.
8. Location of commodities that are banded or encapsulated.
9. Location of required fire department access doors.
10. Type of fire protection systems.
11. Location of valves controlling the water supply of ceiling and in-rack sprinklers.

12. Type, location and specifications of smoke removal and curtain board systems.
13. Dimension and location of transverse and longitudinal flue spaces.
14. Additional information regarding required design features, commodities, storage arrangement and fire protection features within the *high-piled storage area* shall be provided at the time of permit, where required by the *fire code official*.

~~3201.3.1~~ 3202.1.1 Approved construction documents. Following approval of the *construction documents*, a copy of the *approved* plans shall be maintained on the premises in an *approved* location.

~~3201.3.2~~ 3202.1.2 Approved storage layout.
A floor plan, of legible size, shall be provided, mounted on a wall and protected from damage. The floor plan shall be mounted in an *approved* location and show the following:
1. Locations, dimensions and rack layout of *high-piled storage areas*.
2. Design storage height for each storage area.
3. Types of commodities.
4. Commodity clearance between top of storage and the sprinkler deflector for each storage arrangement.
5. Aisle dimensions between each storage array.
6. For palletized and solid-piled storage, the maximum pile volume for each storage array.
7. Location and classification of commodities in accordance with Section 3203.
8. Location of required fire department access doors.
9. Location of valves controlling the water supply of ceiling and in-rack sprinklers.

~~3201.4~~ 3202.2 Fire safety and evacuation plan.
Where required by the Section 403, a fire safety and evacuation plan shall be submitted at the time of permit application for review and approval. A copy of the *approved* fire safety and evacuation plan shall be maintained on the premises in an *approved* location.

CHAPTER 33 FIRE SAFETY DURING CONSTRUCTION AND DEMOLITION

Revise as follows:

SECTION 3302
~~DEFINITIONS~~ SAFETY PLAN

Delete without substitution:

~~3302.1 Terms defined in Chapter 2.~~
~~Words and terms used in this chapter and defined in Chapter 2 shall have the meanings ascribed to them as defined therein.~~

Revise as follows:

~~3303.1~~ 3302.1 Program development and maintenance.
The *owner* or *owner's* authorized agent shall be responsible for the development, implementation and maintenance of an *approved*, written *site safety plan* establishing a fire prevention program at the project site applicable throughout all phases of the construction, repair, *alteration* or demolition work. The plan addresses the requirements of this chapter and other applicable portions of this code, the duties of staff and staff training requirements. The plan shall be submitted and *approved* before a building permit is issued. Any changes to the plan shall be submitted for approval.

~~3303.1.1~~ 3302.2 Components of site safety plans.
Site safety plans shall include the following as applicable:

1. Name and contact information of site safety director.
2. Documentation of the training of the site safety director and fire watch personnel.
3. Procedures for reporting emergencies.
4. Fire department vehicle access routes.
5. Location of fire protection equipment, including portable fire extinguishers, standpipes, fire department connections and fire hydrants.
6. Smoking and cooking policies, designated areas to be used where *approved*, and signage locations in accordance with Section 3305.7.
7. Location and safety considerations for temporary heating equipment.
8. Hot work permit plan.
9. Plans for control of combustible waste material.
10. Locations and methods for storage and use of *flammable* and *combustible liquids* and other hazardous materials.
11. Provisions for site security and where required, for a fire watch.
12. Changes that affect this plan.
13. Other site-specific information required by the *fire code official*.

CHAPTER 34 TIRE REBUILDING AND TIRE STORAGE

SECTION 3401 GENERAL

Revise as follows:

3401.1 Scope.
Tire rebuilding plants, tire storage and tire byproduct facilities shall comply with this chapter, other applicable requirements of this code and NFPA 13. ~~Tire storage in buildings shall also comply with Chapter 32.~~

SECTION 3402 ~~DEFINITIONS~~ OTHER REQUIREMENTS

Delete without substitution:

~~3402.1 Terms defined in Chapter 2.~~
~~Words and terms used in this chapter and defined in Chapter 2 shall have the meanings ascribed to them as defined therein.~~

Add new text as follows:

3402.1 High-piled storage. Indoor tire storage exceeding a height of six feet shall also comply with Chapter 32.

CHAPTER 35 WELDING AND OTHER HOT WORK

Revise as follows:

SECTION 3502
~~DEFINITIONS~~ OTHER REQUIREMENTS

Delete without substitution:

~~**3502.1 Definitions.**~~
~~The following terms are defined in Chapter 2:~~
~~**HOT WORK.**~~

~~**HOT WORK AREA.**~~

~~**HOT WORK EQUIPMENT.**~~

~~**HOT WORK PERMITS.**~~

~~**HOT WORK PROGRAM.**~~

~~**RESPONSIBLE PERSON.**~~

Revise as follows:

~~3501.3~~ 3502.1 Restricted areas.
Hot work shall only be conducted in areas designed or authorized for that purpose by the personnel responsible for a hot work program. Hot work shall not be conducted in the following areas unless approval has been obtained from the *fire code official*:

1. Areas where the *automatic sprinkler system* is impaired.
2. Areas where there exists the potential of an explosive atmosphere, such as locations where flammable gases, liquids or vapors are present.
3. Areas with readily ignitable materials, such as storage of large quantities of bulk sulfur, baled paper, cotton, lint, dust or loose combustible materials.
4. On board ships at dock or ships under construction or repair.
5. At other locations as specified by the *fire code official*.

~~3501.4~~ 3502.2 Cylinders and containers.
Compressed gas cylinders and fuel containers shall also comply with ~~this chapter and~~ Chapter 53.

CHAPTER 36 MARINAS

Revise as follows:

SECTION 3602
~~DEFINITIONS~~ DOCUMENTS

Delete without substitution:

~~**3602.1 Definitions.**~~
~~The following terms are defined in Chapter 2:~~
~~**FLOAT.**~~

~~**MARINA.**~~

~~**PIER.**~~

~~**VESSEL.**~~

~~**WHARF.**~~

Revise as follows:

~~**3601.2**~~ **3602.1** **Plans and approvals.** Plans for marina fire protection facilities shall be *approved* prior to installation. The work shall be subject to final inspection and approval after installation.

CHAPTER 37 COMBUSTIBLE FIBERS

SECTION 3701 GENERAL

3701.1 Scope. The equipment, processes and operations involving *combustible fibers* shall comply with this chapter.

Revise as follows:

~~**3701.3**~~ **3701.2** **Permits.**
Permits shall be required as set forth in Section 105.5.

SECTION 3702 ~~DEFINITIONS~~ APPLICATION

Delete without substitution:

~~**3702.1 Definitions.**~~
~~The following terms are defined in Chapter 2:~~
~~**BALED COTTON.**~~

~~**BALED COTTON, DENSELY PACKED.**~~

~~**COMBUSTIBLE FIBERS.**~~

~~**COTTON.**~~

~~**SEED COTTON.**~~

Revise as follows:

~~**3701.2**~~ **3702.1** **Applicability.** Storage of *combustible fibers* in any quantity shall comply with this ~~section~~chapter.

CHAPTER 38 HIGHER EDUCATION LABORATORIES

Revise as follows:

SECTION 3802 ~~DEFINITIONS~~ APPLICATION

Delete without substitution:

~~**3802.1 Definitions**~~**.**
~~The following terms are defined in Chapter 2:~~
~~**CHEMICAL FUME HOOD.**~~

~~**GLOVE BOX.**~~

~~**HIGHER EDUCATION LABORATORY.**~~

~~**LABORATORY SUITE.**~~

~~**SPECIAL EXPERT.**~~

Revise as follows:

~~**3801.2**~~ **3802.1** ~~**Application**~~ **General.**
The provisions of this chapter shall be applied as exceptions or additions to applicable requirements of this code. ~~Unless specifically modified by this chapter, the storage, use and handling of hazardous materials shall comply with the provisions in Chapters 50 through 67 and the *International Building Code* for quantities not exceeding the maximum allowable quantity.~~

Add new text as follows:

3802.2 Quantities not exceeding the maximum allowable quantity. Unless specifically modified by this chapter, the storage, use and handling of hazardous materials shall comply with the provisions in Chapters 50 through 67 for quantities not exceeding the maximum allowable quantity.

CHAPTER 39 PROCESSING AND EXTRACTION FACILITIES

SECTION 3901 GENERAL

Revise as follows:

~~**3901.3**~~ **3901.2 Permits.**
Permits shall be required as set forth in Sections 105.5 and 105.6.

~~**3901.4**~~ **3901.3 Lighting.**
Where used, horticultural lights or lighting systems shall be *listed* and *labeled* in accordance with UL 8800 and installed in accordance with the listing, the manufacturer's installation instructions and NFPA 70.

~~**3901.5**~~ **3901.4 Carbon dioxide generation.**
Carbon dioxide-enriched atmospheres generated using methods to create carbon dioxide as a byproduct shall meet the requirements of Sections 5307.4.1 through 5307.4.7.

SECTION 3902 ~~DEFINITIONS~~ APPLICATION

Delete without substitution:

~~**3902.1 Definitions**~~**.**
~~The following terms are defined in Chapter 2:~~
~~**DESOLVENTIZING.**~~

~~**MISCELLA.**~~

Revise as follows:

~~3901.2~~ 3902.1 Existing buildings or facilities.
Existing buildings or facilities used for the processing or extraction of plant oils using solvents shall comply with this chapter. ~~Existing extraction processes where the medium of extraction is changed to include the use of solvents shall comply with this chapter.~~

Add new text as follows:

3902.2 Existing processes. Existing extraction processes where the medium of extraction is changed to include the use of solvents shall comply with this chapter.

CHAPTER 40 STORAGE OF DISTILLED SPIRITS AND WINES

Revise as follows:

SECTION 4002
~~DEFINITIONS~~ NONAPPLICABILITY

Delete without substitution:

~~4002.1 Definitions~~.
~~Words and terms used in this chapter and defined in Chapter 2 shall have the meanings ascribed to them as defined therein.~~

Revise as follows:

~~4001.1.1~~ 4002.1 Nonapplicability.
Chapter 50 and Chapter 57 are not applicable to the storage of distilled spirits and wines in barrels and casks ~~as identified in Section 5001.1, Exception 10, and Section 5701.2, Item 10~~where stored in compliance with this chapter.

CHAPTER 50 HAZARDOUS MATERIALS—GENERAL PROVISIONS

Revise as follows:

~~5001.4~~ 5001.3 Retail and wholesale storage and display.
For retail and wholesale storage and display of nonflammable solid and nonflammable or noncombustible liquid hazardous materials in Group M occupancies and storage in Group S occupancies, see Section 5003.11.

~~5001.5~~ 5001.4 Permits.
Permits shall be required as set forth in Sections 105.5 and 105.6.
Where required by the *fire code official*, permittees shall apply for approval to permanently close a storage, use or handling facility. Such application shall be submitted not less than 30 days prior to the termination of the storage, use or handling of hazardous materials. The *fire code official* is authorized to require that the application be accompanied by an *approved* facility closure plan in accordance with Section ~~5001.6.3~~5001.5.3.

~~5001.5.1~~ 5001.4.1 Hazardous Materials Management Plan. Where required by the *fire code official*, an application for a permit shall include a Hazardous Materials Management Plan (HMMP). The HMMP shall include a facility site plan designating the following:

1. Access to each storage and use area.

2. Location of emergency equipment.
3. Location where liaison will meet emergency responders.
4. Facility evacuation meeting point locations.
5. The general purpose of other areas within the building.
6. Location of all above-ground and underground tanks and their appurtenances including, but not limited to, sumps, vaults, below-grade treatment systems and piping.
7. The hazard classes in each area.
8. Locations of all *control areas* and Group H occupancies.
9. Emergency *exits*.

~~5001.5.2~~ 5001.4.2 Hazardous Materials Inventory Statement (HMIS). Where required by the *fire code official*, an application for a permit shall include an HMIS, such as Superfund Amendments and Reauthorization Act of 1986 (SARA) Title III, Tier II Report or other *approved* statement. The HMIS shall include the following information:

1. Product name.
2. Component.
3. Chemical Abstract Service (CAS) number.
4. Location where stored or used.
5. Container size.
6. Hazard classification.
7. Amount in storage.
8. Amount in use-*closed systems*.
9. Amount in use-*open systems*.

~~5001.6~~ 5001.5 Facility closure.
Facilities shall be placed out of service in accordance with Sections ~~5001.6.1~~5001.5.1 through ~~5001.6.3~~5001.5.3.

~~5001.6.1~~ 5001.5.1 Temporarily out-of-service facilities. Facilities that are temporarily out of service shall continue to maintain a permit and be monitored and inspected.

~~5001.6.2~~ 5001.5.2 Permanently out-of-service facilities.
Facilities for which a permit is not kept current or is not monitored and inspected on a regular basis shall be deemed to be permanently out of service and shall be closed in an *approved* manner. Where required by the *fire code official*, permittees shall apply for approval to close permanently storage, use or handling facilities. The *fire code official* is authorized to require that such application be accompanied by an *approved* facility closure plan in accordance with Section ~~5001.6.3~~5001.5.3.

~~5001.6.3~~ 5001.5.3 Facility closure plan.
Where a facility closure plan is required in accordance with Section ~~5001.5~~5001.4 to terminate storage, dispensing, handling or use of hazardous materials, it shall be submitted to the *fire code official* not less than 30 days prior to facility closure. The plan shall demonstrate that hazardous materials that are stored, dispensed, handled or used in the facility will be transported, disposed of or reused in a manner that eliminates the need for further maintenance and any threat to public health and safety.

SECTION 5002
~~DEFINITIONS~~ PERFORMANCE-BASED DESIGN

Delete without substitution:

~~**5002.1 Definitions.**~~

~~The following terms are defined in Chapter 2:~~

~~**BOILING POINT.**~~

~~**CEILING LIMIT.**~~

~~**CHEMICAL.**~~

~~**CHEMICAL NAME.**~~

~~**CLOSED CONTAINER.**~~

~~**CONTAINER.**~~

~~**CONTROL AREA.**~~

~~**CYLINDER.**~~

~~**DAY BOX.**~~

~~**DEFLAGRATION.**~~

~~**DESIGN PRESSURE.**~~

~~**DETACHED BUILDING.**~~

~~**DISPENSING.**~~

~~**EXCESS FLOW CONTROL.**~~

~~**EXHAUSTED ENCLOSURE.**~~

~~**EXPLOSION.**~~

~~**FLAMMABLE VAPORS OR FUMES.**~~

~~**GAS CABINET.**~~

~~**GAS ROOM.**~~

~~**HANDLING.**~~

~~**HAZARDOUS MATERIALS.**~~

~~**HEALTH HAZARD.**~~

~~**IMMEDIATELY DANGEROUS TO LIFE AND HEALTH (IDLH).**~~

~~**INCOMPATIBLE MATERIALS.**~~

~~**LIQUID.**~~

~~**LOWER EXPLOSIVE LIMIT (LEL).**~~

~~**LOWER FLAMMABLE LIMIT (LFL).**~~

~~**MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA.**~~

~~**NORMAL TEMPERATURE AND PRESSURE (NTP).**~~

~~**OUTDOOR CONTROL AREA.**~~

~~**PERMISSIBLE EXPOSURE LIMIT (PEL).**~~

~~**PESTICIDE.**~~

~~**PHYSICAL HAZARD.**~~

~~**PRESSURE VESSEL.**~~

~~**SAFETY CAN.**~~

~~**SAFETY DATA SHEET (SDS).**~~

~~**SECONDARY CONTAINMENT.**~~

~~**SEGREGATED.**~~

~~**SOLID.**~~

~~**STORAGE, HAZARDOUS MATERIALS.**~~

~~**SYSTEM.**~~

~~**TANK, ATMOSPHERIC.**~~

~~**TANK, PORTABLE.**~~

~~**TANK, STATIONARY.**~~

~~**TANK VEHICLE.**~~

~~**UNAUTHORIZED DISCHARGE.**~~

~~**USE (MATERIAL).**~~

~~**VAPOR PRESSURE.**~~

Revise as follows:

~~**5001.3**~~ 5002.1 **Performance-based design alternative.**
Where *approved* by the *fire code official*, buildings and facilities where hazardous materials are stored, used or handled shall be permitted to comply with this section as an alternative to compliance with the other requirements set forth in this chapter and Chapters 51 through 67.

~~**5001.3.1**~~ 5002.1.1 **Objective.**
The objective of Section ~~5001.3~~5002 is to protect people and property from the consequences of unauthorized discharge, fires or explosions involving hazardous materials.

~~**5001.3.2**~~ 5002.2 **Functional statements.** Performance-based design alternatives are based on the following functional statements:

1. Provide safeguards to minimize the risk of unwanted releases, fires or explosions involving hazardous materials.
2. Provide safeguards to minimize the consequences of an unsafe condition involving hazardous materials during normal operations and in the event of an abnormal condition.

~~**5001.3.3**~~ 5002.3 **Performance requirements.**
Where safeguards, systems, documentation, written plans or procedures, audits, process hazards analysis, mitigation measures, engineering controls or construction features are required by Sections ~~5001.3.3.1~~5002.3.1 through ~~5001.3.3.18~~5002.3.18, the details of the design alternative shall be subject to approval by the *fire code official*. The details of actions granting the use of the design alternatives shall be recorded and entered in the files of the jurisdiction.

~~**5001.3.3.1**~~ 5002.3.1 **Properties of hazardous materials.** The physical- and health-hazard properties of hazardous materials on-site shall be known and shall be made readily available to employees, neighbors and the *fire code official*.

~~**5001.3.3.2**~~ 5002.3.2 **Reliability of equipment and operations.** Equipment and operations involving hazardous materials shall be designed, installed and maintained to ensure that they reliably operate as intended.

~~**5001.3.3.3**~~ 5002.3.3 **Prevention of unintentional reaction or release.** Safeguards shall be provided to minimize the risk of an unintentional reaction or release that could endanger people or property.

~~**5001.3.3.4**~~ 5002.3.4 **Spill mitigation.** Spill containment systems or means to render a spill harmless to people or property shall be provided where a spill is determined to be a plausible event and where such an event would endanger people or property.

~~5001.3.3.5~~ 5002.3.5 **Ignition hazards.** Safeguards shall be provided to minimize the risk of exposing combustible hazardous materials to unintended sources of ignition.

~~5001.3.3.6~~ 5002.3.6 **Protection of hazardous materials.** Safeguards shall be provided to minimize the risk of exposing hazardous materials to a fire or physical damage whereby such exposure could endanger or lead to the endangerment of people or property.

~~5001.3.3.7~~ 5002.3.7 **Exposure hazards.** Safeguards shall be provided to minimize the risk of and limit damage from a fire or explosion involving explosive hazardous materials whereby such fire or explosion could endanger or lead to the endangerment of people or property.

~~5001.3.3.8~~ 5002.3.8 **Detection of gas or vapor release.** Where a release of hazardous materials gas or vapor would cause immediate harm to persons or property, means of mitigating the dangerous effects of a release shall be provided.

~~5001.3.3.9~~ 5002.3.9 **Reliable power source.** Where a power supply is relied on to prevent or control an emergency condition that could endanger people or property, the power supply shall be from a reliable source.

~~5001.3.3.10~~ 5002.3.10 **Ventilation.** Where ventilation is necessary to limit the risk of creating an emergency condition resulting from normal or abnormal operations, means of ventilation shall be provided.

~~5001.3.3.11~~ 5002.3.11 **Process hazard analyses.** Process hazard analyses shall be conducted to ensure reasonably the protection of people and property from dangerous conditions involving hazardous materials.

~~5001.3.3.12~~ 5002.3.12 **Prestartup safety review.** Written documentation of prestartup safety review procedures shall be developed and enforced to ensure that operations are initiated in a safe manner. The process of developing and updating such procedures shall involve the participation of affected employees.

~~5001.3.3.13~~ 5002.3.13 **Operating and emergency procedures.** Written documentation of operating procedures and procedures for emergency shutdown shall be developed and enforced to ensure that operations are conducted in a safe manner. The process of developing and updating such procedures shall involve the participation of affected employees.

~~5001.3.3.14~~ 5002.3.14 **Management of change.** A written plan for management of change shall be developed and enforced. The process of developing and updating the plan shall involve the participation of affected employees.

~~5001.3.3.15~~ 5002.3.15 **Emergency plan.** A written emergency plan shall be developed to ensure that proper actions are taken in the event of an emergency, and the plan shall be followed if an emergency condition occurs. The process of developing and updating the plan shall involve the participation of affected employees.

~~5001.3.3.16~~ 5002.3.16 **Accident procedures.** Written procedures for investigation and documentation of accidents shall be developed, and accidents shall be investigated and documented in accordance with these procedures.

~~5001.3.3.17~~ 5002.3.17 **Consequence analysis.** Where an accidental release of hazardous materials could endanger people or property, either on- or off-site, an analysis of the expected consequences of a plausible release shall be performed and utilized in the analysis and selection of active and passive hazard mitigation controls.

~~5001.3.3.18~~ 5002.3.18 **Safety audits.** Safety audits shall be conducted on a periodic basis to verify compliance with the requirements of this section.

CHAPTER 51 AEROSOLS

Revise as follows:

SECTION 5102

~~DEFINITIONS~~ AEROSOL CONTAINERS

Delete without substitution:

~~**5102.1 Definitions**~~**.**
~~The following terms are defined in Chapter 2:~~
~~**AEROSOL CONTAINER.**~~

~~**AEROSOL PRODUCT.**~~

~~**Level 1 aerosol products.**~~
~~**Level 2 aerosol products.**~~
~~**Level 3 aerosol products.**~~

~~**AEROSOL PRODUCT WAREHOUSE.**~~
~~**PROPELLANT.**~~

~~**RETAIL DISPLAY AREA.**~~

Revise as follows:

~~5101.4~~ <u>5002.1</u> ~~Containers~~ <u>Maximum size of containers</u>.
Metal aerosol containers shall be limited to a maximum size of 33.8 fluid ounces (1000 ml). Plastic aerosol containers shall be limited to a maximum of 4 fluid ounces (118 ml) except as provided in Sections 5104.1.1 and 5104.1.2. Glass aerosol containers shall be limited to a maximum of 4 fluid ounces (118 ml).

CHAPTER 53 COMPRESSED GASES

SECTION 5301 GENERAL

Revise as follows:

5301.1 Scope.
Storage, use and handling of *compressed gases* in *compressed gas* containers, cylinders, tanks and systems shall comply with this chapter and NFPA 55, including those gases regulated elsewhere in this code. Partially full *compressed gas* containers, cylinders or tanks containing residual gases shall be considered as full for the purposes of the controls required.
~~Liquefied natural gas for use as a vehicular fuel shall also comply with NFPA 52 and NFPA 59A.~~

~~*Compressed gases* classified as hazardous materials shall also comply with Chapter 50 for general requirements and chapters addressing specific hazards, including Chapters 58 (Flammable Gases and Flammable *Cryogenic Fluids*), 60 (Highly Toxic and Toxic Materials), 63 (*Oxidizers*, Oxidizing Gases and Oxidizing *Cryogenic Fluids*) and 64 (*Pyrophoric* Materials).~~

~~Compressed hydrogen (CH_2) shall also comply with the applicable portions of Chapters 23 and 58 of this code, the *International Fuel Gas Code* and NFPA 2.~~

~~Cutting and welding gases shall also comply with Chapter 35.~~

Exceptions:

1. Gases used as refrigerants in refrigeration systems (see Section 608).
2. Compressed natural gas (CNG) for use as a vehicular fuel shall comply with Chapter 23, the *International Fuel Gas Code* and NFPA 52 .
3. *Cryogenic fluids* shall comply with Chapter 55.

4. LP-gas shall comply with Chapter 61 and the *International Fuel Gas Code*.

SECTION 5302
~~DEFINITIONS~~ OTHER REQUIREMENTS

Delete without substitution:

~~**5302.1 Definitions.**~~
~~The following terms are defined in Chapter 2:~~
~~**COMPRESSED GAS.**~~

~~**COMPRESSED GAS CONTAINER.**~~

~~**COMPRESSED GAS SYSTEM.**~~

~~**NESTING.**~~

~~**TUBE TRAILER.**~~

Add new text as follows:

5302.1 Other hazards. In addition to the requirements of this chapter, the following material-specific requirements shall apply:

1. Compressed gases classified as hazardous materials shall comply with Chapter 50.
2. Flammable gases and flammable cryogenic fluids shall comply with Chapter 58.
3. Highly Toxic and Toxic Materials shall comply with Chapter 60.
4. Oxidizers, oxidizing gases and oxidizing cryogenic fluids shall comply with chapter 63.
5. Pyrophoric materials shall comply with Chapter 64.
6. Compressed hydrogen (CH2) shall comply with Chapters 23 and 58 and NFPA 2.
7. Cutting and welding gases shall comply with Chapter 35.

CHAPTER 54 CORROSIVE MATERIALS

SECTION 5401
GENERAL

Revise as follows:

5401.1 Scope.
The storage and use of *corrosive* materials shall be in accordance with this chapter. ~~*Compressed gases* shall also comply with Chapter 53.~~

Exceptions:

1. Display and storage in Group M and storage in Group S occupancies complying with Section 5003.11.
2. Stationary storage battery systems in accordance with Section 1207.
3. This chapter shall not apply to R-717 (ammonia) where used as a refrigerant in a refrigeration system (see Section 608).

SECTION 5402

~~DEFINITION~~ OTHER REQUIREMENTS

Delete without substitution:

~~**5402.1 Definition.**~~
~~The following term is defined in Chapter 2:~~
~~**CORROSIVE.**~~

Add new text as follows:

5402.1 Compressed gases. *Compressed gases* shall also comply with Chapter 53.

CHAPTER 55 CRYOGENIC FLUIDS

SECTION 5501 GENERAL

Revise as follows:

5501.1 Scope.
Storage, use and handling of *cryogenic fluids* shall comply with this chapter and NFPA 55. ~~*Cryogenic fluids* classified as hazardous materials shall also comply with the general requirements of Chapter 50.~~ Partially full containers containing residual *cryogenic fluids* shall be considered as full for the purposes of the controls required.

Exceptions:

1. Fluids used as refrigerants in refrigeration systems (see Section 608).
2. Liquefied natural gas (LNG), which shall comply with NFPA 59A.

~~Oxidizing *cryogenic fluids*, including oxygen, shall comply with Chapter 63, as applicable.~~
~~Flammable *cryogenic fluids*, including hydrogen, methane and carbon monoxide, shall comply with Chapters 23 and 58, as applicable.~~

~~Inert *cryogenic fluids*, including argon, helium and nitrogen, shall comply with ANSI/CGA P-18.~~

5501.2 Permits.
Permits shall be required as set forth in Section 105.5.

Revise as follows:

SECTION 5502 ~~DEFINITIONS~~ OTHER REQUIREMENTS

Delete without substitution:

~~**5502.1 Definitions.**~~
~~The following terms are defined in Chapter 2.~~
~~**CRYOGENIC CONTAINER.**~~

~~**CRYOGENIC FLUID.**~~

~~**CRYOGENIC VESSEL.**~~

~~**FLAMMABLE CRYOGENIC FLUID.**~~

~~**LOW-PRESSURE TANK.**~~

Add new text as follows:

5502.1 Other hazards. In addition to the requirements of this chapter, the following material-specific requirements shall apply:

1. Cryogenic fluids shall comply with NFPA 55.
2. Cryogenic fluids classified as hazardous materials shall comply with the general requirements of Chapter 50.
3. Oxidizing cryogenic fluids, including oxygen, shall comply with Chapter 63, as applicable.
4. Flammable cryogenic fluids, including hydrogen, methane and carbon monoxide, shall comply with Chapters 23 and 58, as applicable.
5. Inert cryogenic fluids, including argon, helium and nitrogen, shall comply with ANSI/CGA P-18.

CHAPTER 56 EXPLOSIVES AND FIREWORKS

Revise as follows:

SECTION 5602
~~DEFINITIONS~~ QUANTITIES AND DISTANCES

Delete without substitution:

~~**5602.1 Definitions.**~~
~~The following terms are defined in Chapter 2:~~
~~**AMMONIUM NITRATE.**~~

~~**BARRICADE.**~~

~~**Artificial barricade.**~~
~~**Natural barricade.**~~

~~**BARRICADED.**~~
~~**BLAST AREA.**~~

~~**BLAST SITE.**~~

~~**BLASTER.**~~

~~**BLASTING AGENT.**~~

~~**BULLET RESISTANT.**~~

~~**DETONATING CORD.**~~

~~**DETONATION.**~~

~~**DETONATOR.**~~

~~**DISCHARGE SITE.**~~

~~**DISPLAY SITE.**~~

~~**EXPLOSIVE.**~~

~~**High explosive.**~~
~~**Low explosive.**~~
~~**Mass-detonating explosives.**~~

~~**UN/DOTn Class 1 explosives.**~~

~~**Division 1.1.**~~

~~**Division 1.2.**~~

~~**Division 1.3.**~~

~~**Division 1.4.**~~

~~**Division 1.5.**~~

~~**Division 1.6.**~~

~~**EXPLOSIVE MATERIAL.**~~

~~**FALLOUT AREA.**~~

~~**FIREWORKS.**~~

~~**Fireworks, 1.3G.**~~

~~**Fireworks, 1.4G.**~~

~~**FIREWORKS DISPLAY.**~~

~~**HIGHWAY.**~~

~~**INHABITED BUILDING.**~~

~~**MAGAZINE.**~~

~~**Indoor.**~~

~~**Type 1.**~~

~~**Type 2.**~~

~~**Type 3.**~~

~~**Type 4.**~~

~~**Type 5.**~~

~~**MORTAR.**~~

~~**NET EXPLOSIVE WEIGHT (net weight).**~~

~~**OPERATING BUILDING.**~~

~~**OPERATING LINE.**~~

~~**PLOSOPHORIC MATERIAL.**~~

~~**PROXIMATE AUDIENCE.**~~

~~**PUBLIC TRAFFIC ROUTE (PTR).**~~

~~**PYROTECHNIC ARTICLE.**~~

~~**PYROTECHNIC COMPOSITION.**~~

~~**PYROTECHNIC SPECIAL EFFECT.**~~

~~**PYROTECHNIC SPECIAL-EFFECT MATERIAL.**~~

~~**PYROTECHNICS.**~~

~~**QUANTITY-DISTANCE (Q-D).**~~

~~**Inhabited building distance (IBD).**~~

~~**Intermagazine distance (IMD).**~~

~~**Intraline distance (ILD) or Intraplant distance (IPD).**~~

~~**RAILWAY.**~~

~~**READY BOX.**~~

~~**SMALL ARMS AMMUNITION.**~~

~~**SMALL ARMS PRIMERS.**~~

~~**SMOKELESS PROPELLANTS.**~~

~~**SPECIAL INDUSTRIAL EXPLOSIVE DEVICE.**~~

~~**THEFT RESISTANT.**~~

Revise as follows:

~~5601.8~~ 5602.1 Establishment of quantity of explosives and distances.

The quantity of *explosives* and distances shall be in accordance with Sections ~~5601.8.1~~5602.2 through ~~5601.8.1.4~~5602.3.4.

~~5601.8.1~~ 5602.2 Quantity of explosives.

The quantity-distance (Q-D) tables in Sections 5604.5 and 5605.3 shall be used to provide the minimum separation distances from potential explosion sites as set forth in Tables ~~5601.8.1(1)~~5602.2(1) through ~~5601.8.1(3)~~5602.2(3). The classification and the weight of the *explosives* are primary characteristics governing the use of these tables. ~~The net *explosive* weight shall be determined in accordance with Sections 5601.8.1.1 through 5601.8.1.4.~~

TABLE ~~5601.8.1(1)~~5602.2(1) APPLICATION OF QUANTITY-DISTANCE (Q-D) TABLES—DIVISION 1.1, 1.2 AND 1.5 EXPLOSIVES[a, b, c]

ITEM	MAGAZINE	OPERATING BUILDING	INHABITED BUILDING	PUBLIC TRAFFIC ROUTE
Inhabited building	IBD in Table 5604.5.2(1)	IBD in Table 5604.5.2(1)	Not Applicable	Not Applicable
Magazine	IMD in Table 5604.5.2(1)	ILD or IPD in Table 5605.3	IBD in Table 5604.5.2(1)	PTR in Table 5604.5.2(1)
Operating building	ILD or IPD in Table 5604.5.2(1)	ILD or IPD in Table 5605.3	IBD in Table 5604.5.2(1)	PTR in Table 5604.5.2(1)
Public traffic route	PTR in Table 5604.5.2(1)	PTR in Table 5604.5.2(1)	Not Applicable	Not Applicable

For SI: 1 foot = 304.8 mm.

a. The minimum separation distance shall be 60 feet. Where a building or magazine containing explosives is barricaded, the minimum distance shall be 30 feet.

b. Linear interpolation between tabular values in the referenced Q-D tables shall not be allowed. Nonlinear interpolation of the values shall be allowed subject to an *approved* technical opinion and report prepared in accordance with Section 104.2.2.

c. For definitions of quantity-distance abbreviations IBD, ILD, IMD, IPD and PTR, see Chapter 2.

TABLE ~~5601.8.1(2)~~5602.2(2) APPLICATION OF QUANTITY-DISTANCE (Q-D) TABLES—DIVISION 1.3 EXPLOSIVES[a, b, c]

ITEM	MAGAZINE	OPERATING BUILDING	INHABITED BUILDING	PUBLIC TRAFFIC ROUTE
Inhabited building	IBD in Table 5604.5.2(2)	IBD in Table 5604.5.2(2)	Not Applicable	Not Applicable
Magazine	IMD in Table 5604.5.2(2)	ILD or IPD in Table 5604.5.2(2)	IBD in Table 5604.5.2(2)	PTR in Table 5604.5.2(2)
Operating building	ILD or IPD in Table 5604.5.2(2)	ILD or IPD in Table 5604.5.2(2)	IBD in Table 5604.5.2(2)	PTR in Table 5604.5.2(2)
Public traffic route	PTR in Table 5604.5.2(2)	PTR in Table 5604.5.2(2)	Not Applicable	Not Applicable

For SI: 1 foot = 304.8 mm.

a. The minimum separation distance shall be not less than 50 feet.

b. Linear interpolation between tabular values in the referenced Q-D table shall be allowed.

c. For definitions of quantity-distance abbreviations IBD, ILD, IMD, IPD and PTR, see Chapter 2.

TABLE ~~5601.8.1(3)~~5602.2(3) APPLICATION OF QUANTITY-DISTANCE (Q-D) TABLES—DIVISION 1.4 EXPLOSIVES[a, b, c]

ITEM	MAGAZINE	OPERATING BUILDING	INHABITED BUILDING	PUBLIC TRAFFIC ROUTE
Inhabited building	IBD in Table 5604.5.2(3)	IBD in Table 5604.5.2(3)	Not Applicable	Not Applicable
Magazine	IMD in Table 5604.5.2(3)	ILD or IPD in Table 5604.5.2(3)	IBD in Table 5604.5.2(3)	PTR in Table 5604.5.2(3)
Operating building	ILD or IPD in Table 5604.5.2(3)	ILD or IPD in Table 5604.5.2(3)	IBD in Table 5604.5.2(3)	PTR in Table 5604.5.2(3)
Public traffic route	PTR in Table 5604.5.2(3)	PTR in Table 5604.5.2(3)	Not Applicable	Not Applicable

For SI: 1 foot = 304.8 mm.

a. The minimum separation distance shall be not less than 50 feet.

b. Linear interpolation between tabular values in the referenced Q-D table shall not be allowed.

c. For definitions of quantity-distance abbreviations IBD, ILD, IMD, IPD and PTR, see Chapter 2.

Add new text as follows:

5602.3 **Net explosive weight.** The net explosive weight of explosives shall be determined in accordance with Sections 5602.3.1 through 5602.3.4.

Revise as follows:

~~5601.8.1.1~~ 5602.3.1 Mass-detonating explosives (Division 11, 12 or 15).
The total net *explosive* weight of mass-detonating *explosives* (Division 1.1, 1.2 or 1.5) shall be used. See Table 5604.5.2(1) or Table 5605.3, as appropriate.

Exception: Where the TNT equivalence of the *explosive material* has been determined, the equivalence is allowed to be used to establish the net *explosive* weight.

~~5601.8.1.2~~ 5602.3.2 Nonmass-detonating explosives (excluding Division 14).
Nonmass-detonating *explosives* (excluding Division 1.4) shall be as follows:

1. Division 1.3 propellants. The total weight of the propellants alone shall be the net *explosive* weight. The net weight of propellant shall be used. See Table 5604.5.2(2).
2. Combinations of bulk metal powder and pyrotechnic compositions. The sum of the net weights of metal powders and pyrotechnic compositions in the containers shall be the net *explosive* weight. See Table 5604.5.2(2).

~~5601.8.1.3~~ 5602.3.3 Combinations of mass-detonating and nonmass-detonating explosives (excluding Division 14).
Combination of mass-detonating and nonmass-detonating *explosives* (excluding Division 1.4) shall be as follows:

1. Where Division 1.1 and 1.2 *explosives* are located in the same site, determine the distance for the total quantity considered first as 1.1 and then as 1.2. The required distance is the greater of the two. Where the Division 1.1 requirements are controlling and the TNT equivalence of the 1.2 is known, the TNT equivalent weight of the 1.2 items shall be allowed to be added to the total *explosive* weight of Division 1.1 items to determine the net *explosive* weight for Division 1.1 distance determination. See Table 5604.5.2(2) or 5605.3, as appropriate.
2. Where Division 1.1 and 1.3 *explosives* are located in the same site, determine the distances for the total quantity considered first as 1.1 and then as 1.3. The required distance is the greater of the two. Where the Division 1.1 requirements are controlling and the TNT equivalence of the 1.3 is known, the TNT equivalent weight of the 1.3 items shall be allowed to be added to the total *explosive* weight of Division 1.1 items to determine the net *explosive* weight for Division 1.1 distance determination. See Table 5604.5.2(1), 5604.5.2(2) or 5605.3, as appropriate.
3. Where Division 1.1, 1.2 and 1.3 *explosives* are located in the same site, determine the distances for the total quantity considered first as 1.1, next as 1.2 and finally as 1.3. The required distance is the greatest of the three. As allowed by Items 1 and 2, TNT equivalent weights for 1.2 and 1.3 items are allowed to be used to determine the net weight of *explosives* for Division 1.1 distance determination. Table 5604.5.2(1) or 5605.3 shall be used where TNT equivalency is used to establish the net *explosive* weight.
4. For composite pyrotechnic items Division 1.1 and Division 1.3, the sum of the net weights of the pyrotechnic composition and the *explosives* involved shall be used. See Tables 5604.5.2(1) and 5604.5.2(2).

~~5601.8.1.4~~ 5602.3.4 Moderate fire—no blast hazards (Division 14). For Division 1.4 *explosives*, the total weight of the *explosive material* alone is the net weight. The net weight of the *explosive material* shall be used.

5604.5.2 Outdoor magazines.
Outdoor magazines other than Type 3 shall be located so as to comply with Table 5604.5.2(2) or 5604.5.2(3) as set forth in Tables

~~5601.8.1(1)~~ 5602.2(1) through ~~5601.8.1(3)~~5602.2.(3). Where a magazine or group of magazines, as described in Section 5604.5.2.2, contains different classes of *explosive materials*, and Division 1.1 materials are present, the required separations for the magazine or magazine group as a whole shall comply with Table 5604.5.2(2).

5605.4 Separation of manufacturing operating buildings from inhabited buildings, public traffic routes and magazines.
Where an operating building on an *explosive materials* plant site is designed to contain *explosive materials*, such a building shall be located away from inhabited buildings, public traffic routes and magazines in accordance with Table 5604.5.2(2) or 5604.5.2(3) as appropriate, based on the maximum quantity of *explosive materials* permitted to be in the building at one time (see Section ~~5601.8~~5602).

Exception: Fireworks manufacturing buildings constructed and operated in accordance with NFPA 1124.

5605.4.1 Determination of net explosive weight for operating buildings.
In addition to the requirements of Section ~~5601.8~~5602 to determine the net *explosive* weight for materials stored or used in operating buildings, quantities of *explosive materials* stored in magazines located at distances less than intraline distances from the operating building shall be added to the contents of the operating building to determine the net *explosive* weight for the operating building.

CHAPTER 57 FLAMMABLE AND COMBUSTIBLE LIQUIDS

Revise as follows:

SECTION 5702
~~DEFINITIONS~~ CLASSIFICATION OF MATERIALS

Delete without substitution:

~~**5702.1 Definitions.**~~
~~The following terms are defined in Chapter 2:~~
~~**ALCOHOL-BASED HAND RUB.**~~

~~**BULK PLANT OR TERMINAL.**~~

~~**BULK TRANSFER.**~~

~~**COMBUSTIBLE LIQUID.**~~

~~**Class II.**~~

~~**Class IIIA.**~~

~~**Class IIIB.**~~

~~**FIRE POINT.**~~

~~**FLAMMABLE LIQUID.**~~

~~**Class IA.**~~

~~**Class IB.**~~

~~**Class IC.**~~

~~**FLASH POINT.**~~

~~**FUEL LIMIT SWITCH.**~~

~~**LIQUID STORAGE ROOM.**~~

~~**LIQUID STORAGE WAREHOUSE.**~~

~~**MOBILE FUELING.**~~

~~**PROCESS TRANSFER.**~~

~~**REFINERY.**~~

~~**REMOTE EMERGENCY SHUTOFF DEVICE.**~~

~~**REMOTE SOLVENT RESERVOIR.**~~

~~**SOLVENT DISTILLATION UNIT.**~~

~~**TANK, PRIMARY.**~~

Revise as follows:

~~**5701.5**~~ **<u>5702.1</u> Material classification.**
Flammable and *combustible liquids* shall be classified in accordance with the definitions in Chapter 2.
~~When mixed with lower flash-point liquids, Class II or III liquids are capable of assuming the characteristics of the lower flash-point liquids. Under such conditions, the appropriate provisions of this chapter for the actual *flash point* of the mixed liquid shall apply.~~

~~When heated above their *flash points*, Class II and III liquids assume the characteristics of Class I liquids. Under such conditions, the appropriate provisions of this chapter for *flammable liquids* shall apply.~~

Add new text as follows:

<u>5702.2</u> <u>Mixtures</u>. <u>When mixed with lower flash-point liquids, Class II or III liquids are capable of assuming the characteristics of the lower flash-point liquids. Under such conditions, the appropriate provisions of this chapter for the actual *flash point* of the mixed liquid shall apply.</u>

<u>5702.3</u> <u>Heated liquids</u>. <u>Where heated above their *flash points*, Class II and III liquids assume the characteristics of Class I liquids. Under such conditions, the appropriate provisions of this chapter for *flammable liquids* shall apply.</u>

CHAPTER 58 FLAMMABLE GASES AND FLAMMABLE CRYOGENIC FLUIDS

SECTION 5801 GENERAL

Revise as follows:

5801.1 Scope.
The storage and use of flammable gases and flammable *cryogenic fluids* shall be in accordance with this chapter, NFPA 2 and NFPA 55. ~~*Compressed gases* shall also comply with Chapter 53 and *cryogenic fluids* shall also comply with Chapter 55. Flammable *cryogenic fluids* shall comply with Section 5806. Hydrogen motor fuel-dispensing stations and repair garages and their associated above-ground hydrogen storage systems shall also be designed, constructed and maintained in accordance with Chapter 23.~~

Exceptions:

1. Gases used as refrigerants in refrigeration systems (see Section 608).
2. Liquefied petroleum gases and natural gases regulated by Chapter 61.
3. Fuel-gas systems and appliances regulated under the *International Fuel Gas Code* other than gaseous hydrogen systems and appliances.
4. *Pyrophoric* gases in accordance with Chapter 64.

SECTION 5802 ~~DEFINITIONS~~ <u>OTHER REQUIREMENTS</u>

Delete without substitution:

~~**5802.1 Definitions.**~~
~~The following terms are defined in Chapter 2:~~

~~**FLAMMABLE GAS.**~~

~~**FLAMMABLE LIQUEFIED GAS.**~~

~~**GAS DETECTION SYSTEM.**~~

~~**GASEOUS HYDROGEN SYSTEM.**~~

~~**HYDROGEN FUEL GAS ROOM.**~~

~~**METAL HYDRIDE.**~~

~~**METAL HYDRIDE STORAGE SYSTEM.**~~

Add new text as follows:

5802.1 Other hazards. In addition to the requirements of this chapter, the following material-specific requirements shall apply:

1. Compressed gases shall comply with Chapter 53.
2. Cryogenic fluids shall comply with Chapter 55.
3. Hydrogen motor fuel-dispensing stations and repair garages and their associated above-ground hydrogen storage systems shall comply with Chapter 23.

CHAPTER 59 FLAMMABLE SOLIDS

Delete without substitution:

~~SECTION 5902~~
~~DEFINITIONS~~

~~**5902.1 Definitions.**~~
~~The following terms are defined in Chapter 2:~~

~~**FLAMMABLE SOLID.**~~

~~**MAGNESIUM.**~~

CHAPTER 60 HIGHLY TOXIC AND TOXIC MATERIALS

Revise as follows:

6001.1 Scope.
The storage and use of highly toxic and toxic materials shall comply with this chapter. ~~*Compressed gases* shall also comply with Chapter 53.~~

Exceptions:

1. Display and storage in Group M and storage in Group S occupancies complying with Section 5003.11.

2. Conditions involving pesticides or agricultural products as follows:
   2.1. Application and release of pesticide, agricultural products and materials intended for use in weed abatement, erosion control, soil amendment or similar applications when applied in accordance with the manufacturer's instruction and label directions.
   2.2. Transportation of pesticides in compliance with the Federal Hazardous Materials Transportation Act and regulations thereunder.
   2.3. Storage in *dwellings* or private garages of pesticides registered by the US Environmental Protection Agency to be utilized in and around the home, garden, pool, spa and patio.

SECTION 6002
~~DEFINITIONS~~ OTHER REQUIREMENTS

Delete without substitution:

~~**6002.1 Definitions.**~~
~~The following terms are defined in Chapter 2:~~
~~**CONTAINMENT SYSTEM.**~~

~~**CONTAINMENT VESSEL.**~~

~~**EXCESS FLOW VALVE.**~~

~~**HIGHLY TOXIC.**~~

~~**OZONE-GAS GENERATOR.**~~

~~**PHYSIOLOGICAL WARNING THRESHOLD.**~~

~~**REDUCED FLOW VALVE.**~~

~~**TOXIC.**~~

Add new text as follows:

6002.1 Compressed gases. *Compressed gases* shall also comply with Chapter 53.

CHAPTER 61 LIQUEFIED PETROLEUM GASES

SECTION 6101
GENERAL

Revise as follows:

6101.1 Scope.
Storage, handling and transportation of liquefied petroleum gas (LP-gas) and the installation of LP-gas equipment pertinent to systems for such uses shall comply with this chapter and NFPA 58. ~~Properties of LP-gases shall be determined in accordance with Appendix B of NFPA 58.~~

SECTION 6102
~~DEFINITIONS~~ LP-gas

Delete without substitution:

~~**6102.1 Definitions.**~~
~~The following terms are defined in Chapter 2:~~
~~**LIQUEFIED PETROLEUM GAS (LP-gas).**~~

~~**LP-GAS CONTAINER.**~~

Add new text as follows:

6102.1 Properties. Properties of LP-gases shall be determined in accordance with Appendix B of NFPA 58.

CHAPTER 62 ORGANIC PEROXIDES

SECTION 6201 GENERAL

Revise as follows:

6201.1 Scope.
The storage and use of *organic peroxides* shall be in accordance with this chapter and Chapter 50.
~~Unclassified detonable *organic peroxides* that are capable of *detonation* in their normal shipping containers under conditions of fire exposure shall be stored in accordance with Chapter 56.~~

SECTION 6202 ~~DEFINITION~~ OTHER REQUIREMENTS

Delete without substitution:

~~**6202.1 Definition.**~~
~~The following term is defined in Chapter 2:~~
~~**ORGANIC PEROXIDE.**~~

~~**Class I.**~~
~~**Class II.**~~
~~**Class III.**~~
~~**Class IV.**~~
~~**Class V.**~~
~~**Unclassified detonable.**~~

Add new text as follows:

6202.1 Detonable organic peroxides. Unclassified detonable *organic peroxides* that are capable of *detonation* in their normal shipping containers under conditions of fire exposure shall be stored in accordance with Chapter 56.

CHAPTER 63 OXIDIZERS, OXIDIZING GASES AND OXIDIZING CRYOGENIC FLUIDS

SECTION 6301

GENERAL

Revise as follows:

6301.1 Scope.
The storage and use of oxidizing materials shall be in accordance with this chapter and Chapter 50. ~~Oxidizing gases shall also comply with Chapter 53. Oxidizing *cryogenic fluids* shall also comply with Chapter 55.~~

Exceptions:

1. Display and storage in Group M and storage in Group S occupancies complying with Section 5003.11.
2. Bulk oxygen systems at industrial and institutional consumer sites shall be in accordance with NFPA 55.
3. Liquid oxygen stored or used in home health care in Group I-1, I-4 and R occupancies in accordance with Section 6306.

SECTION 6302
~~DEFINITIONS~~ <u>OTHER REQUIREMENTS</u>

Delete without substitution:

~~**6302.1 Definitions.**~~
~~The following terms are defined in Chapter 2:~~
~~**BULK OXYGEN SYSTEM.**~~

~~**LIQUID OXYGEN AMBULATORY CONTAINER.**~~

~~**LIQUID OXYGEN HOME CARE CONTAINER.**~~

~~**OXIDIZER.**~~

~~**Class 4.**~~
~~**Class 3.**~~
~~**Class 2.**~~
~~**Class 1.**~~

~~**OXIDIZING CRYOGENIC FLUID.**~~
~~**OXIDIZING GAS.**~~

Add new text as follows:

<u>**6302.1**</u> <u>**Other hazards.**</u> <u>In addition to the requirements of this chapter, the following material-specific requirements shall apply:</u>

1. <u>Oxidizing gases shall comply with Chapter 53.</u>
2. <u>Oxidizing cryogenic fluids shall comply with Chapter 55.</u>

CHAPTER 64 PYROPHORIC MATERIALS

SECTION 6401
GENERAL

Revise as follows:

6401.1 Scope.

The storage and use of *pyrophoric* materials shall be in accordance with this chapter. ~~*Compressed gases* shall also comply with Chapter 53.~~

SECTION 6402
~~DEFINITION~~ OTHER REQUIREMENTS

Delete without substitution:

~~**6402.1 Definition.**~~
~~The following term is defined in Chapter 2:~~
~~**PYROPHORIC.**~~

Add new text as follows:

6402.1 Compressed gases. *Compressed gases* shall also comply with Chapter 53.

CHAPTER 65 PYROXYLIN (CELLULOSE NITRATE) PLASTICS

SECTION 6501
GENERAL

Revise as follows:

6501.1 Scope.
This chapter shall apply to the storage and handling of plastic substances, materials or compounds with cellulose nitrate (pyroxylin) as a base, by whatever name known, in the form of blocks, sheets, tubes or fabricated shapes.
~~Cellulose nitrate (pyroxylin) motion picture film shall comply with the requirements of Section 306.~~

SECTION 6502
~~DEFINITIONS~~ OTHER REQUIREMENTS

Delete without substitution:

~~**6502.1 Terms defined in Chapter 2.**~~
~~Words and terms used in this chapter and defined in Chapter 2 shall have the meanings ascribed to them as defined therein.~~

Add new text as follows:

6502.1 Cellulose nitrate (pyroxylin) film. Cellulose nitrate (pyroxylin) motion picture film shall comply with Section 306.

CHAPTER 66 UNSTABLE (REACTIVE) MATERIALS

SECTION 6601
GENERAL

Revise as follows:

6601.1 Scope.

The storage and use of unstable (reactive) materials shall be in accordance with this chapter. ~~*Compressed gases* shall also comply with Chapter 53.~~

Exceptions:

1. Display and storage in Group M and storage in Group S occupancies complying with Section 5003.11.
2. Detonable unstable (reactive) materials shall be stored in accordance with Chapter 56.

SECTION 6602 ~~DEFINITION~~ OTHER REQUIREMENTS

Delete without substitution:

~~**6602.1 Definition.**~~

~~The following term is defined in Chapter 2:~~

~~**UNSTABLE (REACTIVE) MATERIAL.**~~

~~**Class 4.**~~
~~**Class 3.**~~
~~**Class 2.**~~
~~**Class 1.**~~

Add new text as follows:

6602.1 Compressed gases. *Compressed gases* shall also comply with Chapter 53.

CHAPTER 67 WATER-REACTIVE SOLIDS AND LIQUIDS

Delete without substitution:

~~SECTION 6702 DEFINITION~~

~~**6702.1 Definition.**~~

~~The following term is defined in Chapter 2:~~

~~**WATER-REACTIVE MATERIAL.**~~

~~**Class 3.**~~
~~**Class 2.**~~
~~**Class 1.**~~

Reason: The intent of this proposal is to remove the lists of defined terms included within each chapter of the IFC. The list of definitions is found in the XX02 sections, and provides no useful information other a list of defined terms.

In the 2012 IFC, all the definitions were consolidated into Chapter 2. The lists of terms in the XX02 sections are vestiges of the previous format where the definitions appeared in each chapter. At one time, the XX02 sections contained terms which had a definition specific to a given chapter and only applicable within that chapter. The reformatting which moved all defined terms to Chapter 2 results in chapter-specific definitions no longer being an option. The lists of defined terms have not been maintained with a correct correlation to the new defined terms added to Chapter 2 and do not even contain all the defined terms used in each chapter. More importantly, when the code user seeks a definition, they do not refer to the XX02 sections, they return to Chapter 2 where the definitions are found.

The IBC removed the XX02 sections in the 2018 edition and there has been no negative consequence. The XX02 sections in the IFC no longer provide any guidance or assistance to the code user. It is time to remove these lists from the IFC. Rather than renumber every section in the code, it has been attempted to repurpose the XX02 section by relocating some criteria from within each chapter.

Ch 3 – Permit requirements are moved to Section 302.

Ch 4 – Sections 401.2 through 401.8 relocated to Section 402 Emergency Procedures.

Ch 5 – Section 501.4 Timing of Installation is moved to Section 502. New Section 502.1 contains provisions for access roads and water supply. The second sentence is deleted because it is duplicated in Section 505.2, and therefore unnecessary.

Ch 6 – Sections 601.2 and 601.2.1 are moved to 602 Unsafe Conditions.

Ch 7 – Section 702.1 is inserted to address all types of construction and refer to the specific IBC sections appropriate for the construction of each component. Sections 701.2 through 701.2.1 addressing fire-resistant and smoke-resistant construction are relocated to follow Section 702.1.

Ch 8 – Two sentences from Section 801.1 dealing with application to new and existing buildings are relocated to Section 802 and separated into two separate sections.

Ch 9 – Relocated provisions from Section 901.4.7 Fire Pump Rooms and Riser Rooms to Section 902. This matches the text in the IBC.

Ch 10 – Added provisions for maintenance and fire safety/evacuation plans to Section 1002. These new sections are similar to the current text in the IBC.

Ch 11 – Relocated Section 1101.4 for notification of the owner and scheduling to Section 1102.

Ch 12 – Relocated Section 1201.3 Mixed Systems to Section 1202.

Ch 20 – Relocated Section 2001.2 Regulations Not Covered to Section 2002.

Ch 21 – Section 2102 is deleted and the chapter is renumbered.

Ch 22 – Relocated Section 2204 Dust Explosion Screening Test is moved to Section 2202. References to 2205 are corrected to 2204. Section 2205 to be renumbered.

Ch 23 – Relocated Section 2301.3 to Section 2302.

Ch 24 – Relocated Section 2410 Floor Surfacing and Finishing Operations to Section 2402.

Ch 25 – Section 2506 Ethylene Generators is relocated to 2502. Section 2501.3 is deleted since it states that “approved” ethylene generators must comply with Section 2506, and Section 2506.1 new Section 2502.1) states all ethylene generators must be listed and approved. Therefore, all equipment must be approved, and Section 2501.3 provides no additional information or requirements.

Ch 26 – Relocated Section 2603.3 for safety and notification to Section 2602. Section 2602.4 contains provisions that were previously in Sections 2603.3.5 and 2603.3.4. They both address evacuation, one during fumigation and the other during fogging. These two sections are combined into one section. The remainder of Section 2603 is renumbered.

Ch 27 – Relocated Sections 2701.2 and 2701.4 for application to Section 2702 Application.

Ch 28 – Section 2801.2 to relocated to Section 2802.

Ch 29 – Section 2901.3 is relocated to Section 2902 Maintenance.

Ch 30 – Second sentence from Section 3001.1 is relocated to Section 3002. The reference to complying with “this chapter” is deleted in the new section 3002.1 because it is already stated in Section 3001.1.

Ch 31 – Relocated 5 sentences to Section 3102. New Section 3102 addresses application to specific operations. The items were editorially reformatted to clarify the sections applicable to temporary tents and structures versus permanent tents and membrane structures.

Ch 32 – Sections 3201.3 through 3201.4 are relocated to Section 3202 Documentation.

Ch 33 – Sections 3303.1 are relocated to Section 3302 Safety Plan.

Ch 34 – The last sentence of Section 3401.1 is reworded and becomes Section 3402.

Ch 35 – Sections 3501.3 and 3501.4 are relocated to Section 3502 Other Requirements.

Ch 36 – Section 3601.2 Plans and Approvals is relocated to Section 3602.

Ch 37 – Section 3701.2 is relocated to Section 3702 Applicability.

Ch 38 – Section 3801.2 is relocated to Section 3702 Application. The section is separated into 2 sections. Section 3802.1 addresses the provisions in Ch 38 as being revisions to other requirements in the code. Section 3802.2 addresses the requirements applicable for materials below the MAQ.

Ch 39 – Section 3901.2 is relocated to Section 3902 Application, and separated into 2 sections. Section 3902.1 addresses existing buildings and facilities. Section 3902.2 addresses existing processes and changes in the extraction medium.

Ch 40 – Section 4001.1.1 is relocated to Section 4002 Nonapplicability.

Ch 41 – Section 4102 is created. Section 4101.3 becomes 4102.1 and the entire chapter is renumbered.

Ch 50 – Section 5001.3 is relocated to Section 5002 Performance-based Design. Subsections of 5001 are renumbered and referenced sections revised to match new Section 5002.

Ch 51 – Section 5101.4 is relocated to Section 5102 Aerosol Containers.

Ch 53 – Second and third paragraphs in Section 5301.1 are relocated to Section 5302 Other Regulations. Items 2 through 5 are editorially revised to correlate the format.

Ch 54 – Second sentence in Section 5401.1 is relocated to Section 5402 Other Requirements.

Ch 55 – Second sentence in Section 5501.1 regarding haz mat is relocated to Section 5502 Other Regulations. Also, the last 3 paragraphs of Section 5501.1 are also relocated to Section 5502 and editorially revised to correlate the format.

Ch 56 – Sections 5601.8.1 through 5601.8.1.4 are relocated to Section 5602 Quantities and Distances. Section 5602.3 is added as a charging section for the subsections dealing with the weight of explosives. Other sections throughout the chapter are revised to reference the correct sections.

Ch 57 – Section 5701.5 is relocated to Section 5702 Material Classification. Each paragraph is separated into a separate subsection, dealing with mixtures and liquids heated above the flash point.

Ch 58 – The second and fourth sentences of Section 5801.1 are relocated to Section 5802 Other Requirements and separated into individual items. The items are editorially revised to correlate the format. The third sentence of Section 5801.1 is deleted since it simply referencing a section in this chapter. The first sentence already says these materials need to comply.

Ch 59 – Section 5902 is deleted. The remainder of the chapter is to be renumbered.

Ch 60 – The last sentence of Section 6001.1 is relocated to Section 6002 Other Requirements.

Ch 61 – The last sentence from Section 6101.1 is relocated to Section 6102 LP-gas.

Ch 62 – The second paragraph from Section 6201.1 is relocated to Section 6202 Other Requirements.

Ch 63 – The last sentence from Section 6301.1 is relocated to Section 6302 Other Requirements.

Ch 64 – The last sentence from Section 6401.1 is relocated to Section 6402 Other Requirements.

Ch 65 – The second paragraph from Section 6501.1 is relocated to Section 6502 Other Requirements.

Ch 66 – The last sentence from Section 6601.1 is relocated to Section 6602 Other Requirements.

Ch 67 – Section 6702 is deleted. The remainder of the chapter would be renumbered.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal deletes the XX02 sections (definitions) in each chapter with other text relocated from elsewhere in the chapter. In some cases, the text is editorially revised to make the sections correlate. No new requirements are created.

F1-24

F2-24

IFC: 301.2, 501.2, 501.3, 901.2, 901.3, 901.6.3, 901.6.3.1, 901.5, 1101.3, 2001.3, 2101.2, 2201.2, 2301.2, 2301.3, 2401.3, 2501.2, 2601.2, 2701.5, 2801.2, 2901.2, 3001.2, 3103.2, 3201.2, 3201.3.1, 3401.2, 3501.2, 3601.2, 3701.3, 3901.3, 5001.5, 5101.2, 5301.2, 5501.2, 5601.2, 5701.4, 5801.2, 5901.2, 6001.2, 6101.2, 6201.2, 6301.2, 6401.2, 6501.2, 6601.2, 6701.2

Proponents: Steven Orlowski, Sundowne Building Code Consultants, LLC, Self (sorlowski@sbcc.codes); Robert Marshall, San Mateo Consolidated Fire Department, International Association of Fire Chiefs- Fire and Life Safety Section (rmarshall@smcfire.org)

2024 International Fire Code

Delete without substitution:

~~301.2 Permits~~.
~~Permits shall be required as set forth in Section 105.5 for the activities or uses regulated by Sections 306, 307, 308, 315, 320 and 321.~~

~~501.2 Permits~~.
~~A permit shall be required as set forth in Sections 105.5 and 105.6.~~

~~501.3 Construction documents~~. ~~*Construction documents* for proposed fire apparatus access, location of *fire lanes*, security gates across fire apparatus access roads and *construction documents* and hydraulic calculations for fire hydrant systems shall be submitted to the fire department for review and approval prior to construction.~~

~~901.2 Construction documents~~.
~~The *fire code official* shall have the authority to require *construction documents* and calculations for all *fire protection* and *life safety systems* and to require permits be issued for the installation, rehabilitation or modification of any *fire protection* and *life safety systems. Construction documents* for *fire protection* and *life safety systems* shall be submitted for review and approval prior to system installation.~~

~~901.3 Permits~~.
~~Permits shall be required as set forth in Sections 105.5 and 105.6.~~

~~901.6.3 Records~~. ~~Records of all system inspections, tests and maintenance shall be maintained in accordance with Section 110.3.~~

~~901.6.3.1 Records information~~. ~~Initial records shall include the name of the installation contractor, type of components installed, manufacturer of the components, location and number of components installed per floor. Records shall include the manufacturers' operation and maintenance instruction manuals. Such records shall be maintained for the life of the installation.~~

~~901.5 Administration of installation acceptance testing~~.
~~Fire protection and *life safety* systems and appurtenances thereto shall be subject to acceptance tests as contained in the installation standards and as *approved* by the *fire code official*. The *fire code official* shall be notified before any required acceptance testing.~~

~~1101.3 Permits~~.
~~Permits shall be required as set forth in Sections 105.5 and 105.6 and the *International Building Code*.~~

~~2001.3 Permits~~.
~~For permits to operate aircraft-refueling vehicles, application of flammable or combustible finishes and hot work, see Section 105.5.~~

~~2101.2 Permit required~~.
~~Permits shall be required as set forth in Section 105.5.~~

~~2201.2 Permits~~.
~~Permits shall be required for *combustible dust* producing operations as set forth in Section 105.5.~~

~~2301.2 Permits~~.
~~Permits shall be required as set forth in Section 105.5.~~

~~2301.3 Construction documents~~.
~~*Construction documents* shall be submitted for review and approval prior to the installation or construction of automotive, marine or fleet vehicle motor fuel-dispensing facilities and repair garages in accordance with Section 106.1.~~

~~2401.3 Permits~~.
~~Permits shall be required as set forth in Sections 105.5 and 105.6.~~

~~2501.2 Permits~~.
~~Permits shall be required as set forth in Section 105.5.~~

~~2601.2 Permits~~.
~~Permits shall be required as set forth in Section 105.5.~~

~~2701.5 Permits~~.
~~Permits shall be required as set forth in Section 105.5.~~

~~2801.2 Permit~~.
~~Permits shall be required as set forth in Section 105.5.~~

~~2901.2 Permits~~.
~~Permits shall be required as set forth in Section 105.5.~~

~~3001.2 Permits~~.
~~Permits shall be required as set forth in Sections 105.5 and 105.6.~~

~~3103.2 Approval required~~.
~~*Tents* and *membrane structures* required to have a permit, as set forth in Sections 105.5 and 105.6, shall not be erected, operated or maintained for any purpose without first obtaining a permit and approval from the *fire code official*.~~

~~**3201.2 Permits**~~**.**
~~A permit shall be required as set forth in Sections 105.5 and 105.6.~~

~~**3201.3.1 Approved construction documents**~~**.** ~~Following approval of the *construction documents*, a copy of the *approved* plans shall be maintained on the premises in an *approved* location.~~

~~**3401.2 Permit required**~~**.**
~~Permits shall be required as set forth in Section 105.5.~~

~~**3501.2 Permits**~~**.**
~~Permits shall be required as set forth in Section 105.5.~~

~~**3601.2 Plans and approvals**~~**.** ~~Plans for marina fire protection facilities shall be *approved* prior to installation. The work shall be subject to final inspection and approval after installation.~~

~~**3701.3 Permits**~~**.**
~~Permits shall be required as set forth in Section 105.5.~~

~~**3901.3 Permits**~~**.**
~~Permits shall be required as set forth in Sections 105.5 and 105.6.~~

Revise as follows:

5001.5 ~~Permits~~Facility Closure Plan.
~~Permits shall be required as set forth in Sections 105.5 and 105.6.~~
Where required by the *fire code official*, permittees shall apply for approval to permanently close a storage, use or handling facility. Such application shall be submitted not less than 30 days prior to the termination of the storage, use or handling of hazardous materials. The *fire code official* is authorized to require that the application be accompanied by an *approved* facility closure plan in accordance with Section 5001.6.3.

Delete without substitution:

~~**5101.2 Permit required**~~**.**
~~Permits shall be required as set forth in Section 105.5.~~

~~**5301.2 Permits**~~**.**
~~Permits shall be required as set forth in Section 105.5.~~

~~**5501.2 Permits**~~**.**
~~Permits shall be required as set forth in Section 105.5.~~

~~**5601.2 Permit required**~~**.**
~~Permits shall be required as set forth in Section 105.5 and regulated in accordance with this section.~~

~~**5701.4 Permits.**~~
~~Permits shall be required as set forth in Sections 105.5 and 105.6.~~

~~**5801.2 Permits.**~~
~~Permits shall be required as set forth in Section 105.5.~~

~~**5901.2 Permits.**~~
~~Permits shall be required as set forth in Section 105.5.~~

~~**6001.2 Permits.**~~
~~Permits shall be required as set forth in Section 105.5.~~

Revise as follows:

6101.2 Permits <u>for filling LP-gas continers</u>.
~~Permits shall be required as set forth in Sections 105.5 and 105.6.~~
Distributors shall not fill an LP-gas container for which a permit is required unless a permit for installation has been issued for that location by the *fire code official*.

Delete without substitution:

~~**6201.2 Permits.**~~
~~Permits shall be required for organic peroxides as set forth in Section 105.5.~~

~~**6301.2 Permits.**~~
~~Permits shall be required as set forth in Section 105.5.~~

~~**6401.2 Permits.**~~
~~Permits shall be required as set forth in Section 105.5.~~

~~**6501.2 Permits.**~~
~~Permits shall be required as set forth in Section 105.5.~~

~~**6601.2 Permits.**~~
~~Permits shall be required as set forth in Section 105.5.~~

~~**6701.2 Permits.**~~
~~Permits shall be required as set forth in Section 105.5.~~

Reason: There are several sections throughout many chapters in the International Fire Code, which require permits needing to comply with Section 105 and construction documents complying with Section 106. The purpose of this proposal is to remove the redundancy and the pointers as they are not necessary. This proposal does acknowledge that in some chapters the requirements are different than the general permitting requirements, such as Chapter 50 and Chapter 61 (Section 5001.2 requires a permit for facility closures and Section 6101.2 requires permits for filling LP-gas containers, both of which are not listed in section 105). This proposal is strictly editorial in nature and does not remove the code officials ability to require permits.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal removes redundant pointers in several chapter of the IFC, that point back to section 105 and 106 for permitting and construction document requirements. This proposal is editorial in nature and has no cost impact on construction.

F2-24

F3-24

IFC: 105.5.2

Proponents: William Koffel, Koffel Associates, Inc., Household & Consumer Products Association (HCPA) (wkoffel@koffel.com)

2024 International Fire Code

Revise as follows:

105.5.2 Aerosol products, aerosol cooking spray products, plastic aerosol 2 products, and plastic aerosol 3 products.
An operational permit is required to manufacture, store or handle an aggregate quantity of Level 2 or Level 3 aerosol products, aerosol cooking spray products, plastic aerosol 2 products, or plastic aerosol 3 products in excess of 500 pounds (227 kg) net weight.

Reason: Adding plastic aerosol 2 products to the permit requirements is consistent with other proposed changes to the IFC and the current edition of NFPA 30B.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The requirement is for an operational permit which should not impact the cost of construction.

F3-24

F4-24

IFC: 105.5.14

Proponents: William Koffel, Koffel Associates, Inc., California Solar and Storage Association (CALSSA) (wkoffel@koffel.com)

2024 International Fire Code

Revise as follows:

105.5.14 Energy storage systems.
An operational permit is required for ~~stationary and~~ mobile energy storage systems regulated by Section 1207.

Reason: While the need for an operational permit for mobile ESS is understandable, there do not appear to be any operational considerations with a stationary ESS. The construction permit required by Section 105.6 adequately addresses stationary ESS. CALSSA members have reported that only a few, if any, fire officials are issuing operational permits for stationary ESS.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0.00 Cost will decrease.

Estimated Immediate Cost Impact Justification (methodology and variables):

Eliminating the need for an operational permit for stationary ESS will decrease the cost of such systems. Operational permits are also not related to construction costs.

F4-24

F5-24

IFC: 105.5.36

Proponents: Scott Plumer, Arvada Fire Protection District, Arvada Fire Protection District

2024 International Fire Code

Revise as follows:

105.5.36 Open burning. An operational permit is required for the kindling or maintaining of an open fire or a fire on any public street, alley, road, or other public or private ground. Instructions and stipulations of the permit shall be complied with.

Exception: *Recreational fires* and *portable outdoor fireplaces*.

Reason: This proposal adds an exception for *portable outdoor fireplaces* to the open burning requirements. There is no need to require permits for these appliances since the code already requires they be used according to the manufacturer instructions.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal will not affect the cost of construction as it is a clarification only.

F5-24

F6-24

IFC: 105.5.58 (New)

Proponents: Scott Eckstein, Richardson Fire Department, Richardson Fire Department (scott.eckstein@cor.gov)

2024 International Fire Code

Add new text as follows:

105.5.58 Indoor Assembly Events. An operational permit is required to conduct an *indoor assembly event* where planned attendance exceeds 500 persons.

Exception: When the *indoor assembly event* is utilized as part of a Group A occupancy and for the purpose of religious worship.

Reason: Crowd managers are required per 403.11.3 (IFC 2021) for outdoor events over 1,000 people and for indoor assemblies events over 500 people. Indoor events are becoming more prevalent in assembly and educational occupancies that are not connected to religious worship. These indoor events frequently do not fall under the use of carnival, trade show, exhibitition or other types of gathering.

The code should be updated to include the use of an operational permit for indoor assembly events when a crowd manager would otherwise be required.

Bibliography: This alteration is conceptual in nature and is meant to address when a permit is required for indoor assembly events when a crowd manager is already required, but no permit exists.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

There is no real cost impact to developers or organizers. Frequently fire departments are already involved and provide safety information to organizers when the indoor assembly event exceeds a certain size.

F6-24

F7-24

IFC: SECTION 202; IBC: SECTION 202

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Megan Hall, UC Berkeley Fire Prevention, self (mchall@berkeley.edu); Lynne Kilpatrick, HMEx Assistant LLC, self (lynne.kilpatrick@hmexassistant.com)

2024 International Fire Code

Revise as follows:

AEROSOL PRODUCT. A combination of a container, a propellant and a material that is dispensed. Aerosol products shall be classified by means of the calculation of their chemical heats of combustion and shall be designated Level ~~1, Level 2 or Level 3.~~3, Level 2 or Level 1.

~~Level 1 aerosol products~~ Level 3. ~~Those with a total chemical heat of combustion that is less than or equal to 8,600 British thermal units per pound (Btu/lb) (20 kJ/g)~~. An aerosol product that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as an Aerosol (Category 1). Where the GHS category is not known, the following is acceptable for classification purposes: Those with a total chemical heat of combustion that is greater than 13,000 Btu/lb (30 kJ/g)..

~~Level 2 aerosol products~~ Level 2. An aerosol product that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as an Aerosol (Category 2). Where the GHS category is not known, the following is acceptable for classification purposes:Those with a total chemical heat of combustion that is greater than 8,600 Btu/lb (20 kJ/g), but less than or equal to 13,000 Btu/lb (30 kJ/g).

~~Level 3 aerosol products~~ Level 1. ~~Those with a total chemical heat of combustion that is greater than 13,000 Btu/lb (30 kJ/g).~~ An aerosol product that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as an Aerosol (Category 3). Where the GHS category is not known, the following is acceptable for classification purposes: Those with a total chemical heat of combustion that is less than or equal to 8,600 British thermal units per pound (Btu/lb) (20 kJ/g).

2024 International Building Code

Revise as follows:

[F] AEROSOL PRODUCT. A combination of a container, a propellant and a material that is dispensed. Aerosol products shall be classified by means of the calculation of their chemical heats of combustion and shall be designated Level ~~1, Level 2 or Level~~ 3, Level 2 or Level 1.

~~Level 1 aerosol products~~ Level 3. ~~Those with a total chemical heat of combustion that is less than or equal to 8,600 British thermal units per pound (Btu/lb) (20 kJ/g)~~. An aerosol product that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as an Aerosol (Category 1). Where the GHS category is not known, the following is acceptable for classification purposes: Those with a total chemical heat of combustion that is greater than 13,000 Btu/lb (30 kJ/g).

~~Level 2 aerosol products~~ Level 2. An aerosol product that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as an Aerosol (Category 2). Where the GHS category is not known, the following is acceptable for classification purposes:Those with a total chemical heat of combustion that is greater than 8,600 Btu/lb (20 kJ/g), but less than or equal to 13,000 Btu/lb (30 kJ/g).

~~Level 3 aerosol products~~ Level 1. ~~Those with a total chemical heat of combustion that is greater than 13,000 Btu/lb (30 kJ/g).~~ An aerosol product that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as an Aerosol (Category 3). Where the GHS category is not known, the following is acceptable for classification purposes: Those with a total chemical heat of combustion that is less than or equal to 8,600 British thermal units per pound (Btu/lb) (20 kJ/g).

Reason:
Fire Code officials must enforce the hazardous materials provisions of the International Fire Code (IFC) and the International Building Code (IBC) to ensure that people and property in our communities are safe. While code officials need to verify and validate the hazards of materials, classifying hazardous materials in accordance with definitions and hazard classes in the I-codes is the responsibility of facility owners and is an ongoing challenge. Consequences of missing or incorrect classification include increased fire and life safety risk and can lead to misclassification of an occupancy.

Due to the expansion of international chemical trade, the United Nations (UN) developed a Globally Harmonized System (GHS) of classification of hazardous materials. The GHS is an internationally agreed upon standard of classification and labeling that in most cases utilizes prescriptive, standardized testing procedures and criteria to classify hazardous materials. Federal law (29 CFR 1910.1200 (OSHA) and 49 CFR 173.127 (DOT)) mandates that manufacturers selling, producing or transporting chemicals in the United States classify chemicals according to the GHS system and make the information readily available in product Safety Data Sheets (SDSs).

This proposal aims to incorporate the readily available GHS (Revision 7) classifications into the I-code definitions to better align with federal standards for hazardous materials classification. Proper identification of multiple hazards and the degree of hazard are likely outcomes of utilizing the GHS.

For consistency with other Hazardous Materials classifications throughout the I-codes, this proposal re-orders the Aerosol products to list the highest hazard materials first (Level 3), followed in order by reduced level of hazard, ending with the least hazardous material (Level 1).

Aerosol definitions are similar between IFC and GHS, with the same cut-off values for heat of combustion. However, GHS definitions of aerosols include additional testing criteria including ignition distance tests and percentage of flammable components. Minimal changes are anticipated by using the proposed definitions.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is meant to provide correlation with the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) which is used globally and by OSHA. This revised definition will not affect the application of the code and will make compliance more straightforward. US manufacturers and distributors of hazardous materials have been required to use the GHS classification system to communicate the hazards of materials in Safety Data Sheets (SDS) since 2012.

F7-24

F8-24

IFC: SECTION 202

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Fire Code

Revise as follows:

AIRCRAFT OPERATION AREA (AOA). Any area used or intended for use for the parking, taxiing, takeoff, landing or other ground-based or water-based aircraft activity.

AIRPORT. An area of land, water, or structural surface that is used, or intended for use, for the landing and taking off of aircraft with an overall length greater than 39 feet (11 887 mm) and an overall exterior fuselage width greater than 6.6 feet (2012 mm), and any appurtenant areas that are used or intended for use for airport buildings and other airport facilities.

Reason: The intent of the code was always to apply to seaplane facilities as well as land based plane facilities. The change clarifies the intent of the code.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The change is a clarification that seaplane facilities are included as part of these defined terms.

F8-24

F9-24

IFC: SECTION 202 (New); IBC: SECTION 202 (New)

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Lynne Kilpatrick, HMEx Assistant LLC, self (lynne.kilpatrick@hmexassistant.com); Megan Hall, UC Berkeley Fire Prevention, self (mchall@berkeley.edu)

2024 International Fire Code

Add new definition as follows:

ASPHYXIANT. A gas or vapor that displaces oxygen in the ambient atmosphere and can thus cause oxygen deprivation in those who are exposed, leading to unconsciousness and death. These materials are categorized under OSHA (29 CFR 1910.1200) as a Simple Asphyxiant.

ASPHYXIANT, SIMPLE. An asphyxiant that, within the context of this code, exhibits no other health hazard or physical hazard. Examples of simple asphyxiants include nitrogen, argon, and helium.

2024 International Building Code

Add new definition as follows:

ASPHYXIANT. A gas or vapor that displaces oxygen in the ambient atmosphere and can thus cause oxygen deprivation in those who are exposed, leading to unconsciousness and death. These materials are categorized under OSHA (29 CFR 1910.1200) as a Simple Asphyxiant.

ASPHYXIANT, SIMPLE. An asphyxiant that, within the context of this code, exhibits no other health hazard or physical hazard. Examples of simple asphyxiants include nitrogen, argon, and helium.

Reason: Both asphyxiants and simple asphyxiants are terms used in the IFC, but neither is currently defined.

The proposed definition of simple asphyxiant is consistent with its use in the IFC and the definition currently provided in NFPA 704, Standard System for the Identification of the Hazards of Materials for Emergency Response, in that a simple asphyxiant must present no health or physical hazard other than asphyxiation.

The Globally Harmonized System (GHS) of classification does not define these terms, but under OSHA's Hazard Communication Standard, simple asphyxiants may also exhibit physical hazards. Liquefied flammable gases are materials considered to be simple asphyxiants under OSHA but not the IFC. When this term appears in Safety Data Sheets (SDS) for materials, it can be confusing since it is inconsistent with its use in the IFC. In this instance, it is considered more important to align the definitions with the IFC and NFPA 704 than with the OSHA definition.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the FCAC Website

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposed definitions only serve to clarify terms currently used in the IFC and will not impact the cost of construction or maintenance of new or existing buildings and facilities.

F9-24

F10-24

IFC: SECTION 202 (New); IBC: SECTION 202 (New)

Proponents: Steve Thomas, Shums Coda Associates, Himself (sthomas@coloradocode.net)

2024 International Fire Code

Add new definition as follows:

AUTOMATIC FIRE DETECTION SYSTEM. A system that senses the presence of fire, smoke, or heat and activates a fire suppression system or an automatic alarm system.

2024 International Building Code

Add new definition as follows:

AUTOMATIC FIRE DETECTION SYSTEM. A system that senses the presence of fire, smoke, or heat and activates a fire suppression system or an automatic alarm system.

Reason: There has been some confusion on whether an automatic fire detection system includes automatic sprinklers or not. The intent of this proposal is to clarify that the system does include automatic sprinklers. The term is used in several locations within the IBC and the IFC. The definition is based on the same term in the NFPA 2021 Glossary of Terms.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposal intends to clarify a code requirement.

F10-24

F11-24

IFC: SECTION 202, 202, SECTION 202 (New)

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Robert J Davidson, Davidson Code Concepts LLC, Self (rjd@davidsoncodeconcepts.com)

2024 International Fire Code

SECTION 202
GENERAL DEFINITIONS

BATTERY TYPES. For the purposes of this code, certain types are defined as follows:

Revise as follows:

Flow battery. A type of storage battery that includes chemical components dissolved in two different liquids. Ion exchange, which provides the flow of electrical current, occurs through the membrane while both liquids circulate in their respective spaces. (Includes vanadium redox, zinc-bromine, polysulfide-bromide, and other flowing electrolyte-type technologies).

Lead-acid battery. ~~A~~ An aqueous storage battery that is comprised of lead electrodes ,(lead dioxide Is the active material for the positive anode and metallic lead is the active material for the negative cathode), immersed in a solution of water and sulfuric acid electrolyte. Common major classification distinctions (i.e., types) include, vented lead-acid (VLA) , and valve-regulated lead-acid (VRLA). The VRLA is further subdivided into two types representing the method in which the electrolyte is immobilized: either gelled (gel cell) or absorbed in finely-woven porous fiberglass mat (AGM) separators inside the battery between the electrodes.

~~**Lithium metal polymer**~~ **Lithium-sulfur rechargeable battery.** A storage battery that is similar to the lithium-ion battery except that it has a lithium metal anode in the place of the traditional carbon or graphite anode. A lithium-sulfur battery is a secondary (rechargeable) battery that has lithium metal at the anode, sulfur at the cathode, and the electrolyte is nonaqueous.

Lithium-ion battery. A storage battery with lithium ions serving as the charge carriers of the battery. The electrolyte is a polymer mixture of carbonates with ~~an inorganic~~ flammable organic salt ~~and can be~~ in a liquid ~~or a gelled polymer~~ form. Lithiated metal or mixed metal oxides (e.g. cobalt [LCO], manganese [LMO], nickel-manganese-cobalt [NMC or NCM], nickel-cobalt-aluminum [NCA] or iron phosphate [LFP]) ~~is~~ typically ~~a~~ make up the cathode and forms of carbon or graphite (or lithium titanate oxide [LTO]) typically form the anode. Each of these different types of cathodes and anode combinations produce different energy densities, different lifetimes, differing fast charge abilities, and differing safety characteristics, among many other things. The choice of Li-ion chemistry is often driven by whichever of these factors or best mix of factors is/are most important for the application.

Nickel-cadmium (Ni-Cd) battery. An alkaline storage battery in which the positive active material is nickel oxide, the negative electrode contains cadmium and the electrolyte is a solution of water and potassium hydroxide. They lose less life at high temperatures and have better capacity at low temperatures than most other battery technologies, and have a long life if not cycled too much.

Nickel-metal hydride (Ni-MH). An alkaline storage battery in which the positive active material is nickel oxide, the negative electrode is an intermetallic compound and the electrolyte is usually potassium hydroxide solution in water.

Delete without substitution:

~~**Stationary storage battery.** A group of electrochemical cells interconnected to supply a nominal voltage of DC power to a suitably connected electrical load, designed for service in a permanent location.~~

Add new definition as follows:

BATTERY. A class of devices which contain materials that convert chemical energy into electrical energy which then can be used as a power source. There are several technologies that utilize a variety of materials and chemistries for the purpose of storing this electro-chemical energy for use when required.

Electrochemical double layer capacitors (EDLCs).
These devices are usually built up from an electrolyte, a separator, and two carbon-based electrodesAlso referred to as supercapacitors, they store energy using either ion adsorption (electrochemical double layer capacitors) or fast surface redox reactions (pseudo-capacitors). They are commonly also called “supercapacitors” or the trademarked “ultracapacitor™” because they store orders of magnitude more power and energy for the same unit mass or volume as a traditional electrolytic capacitor. They can release power and accept charge much faster than batteries for the same footprint, but store much less energy.

Hybrid supercapacitor Battery (Lithium-ion capacitor (LIC). The lithium-ion capacitor (LIC or LiC) is a hybrid type of capacitor classified as a type of supercapacitor. It combines lithium-ion technology and electric double layer capacitor (EDLC) construction. It is called a hybrid because the anode is the same as those used in lithium-ion batteries and the cathode is the same as those used in supercapacitors. Activated carbon is typically used as the cathode. The anode of the LIC consists of carbon material which is often pre-doped with lithium ions.

Iron-air aqueous battery. The battery includes iron and air electrodes. Each of the cells are filled with water-based, non-flammable alkaline electrolyte (which functions partially like the anolytes and catholytes of flow batteries battery. The battery does not present the risk of thermal runaway. Like the Ni-Fe battery they are relatively coulombically inefficient on float charge, and thus are usually disconnected from the charge bus when at or nearing full charge.

Nickel Iron (Ni-Fe). The battery has nickel(III) oxide-hydroxide positive plates and iron negative plates, with an electrolyte of potassium hydroxide. The active materials are held in nickel-plated steel tubes or perforated pockets. Nickel-iron batteries do not cause spill concerns since there is no acid in the component. They are capable of tens of thousands of cycles and have calendar lifetimes of well over 50 years. However, they are highly coulombically inefficient (with the inefficiency coming from high percentages of water electrolysis from the charging current) when at or near full state-of-charge (SOC). As such, they are usually equipped with catalytic recombiner vents and automatic watering systems.

Nickel-hydrogen (NiH_2). The cells are a hybrid technology, combining elements from both batteries and fuel cells. The battery differs from a nickel–metal hydride (NiMH) battery by the use of hydrogen in gaseous form The nickel–hydrogen cells utilize the nickel hydroxide electrode from nickel–cadmium cells and a platinum hydrogen electrode from fuel cell technology to create a chemistry without the issues and limitations inherent with the cadmium electrode. The cell is contained within a hermetically sealed pressure vessel that envelopes the electrodes and accommodates the pressurized hydrogen.

Nickel-Zinc (Ni-Zn). A battery that is chemically similar to the nickel-metal hydride battery. Nickel and zinc have low toxicity, the battery is non-flammable, and presents no threat to the environment. The Ni-Zn battery uses an alkaline electrolyte (potassium hydroxide, KOH) and zinc acts as the negative electrode while nickel hydroxide is the positive electrode.

Sodium nickel chloride (NaNiCl). This battery is a member of the ‘high temperature’ family. which works at typical temperature scope of 270°C–350°C. Its cell contains sodium and nickel chloride electrodes, isolated by a beta-alumina electrolyte, which can conduct sodium particles yet not electrons. This chemistry is much safer than most battery chemistries with far fewer toxic materials involved in its production, but it does not have the cycling ability or energy density of most of the Li-ion chemistries.

Zinc-air aqueous battery. A zinc–air battery contains a zinc electrode and porous air electrode separated by a membrane and an aqueous alkaline electrolyte that is used in a manner similar to the catholytes and anolytes of a flow battery. The cathode is a bi-functional air electrode which features one or more catalysts that can perform the oxygen reduction reaction (ORR) during discharging and the oxygen evolution reaction (OER) during charging.

Zinc bromide. In zinc bromide batteries, the cathode is made using zinc instead of lithium. The electrolyte is water-based and, therefore, does not pose a fire risk.

Zinc manganese dioxide ($Zn\text{-}MnO_2$). The battery features a Zinc (Zn) anode and a dioxide (MnO_2) cathode with a strongly basic electrolyte (typically potassium hydroxide, KOH), The battery does not present environmental hazards and is EPA-certified for landfill disposal in the United States, and the aqueous electrolyte is non-flammable.

Reason: FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Over several cycles, and in the current code writing cycle for ICC and NFPA 855, new battery types have been vetted and added to provisions addressing energy storage systems. This proposal updates the existing definitions under the subheading of "BATTERY TYPES", adds ten new sub-definitions of recognized battery types, and adds a generic definition for a "battery" due to the additional areas of the IFC that now regulates batteries of various types.

The sub-definition of "stationary storage battery" is proposed for deletion as the portion of the code that applied to that term was eliminated when the energy storage system requirements were added which captured that type of installation.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal editorial updates the definitions related to batteries to correlate with current IFC and NFPA 855 requirements addressing the batteries. Existing definitions have been modified to correlate with current scientific descriptions and new battery types have been added. There are no technical requirement increases associated with these updated definitions. The modifications and additions will increase understanding of the application of the code requirements to these technologies.

F11-24

F12-24

IFC: SECTION 202; IBC: SECTION 202

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Megan Hall, UC Berkeley Fire Prevention, self (mchall@berkeley.edu); Lynne Kilpatrick, HMEx Assistant LLC, self (lynne.kilpatrick@hmexassistant.com)

2024 International Fire Code

Revise as follows:

COMBUSTIBLE LIQUID. A liquid having a closed cup *flash point* at or above 100°F (38°C). Combustible liquids shall be subdivided as follows:
The category of combustible liquids does not include *compressed gases* or *cryogenic fluids* or liquids that do not have a fire point when tested in accordance with ASTM D92.

Class II. A liquid that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as a Flammable Liquid (Category 3) and having a flashpoint at or above 100°F (38°C). Where the GHS category is not known, the following is acceptable for classification purposes: *Liquids* having a closed cup *flash point* at or above 100°F (38°C) and below 140°F (60°C).
Class IIIA. A liquid that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as a Flammable Liquid (Category 4). Where the GHS category is not known, the following is acceptable for classification purposes: *Liquids* having a closed cup *flash point* at or above 140°F (60°C) and below 200°F (93°C).
Class IIIB. *Liquids* having a closed cup *flash point* at or above 200°F (93°C).

FLAMMABLE LIQUID. A liquid having a closed cup *flash point* below 100°F (38°C). *Flammable liquids* are further categorized into a group known as Class I liquids. The Class I category is subdivided as follows:
The category of *flammable liquids* does not include *compressed gases* or *cryogenic fluids* or liquids that do not have a *fire point* when tested in accordance with ASTM D92.

Class IA. A liquid that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as a Flammable Liquid (Category 1). Where the GHS category is not known, the following is acceptable for classification purposes: *Liquids* having a *flash point* below 73°F (23°C) and a *boiling point* below 100°F (38°C).
Class IB. A liquid that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as a Flammable Liquid (Category 2). Where the GHS category is not known, the following is acceptable for classification purposes: *Liquids* having a *flash point* below 73°F (23°C) and a *boiling point* at or above 100°F (38°C).
Class IC. A liquid that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as a Flammable Liquid (Category 3) and having a flashpoint below 100°F (38°C). Where the GHS category is not known, the following is acceptable for classification purposes: *Liquids* having a *flash point* at or above 73°F (23°C) and below 100°F (38°C). The category of flammable liquids does not include *compressed gases* or *cryogenic fluids,* or liquids that do not have a fire point when tested in accordance with ASTM D92.

2024 International Building Code

Revise as follows:

[F] COMBUSTIBLE LIQUID. A *liquid* having a closed cup *flash point* at or above 100°F (38°C). Combustible liquids shall be subdivided as follows:
The category of combustible liquids does not include *compressed gases* or *cryogenic fluids* or *liquids* that do not have a fire point when tested in accordance with ASTM D92.

Class II. A liquid that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as a Flammable Liquid (Category 3) and having a flashpoint at or above 100°F (38°C). Where the GHS category is not known, the following is acceptable for classification purposes: *Liquids* having a closed cup *flash point* at or above 100°F (38°C) and below 140°F (60°C).
Class IIIA. A liquid that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as

a Flammable Liquid (Category 4). Where the GHS category is not known, the following is acceptable for classification purposes: *Liquids* having a closed cup *flash point* at or above 140°F (60°C) and below 200°F (93°C).

Class IIIB. *Liquids* having a closed cup *flash point* at or above 200°F (93°C).

[F] FLAMMABLE LIQUID. A *liquid* having a closed cup *flash point* below 100°F (38°C). Flammable liquids are further categorized into a group known as Class I liquids. The Class I category is subdivided as follows:

Class IA. A liquid that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as a Flammable Liquid (Category 1). Where the GHS category is not known, the following is acceptable for classification purposes: *Liquids* having a *flash point* below 73°F (23°C) and a *boiling point* below 100°F (38°C).

Class IB. A liquid that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as a Flammable Liquid (Category 2). Where the GHS category is not known, the following is acceptable for classification purposes: *Liquids* having a *flash point* below 73°F (23°C) and a *boiling point* at or above 100°F (38°C).

Class IC. A liquid that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as a Flammable Liquid (Category 3) and having a flashpoint below 100°F (38°C). Where the GHS category is not known, the following is acceptable for classification purposes: *Liquids* having a *flash point* at or above 73°F (23°C) and below 100°F (38°C). The category of flammable liquids does not include *compressed gases* or *cryogenic fluids,* or liquids that do not have a fire point when tested in accordance with ASTM D92.

Reason:

Fire Code officials must enforce the hazardous materials provisions of the International Fire Code (IFC) and the International Building Code (IBC) to ensure that people and property in our communities are safe. While code officials need to verify and validate the hazards of materials, classifying hazardous materials in accordance with definitions and hazard classes in the I-codes is the responsibility of facility owners and is an ongoing challenge. Consequences of missing or incorrect classification include increased fire and life safety risk and can lead to misclassification of an occupancy.

Due to the expansion of international chemical trade, the United Nations (UN) developed a Globally Harmonized System (GHS) of classification of hazardous materials. The GHS is an internationally agreed upon standard of classification and labeling that in most cases utilizes prescriptive, standardized testing procedures and criteria to classify hazardous materials. Federal law (29 CFR 1910.1200 (OSHA) and 49 CFR 173.127 (DOT)) mandates that manufacturers selling, producing or transporting chemicals in the United States classify chemicals according to the GHS system and make the information readily available in product Safety Data Sheets (SDSs).

This proposal aims to incorporate the readily available GHS (Revision 7) classifications into the I-code definitions to better align with federal standards for hazardous materials classification. Proper identification of multiple hazards and the degree of hazard are likely outcomes of utilizing the GHS.

Flammable and combustible liquid definitions are nearly identical between IFC and GHS, with the exception of Category 3. Category 3 spans both Flammable Liquids, Class IC and Combustible Liquids, Class II. Users will need to verify flashpoints to differentiate Category 3 liquids. No changes are anticipated by using the proposed definitions. See comparison:

	GHS Flammable Liquid				
	Category 1	Category 2	Category 3	Category 4	N/A
FL IA	FP < 73°F, BP < 100°F				
FL IB		FP < 73°F, BP >100°F			
FL IC			FP < 100°F		
CL II			FP > 100°F		
CL IIIA				140°F > FP < 200 °F	
CL IIIB					FP > 200°F

FL – Flammable Liquid (IFC)

CL – Combustible Liquid (IFC)

FP – Flash point

BP – Boiling Point

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Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is meant to provide correlation with the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) which is used globally and by OSHA. This revised definition will not affect the application of the code and will make compliance more straightforward. US manufacturers and distributors of hazardous materials have been required to use the GHS classification system to communicate the hazards of materials in Safety Data Sheets (SDS) since 2012.

F12-24

F13-24

IFC: SECTION 202; IBC: SECTION 202

Proponents: Andrew Klein, A S Klein Engineering, PLLC, Self Storage Association (andrew@asklein.com)

2024 International Fire Code

Revise as follows:

COMMERCIAL MOTOR VEHICLE. A motor vehicle used to transport passengers or property <u>in commerce </u>where the motor vehicle:

1. Has a gross vehicle weight rating of 10,000 pounds (454 kg) or more; or
2. Is designed to transport 16 or more passengers, including the driver.

2024 International Building Code

Revise as follows:

[F] COMMERCIAL MOTOR VEHICLE. A motor vehicle used to transport passengers or property <u>in commerce</u> where the motor vehicle meets one of the following:

1. Has a gross vehicle weight rating of 10,000 pounds (4540 kg) or more.
2. Is designed to transport 16 or more passengers, including the driver.

Reason: The current definition in the IFC for "Commercial Motor Vehicle is from 49 CFR Part 390.5, Federal Motor Carrier Safety Regulations, however the scope of those regulations deals exclusively with commercial motor vehicles which transport property or passengers in interstate <u>commerce</u>. This code change to the ICC aligns the IFC more closely with that federal regulation and helps avoid the improper application of this definition to RVs or vehicles used for van pools.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0.00 Construction costs for RV and van pool storage buildings could decrease.

Estimated Immediate Cost Impact Justification (methodology and variables):

Facilities designed for the storage of RVs and van pool vehicles will have a 12,000 SF threshold per fire area as opposed to a 5,000 SF threshold per fire area before sprinklers are required.

Estimated Life Cycle Cost Impact:

n/a

Estimated Life Cycle Cost Impact Justification (methodology and variables):

n/a

F13-24

F14-24

IFC: SECTION 202, SECTION 202 (New); IBC: SECTION 202, SECTION 202 (New)

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Lynne Kilpatrick, HMEx Assistant LLC, self (lynne.kilpatrick@hmexassistant.com); Megan Hall, UC Berkeley Fire Prevention, self (mchall@berkeley.edu)

2024 International Fire Code

Revise as follows:

COMPRESSED GAS. A material, or mixture of materials that:

1. Is a gas at 68°F (20°C) or less at 14.7 psia (101 kPa) of pressure; and
2. Has a *boiling point* of 68°F (20°C) or less at 14.7 psia (101 kPa) which is either liquefied, nonliquefied <u>(gaseous)</u> or in solution <u>(dissolved)</u>, except those gases which have no other health- or physical-hazard properties are not considered to be compressed until the pressure in the packaging exceeds 41 psia (282 kPa) at 68°F (20°C).

~~The states of a compressed gas are categorized as follows:~~

1. ~~Nonliquefied compressed gases are gases, other than those in solution, which are in a packaging under the charged pressure and are entirely gaseous at a temperature of 68°F (20°C).~~
2. ~~Liquefied compressed gases are gases that, in a packaging under the charged pressure, are partially liquid at a temperature of 68°F (20°C).~~
3. ~~Compressed gases in solution are nonliquefied gases that are dissolved in a solvent.~~
4. ~~Compressed gas mixtures consist of a mixture of two or more compressed gases contained in a packaging, the hazard properties of which are represented by the properties of the mixture as a whole.~~

Add new definition as follows:

<u>**COMPRESSED GAS, DISSOLVED.** Dissolved compressed gases, or gases in solution, are non-liquefied gases that are dissolved in a solvent. Under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS), these gases are categorized as Gases Under Pressure – Dissolved Gas.</u>

<u>**COMPRESSED GAS, GASEOUS.** Gaseous compressed gases are non-liquefied gases, other than those in solution (dissolved) which are in a packaging under the charged pressure and are entirely gaseous at a temperature of 68°F (20°C). Under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS), these gases are categorized as Gases Under Pressure – Compressed Gas.</u>

<u>**COMPRESSED GAS, LIQUEFIED.** Liquefied compressed gases are gases that, in a packaging under the charged pressure, are partially liquid at a temperature of 68°F (20°C). Under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS), these gases are categorized as Gases Under Pressure – Liquefied Gas.</u>

2024 International Building Code

Revise as follows:

[F] COMPRESSED GAS. A material or mixture of materials that meets both of the following:

1. Is a gas at 68°F (20°C) or less at 14.7 pounds per square inch atmosphere (psia) (101 kPa) of pressure.
2. Has a *boiling point* of 68°F (20°C) or less at 14.7 psia (101 kPa) which is either liquefied, nonliquefied <u>(gaseous)</u> or in solution <u>(disolved)</u>, except those gases which have no other health- or physical-hazard properties are not considered to be compressed until the pressure in the packaging exceeds 41 psia (282 kPa) at 68°F (20°C).

~~The states of a compressed gas are categorized as follows:~~

1. ~~Nonliquefied compressed gases are gases, other than those in solution, which are in a packaging under the charged pressure and are entirely gaseous at a temperature of 68°F (20°C).~~

2. ~~Liquefied compressed gases are gases that, in a packaging under the charged pressure, are partially *liquid* at a temperature of 68°F (20°C).~~

3. ~~Compressed gases in solution are nonliquefied gases that are dissolved in a solvent.~~

4. ~~Compressed gas mixtures consist of a mixture of two or more compressed gases contained in a packaging, the hazard properties of which are represented by the properties of the mixture as a whole.~~

Add new definition as follows:

[F] COMPRESSED GAS, DISSOLVED. Dissolved compressed gases, or gases in solution, are non-liquefied gases that are dissolved in a solvent. Under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS), these gases are categorized as Gases Under Pressure – Dissolved Gas.

[F] COMPRESSED GAS, GASEOUS. Gaseous compressed gases are non-liquefied gases, other than those in solution (dissolved) which are in a packaging under the charged pressure and are entirely gaseous at a temperature of 68°F (20°C). Under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS), these gases are categorized as Gases Under Pressure – Compressed Gas.

[F] COMPRESSED GAS, LIQUEFIED. Liquefied compressed gases are gases that, in a packaging under the charged pressure, are partially liquid at a temperature of 68°F (20°C). Under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS), these gases are categorized as Gases Under Pressure – Liquefied Gas.

Reason: Fire Code officials must enforce the hazardous materials provisions of the International Fire Code (IFC) and the International Building Code (IBC) to ensure that people and property in our communities are safe. While code officials need to verify and validate the hazards of materials, classifying hazardous materials in accordance with definitions and hazard classes in the I-codes is the responsibility of facility owners and is an ongoing challenge. Consequences of missing or incorrect classification include increased fire and life safety risk and can lead to misclassification of an occupancy.

Due to the expansion of international chemical trade, the United Nations (UN) developed a Globally Harmonized System (GHS) of classification of hazardous materials. The GHS is an internationally agreed upon standard of classification and labeling that in most cases utilizes prescriptive, standardized testing procedures and criteria to classify hazardous materials. Federal law (29 CFR 1910.1200 (OSHA) and 49 CFR 173.127 (DOT)) mandates that manufacturers selling, producing or transporting chemicals in the United States classify chemicals according to the GHS system and make the information readily available in product Safety Data Sheets (SDSs).

This proposal aims to incorporate the readily available GHS (Revision 7) classifications into the I-code definitions to better align with federal standards for hazardous materials classification. Proper identification of multiple hazards and the degree of hazard are likely outcomes of utilizing the GHS.

Revisions to the Compressed Gas definition and terms are proposed to better align with similar definitions and terms used by OSHA and the GHS. The GHS identifies four distinct categories of Gases Under Pressure (Compressed, Liquefied, Refrigerated Liquefied and Dissolved), while the IFC identifies four 'states' of Compressed Gas (non-liquefied, liquefied, gases in solution, and gas mixtures).

The definition of Compressed Gas has been restructured to provide three sub-definitions: Dissolved, Gaseous, and Liquefied. Dissolved gases are gases in solution. This term, 'gases in solution', is currently used in several places in Chapter 58. This proposal creates a new definition for Dissolved Compressed Gas, which contains the phrase 'gases in solution', so code users can continue to find the meaning of this term.

Non-liquefied compressed gases are referred to as Gaseous in Chapter 50. Thus, a new sub-definition is proposed to clarify and define this term. The comparable OSHA/GHS term is Compressed gas.

Liquefied compressed gases are defined and used similarly, and a relevant sub-definition is proposed.

Cryogenic Fluids, which are Refrigerated Liquefied Gases under the GHS, are defined separately under the IFC, and although they are liquefied gases, they are treated by the code as a separate hazard class. See Cryogenic Fluid defintion.Item 4, which addresses gas mixtures under the current definition, is proposed to be deleted. IFC Section 5001.2.1 currently addresses the classification of mixtures for all hazardous materials.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the FCAC Website

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is meant to provide correlation with the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) which is used globally and by OSHA. This revised definition will not affect the application of the code and will make compliance more straightforward. US manufacturers and distributors of hazardous materials have been required to use the GHS classification system to communicate the hazards of materials in Safety Data Sheets (SDS) since 2012.

F14-24

F15-24

IFC: SECTION 202; IBC: SECTION 202

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Lynne Kilpatrick, HMEx Assistant LLC, self (lynne.kilpatrick@hmexassistant.com); Megan Hall, UC Berkeley Fire Prevention, self (mchall@berkeley.edu)

2024 International Fire Code

Revise as follows:

CORROSIVE. A substance or mixture that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as either Skin Corrosion (Category 1A, 1B, or 1C), or Serious Eye Damage (Category 1). Where the GHS category is not known, the following is acceptable for classificationpurposes:
A chemical that causes visible destruction of, or irreversible alterations in, living tissue by chemical action at the point of contact. A chemical shall be considered corrosive if, when tested on the intact skin of albino rabbits by the method described in DOTn 49 CFR 173.137, such chemical destroys or changes irreversibly the structure of the tissue at the point of contact following an exposure period of 4 hours. This term does not refer to action on inanimate surfaces.

2024 International Building Code

Revise as follows:

[F] CORROSIVE. A substance or mixture that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as either Skin Corrosion (Category 1A, 1B, or 1C), or Serious Eye Damage (Category 1). Where the GHS category is not known, the following is acceptable for classification purposes:
A chemical that causes visible destruction of, or irreversible alterations in, living tissue by chemical action at the point of contact. A chemical shall be considered corrosive if, when tested on the intact skin of albino rabbits by the method described in DOTn 49 CFR, Part 173.137, such chemical destroys or changes irreversibly the structure of the tissue at the point of contact following an exposure period of 4 hours. This term does not refer to action on inanimate surfaces.

Reason: Fire Code officials must enforce the hazardous materials provisions of the International Fire Code (IFC) and the International Building Code (IBC) to ensure that people and property in our communities are safe. While code officials need to verify and validate the hazards of materials, classifying hazardous materials in accordance with definitions and hazard classes in the I-codes is the responsibility of facility owners and is an ongoing challenge. Consequences of missing or incorrect classification include increased fire and life safety risk and can lead to misclassification of an occupancy.

Due to the expansion of international chemical trade, the United Nations (UN) developed a Globally Harmonized System (GHS) of classification of hazardous materials. The GHS is an internationally agreed upon standard of classification and labeling that in most cases utilizes prescriptive, standardized testing procedures and criteria to classify hazardous materials. Federal law (29 CFR 1910.1200 (OSHA) and 49 CFR 173.127 (DOT)) mandates that manufacturers selling, producing or transporting chemicals in the United States classify chemicals according to the GHS system and make the information readily available in product Safety Data Sheets (SDSs).

This proposal aims to incorporate the readily available GHS (Revision 7) classifications into the I-code definitions to better align with federal standards for hazardous materials classification. Proper identification of multiple hazards and the degree of hazard are likely outcomes of utilizing the GHS. The current IFC definition for Corrosive materials is well aligned with the definitions of the GHS categories listed in that they both use destruction, or irreversible damage, of living tissue during a 4-hour exposure period to establish corrosivity.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the FCAC Website

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is meant to provide correlation with the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) which is used globally and by OSHA. This revised definition will not affect the application of the code and will make compliance more straightforward. US manufacturers and distributors of hazardous materials have been required to use the GHS classification system to communicate the hazards of materials in Safety Data Sheets (SDS) since 2012.

F15-24

F16-24

IFC: SECTION 202, SECTION 202 (New); IBC: SECTION 202, SECTION 202 (New)

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Lynne Kilpatrick, HMEx Assistant LLC, self (lynne.kilpatrick@hmexassistant.com); Megan Hall, UC Berkeley Fire Prevention, self (mchall@berkeley.edu)

2024 International Fire Code

Revise as follows:

CRYOGENIC FLUID. A fluid having a *boiling point* lower than -130°F (-89.9°C) at 14.7 pounds per square inch atmosphere (psia) (an absolute pressure of 101.3 kPa).Under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS), Cryogenic Fluids are categorized as a Gas Under Pressure – Refrigerated Liquefied Gas. However, not all GHS Refrigerated Liquefied Gases are Cryogenic Fluids.

Add new definition as follows:

CRYOGENIC FLUID, FLAMMABLE. A cryogenic fluid that is a flammable gas in its vapor state. These fluids are categorized under the Globally Harmonized System of Classification and Labeling of Chemicals (GHS) as Flammable Gas, Category 1A or Category 1B and Gases Under Pressure - Refrigerated Liquefied Gas.

CRYOGENIC FLUID, INERT. A cryogenic fluid that is an inert gas in its vapor state. These fluids are categorized under the Globally Harmonized System of Classification and Labeling of Chemicals (GHS) as Gases Under Pressure - Refrigerated Liquefied Gas.

CRYOGENIC FLUID, OXIDIZING. A cryogenic fluid that is an oxidizing gas in its vapor state. These fluids are categorized under the Globally Harmonized System of Classification and Labeling of Chemicals (GHS) as Oxidizing Gas, Category 1 and Gases Under Pressure - Refrigerated Liquefied Gas.

Revise as follows:

FLAMMABLE CRYOGENIC FLUID. ~~A *cryogenic fluid* that is flammable in its vapor state.~~ See *cryogenic fluid, flammable.*

OXIDIZING CRYOGENIC FLUID. ~~An oxidizing gas in the cryogenic state.~~See *cryogenic fluid, oxidizing*.

2024 International Building Code

Revise as follows:

[F] CRYOGENIC FLUID. A *liquid* having a *boiling point* lower than -150°F (-101°C) at 14.7 pounds per square inch atmosphere (psia) (an absolute pressure of 101 kPa). Under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS), Cryogenic Fluids are categorized as a Gas Under Pressure – Refrigerated Liquefied Gas. However, not all GHS Refrigerated Liquefied Gases are Cryogenic Fluids.

Add new definition as follows:

[F] CRYOGENIC FLUID, FLAMMABLE. A cryogenic fluid that is a flammable gas in its vapor state. These fluids are categorized under the Globally Harmonized System of Classification and Labeling of Chemicals (GHS) as Flammable Gas, Category 1A or Category 1B and Gases Under Pressure - Refrigerated Liquefied Gas.

[F] CRYOGENIC FLUID, INERT. A cryogenic fluid that is an inert gas in its vapor state. These fluids are categorized under the Globally Harmonized System of Classification and Labeling of Chemicals (GHS) as Gases Under Pressure - Refrigerated Liquefied Gas.

[F] CRYOGENIC FLUID, OXIDIZING. A cryogenic fluid that is an oxidizing gas in its vapor state. These fluids are categorized under the Globally Harmonized System of Classification and Labeling of Chemicals (GHS) as Oxidizing Gas, Category 1 and Gases Under Pressure - Refrigerated Liquefied Gas.

[F] FLAMMABLE CRYOGENIC FLUID. See cryogenic fluid, flammable.

[F] OXIDIZING CRYOGENIC FLUID. See cryogenic fluid, oxidizing.

Reason: Fire Code officials must enforce the hazardous materials provisions of the International Fire Code (IFC) and the International Building Code (IBC) to ensure that people and property in our communities are safe. While code officials need to verify and validate the hazards of materials, classifying hazardous materials in accordance with definitions and hazard classes in the I-codes is the responsibility of facility owners and is an ongoing challenge. Consequences of missing or incorrect classification include increased fire and life safety risk and can lead to misclassification of an occupancy.

Due to the expansion of international chemical trade, the United Nations (UN) developed a Globally Harmonized System (GHS) of classification of hazardous materials. The GHS is an internationally agreed upon standard of classification and labeling that in most cases utilizes prescriptive, standardized testing procedures and criteria to classify hazardous materials. Federal law (29 CFR 1910.1200 (OSHA) and 49 CFR 173.127 (DOT)) mandates that manufacturers selling, producing or transporting chemicals in the United States classify chemicals according to the GHS system and make the information readily available in product Safety Data Sheets (SDSs).

This proposal aims to incorporate the readily available GHS (Revision 7) classifications into the I-code definitions to better align with federal standards for hazardous materials classification. Proper identification of multiple hazards and the degree of hazard are likely outcomes of utilizing the GHS.

Cryogenic Fluids, also referred to as cryogenic liquids, are always refrigerated liquefied gases and are defined in the IFC based on a material's boiling point at atmospheric pressure. However, under the GHS, the category Gases Under Pressure - Refrigerated Liquefied Gas is not prescriptively defined. Thus, a Refrigerated Liquefied Gas under the GHS may or may not be a Cryogenic Fluid under the IFC. Carbon dioxide and Nitrous oxide are refrigerated liquefied gases that do not technically meet the IFC definition of a cryogenic fluid, although both can present similar hazards due to their extremely cold temperature.

This proposal does not change the current prescriptive definition of Cryogenic Fluid, but simply adds a reference to the applicable GHS category as further guidance. Code users will still be required to look at the boiling point of a material to establish whether it is actually a Cryogenic Fluid.

Definitions for Flammable, Inert and Oxidizing Cryogenic Fluids are proposed to be included as sub-definitions under the primary Cryogenic Fluid definition to enable code users to more easily identify the sub-categories of Cryogenic Fluids regulated by the IFC.

Minor revisions are proposed to the existing definitions of Flammable Cryogenic Fluid and Oxidizing Cryogenic Fluid to reflect that in its vapor state, a cryogenic fluid must meet the IFC definition of a 'flammable gas' or 'oxidizing gas', respectively, to be so defined. A new definition for Inert Cryogenic Fluid is proposed to ensure each cryogenic fluid category referred to in the code (e.g., see Chapter 50 Maximum Allowable Quantity Tables) is defined. And, a new definition of Inert Gas is proposed under a separate code change proposal.

The applicable GHS hazard category is proposed to be included in each of the sub-definitions to provide additional guidance to the code user. Flammable cryogenic fluid and oxidizing cryogenic fluid are proposed to be retained in the alphabetical listing in Section 202, but revised to reflect they are sub-definitions of cryogenic fluid.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the FCAC Website

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is meant to provide correlation with the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) which is used globally and by OSHA. This revised definition will not affect the application of the code and will make compliance more straightforward. US manufacturers and distributors of hazardous materials have been required to use the GHS classification system to communicate the hazards of materials in Safety Data Sheets (SDS) since 2012.

F16-24

F17-24

IFC: SECTION 202; IBC: SECTION 202

Proponents: Kevin Scott, KH Scott & Associates LLC, self (khscottassoc@gmail.com)

2024 International Fire Code

Revise as follows:

CONTROL AREA. ~~Spaces within a~~A building, or portion of a building, bounded by exterior walls, fire walls, fire barriers or horizontal assemblies where quantities of hazardous materials not exceeding the *maximum allowable quantities per control area* are stored, dispensed, used or handled. See also the definition of "Outdoor control area."

2024 International Building Code

Revise as follows:

[F] CONTROL AREA. ~~Spaces within a~~A *building*,or portion of a building, bounded by exterior walls, fire walls, fire barriers or horizontal assemblies where quantities of *hazardous materials* not exceeding the maximum allowable quantities per control area are stored, dispensed, *used* or handled. See the definition of "Outdoor control area" in the International Fire Code.

Reason: This proposal is intended to clarify the application of the control area concept. Currently, there is some confusion as to how to deal with a single control area in a building.

The control area concept is based on the assumption that a single building is a creates a single control area. Where fire-resistance-rated construction is utilized, additional control areas can be added. However, this is not clear to all readers of the code.

The definition of control area simply states that it is a space in a building where the MAQ is not exceeded. Then in IFC Section 5003.8.3.1 (IBC Section 414.2.1) the code requires fire-resistance-rated construction to "separate from each other," implying that if only 1 control area is provided there is nothing to separate. But this section has been applied to require a an enclosed room for storage of haz mat to be of a 1-hour rated room even though there is no haz mat or control area needed outside the enclosed room—which is not the code's intent.

The definition of fire area provides more guidance—it states that a fire area is bounded by fire walls, fire barriers, exterior walls or horizontal assemblies. This definition provides clarity that the exterior walls of a building can create a fire area even when they are not fire-resistance-rated.

That language proposed to revise the control area definition correlates with that used for the fire area definition, and clarifies that a building can be a control area and that the exterior walls create that control area. Additional control areas can be constructed if separated from each other by fire walls, fire barriers or horizontal assemblies as indicated in Section 5003.8.3.1 (IBC Section 414.2.1).

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal correlates and clarifies the requirements. See reason statement.

F17-24

F18-24

IFC: SECTION 202 (New); IBC: SECTION 202

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Lynne Kilpatrick, HMEx Assistant LLC, self (lynne.kilpatrick@hmexassistant.com); Megan Hall, UC Berkeley Fire Prevention, self (mchall@berkeley.edu)

2024 International Fire Code

Revise as follows:

EXPLOSIVE.
A chemical compound, mixture or device, the primary or common purpose of which is to function by explosion. The term includes, but is not limited to, dynamite, black powder, pellet powder, initiating explosives, detonators, safety fuses, squibs, detonating cord, igniter cord and igniters.
The term "explosive" includes any material determined to be within the scope of USC Title 18: Chapter 40 and also includes any material classified as an explosive by the *hazardous materials* regulations of DOTn 49 CFR Parts 100–185.

High explosive. Explosive material, such as dynamite, which can be caused to detonate by means of a No. 8 test blasting cap when unconfined.

Low explosive. Explosive material that will burn or deflagrate when ignited. It is characterized by a rate of reaction that is less than the speed of sound. Examples of low explosives include, but are not limited to: black powder; safety fuse; igniters; igniter cord; fuse lighters; fireworks; and propellants, 1.3C.

Mass-detonating explosives. Division 1.1, 1.2 and 1.5 explosives alone or in combination, or loaded into various types of ammunition or containers, most of which can be expected to explode virtually instantaneously when a small portion is subjected to fire, severe concussion, impact, the impulse of an initiating agent or the effect of a considerable discharge of energy from without. Materials that react in this manner represent a mass explosion hazard. Such an explosive will normally cause severe structural damage to adjacent objects. Explosive propagation could occur immediately to other items of ammunition and explosives stored sufficiently close to and not adequately protected from the initially exploding pile with a time interval short enough so that two or more quantities must be considered as one for quantity-distance purposes.

UN/DOTn Class 1 explosives. The former classification system used by DOTn included the terms "high" and "low" explosives as defined herein. The following terms further define explosives under the current system applied by DOTn for all explosive materials defined as hazard Class 1 materials. Compatibility group letters are used in concert with the division to specify further limitations on each division noted (i.e., the letter G identifies the material as a pyrotechnic substance or article containing a pyrotechnic substance and similar materials).

Division 1.1.
<u>A chemical or item that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Explosive (Division 1.1). Where the GHS category is not known, the following is acceptable for classification purposes:</u>
Explosives that have a mass explosion hazard. A mass explosion is one which affects almost the entire load instantaneously.

Division 1.2.
<u>A chemical or item that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Explosive (Division 1.2). Where the GHS category is not known, the following is acceptable for classification purposes:</u>
Explosives that have a projection hazard but not a mass explosion hazard.

Division 1.3.
<u>A chemical or item that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Explosive (Division 1.3). Where the GHS category is not known, the following is acceptable for classification purposes:</u>
Explosives that have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but not a mass explosion hazard.

Division 1.4.
<u>A chemical or item that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Explosive (Division 1.4). Where the GHS category is not known, the following is acceptable for classification purposes:</u>
Explosives that pose a minor explosion hazard. The explosive effects are largely confined to the package and no projection of fragments of appreciable size or range is to be expected. An external fire must not cause virtually instantaneous explosion of almost the entire contents of the package.

Division 1.5.

A chemical or item that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Explosive (Division 1.5). Where the GHS category is not known, the following is acceptable for classification purposes:

Very insensitive explosives. This division is comprised of substances that have a mass explosion hazard, but that are so insensitive there is very little probability of initiation or of transition from burning to detonation under normal conditions of transport.

Division 1.6.

A chemical or item that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Explosive (Division 1.6). Where the GHS category is not known, the following is acceptable for classification purposes:

Extremely insensitive articles which do not have a mass explosion hazard. This division is comprised of articles that contain only extremely insensitive detonating substances and which demonstrate a negligible probability of accidental initiation or propagation.

2024 International Building Code

Revise as follows:

[F] EXPLOSIVE. A chemical compound, mixture or device, the primary or common purpose of which is to function by *explosion*. The term includes, but is not limited to: dynamite, black powder, pellet powder, initiating explosives, detonators, safety fuses, squibs, detonating cord, igniter cord, and igniters. The term "explosive" includes any material determined to be within the scope of USC Title 18: Chapter 40 and also includes any material classified as an *explosive* other than consumer *fireworks*, 1.4G by the *hazardous materials* regulations of DOTn 49 CFR Parts 100-185.

High explosive. Explosive material, such as dynamite, which can be caused to detonate by means of a No. 8 test blasting cap when unconfined.

Low explosive. Explosive material that will burn or deflagrate when ignited. It is characterized by a rate of reaction that is less than the speed of sound. Examples of low explosives include, but are not limited to: black powder; safety fuse; igniters; igniter cord; fuse lighters; fireworks; and propellants, 1.3C.

Mass-detonating explosives. Division 1.1, 1.2 and 1.5 explosives alone or in combination, or loaded into various types of ammunition or containers, most of which can be expected to explode virtually instantaneously when a small portion is subjected to fire, severe concussion, impact, the impulse of an initiating agent or the effect of a considerable discharge of energy from without. Materials that react in this manner represent a mass explosion hazard. Such an explosive will normally cause severe structural damage to adjacent objects. Explosive propagation could occur immediately to other items of ammunition and explosives stored sufficiently close to and not adequately protected from the initially exploding pile with a time interval short enough so that two or more quantities must be considered as one for quantity-distance purposes.

UN/DOTn Class 1 explosives. The former classification system used by DOTn included the terms "high" and "low" explosives as defined herein. The following terms further define explosives under the current system applied by DOTn for all explosive materials defined as hazard Class 1 materials. Compatibility group letters are used in concert with the division to specify further limitations on each division noted (i.e., the letter G identifies the material as a pyrotechnic substance or article containing a pyrotechnic substance and similar materials).

Division 1.1.

A chemical or item that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Explosive (Division 1.1). Where the GHS category is not known, the following is acceptable for classification purposes:

Explosives that have a mass explosion hazard. A mass explosion is one which affects almost the entire load instantaneously.

Division 1.2.

A chemical or item that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Explosive (Division 1.2). Where the GHS category is not known, the following is acceptable for classification purposes:

Explosives that have a projection hazard but not a mass explosion hazard.

Division 1.3.

A chemical or item that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Explosive (Division 1.3). Where the GHS category is not known, the following is acceptable for classification purposes:

Explosives that have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but not a mass explosion hazard.

Division 1.4.

A chemical or item that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Explosive (Division 1.4). Where the GHS category is not known, the following is acceptable for classification purposes:

Explosives that pose a minor explosion hazard. The explosive effects are largely confined to the package and no projection of fragments of appreciable size or range is to be expected. An external fire must not cause virtually instantaneous explosion of almost the entire contents of the package.

Division 1.5.

A chemical or item that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Explosive (Division 1.5). Where the GHS category is not known, the following is acceptable for classification purposes:

Very insensitive explosives. This division is comprised of substances that have a mass explosion hazard, but that are so insensitive there is very little probability of initiation or of transition from burning to detonation under normal conditions of transport.

Division 1.6.

A chemical or item that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Explosive (Division 1.6). Where the GHS category is not known, the following is acceptable for classification purposes:

Extremely insensitive articles which do not have a mass explosion hazard. This division is comprised of articles that contain only extremely insensitive detonating substances and which demonstrate a negligible probability of accidental initiation or propagation.

Reason: Fire Code officials must enforce the hazardous materials provisions of the International Fire Code (IFC) and the International Building Code (IBC) to ensure that people and property in our communities are safe. While code officials need to verify and validate the hazards of materials, classifying hazardous materials in accordance with definitions and hazard classes in the I-codes is the responsibility of facility owners which continues to be a challenge. Consequences of missing or incorrect classification include increased fire and life safety risk and can lead to misclassification of an occupancy.

Due to the expansion of international chemical trade, the United Nations (UN) developed a Globally Harmonized System (GHS) of classification of hazardous materials. The GHS is an internationally agreed upon standard of classification and labeling that in most cases utilizes prescriptive, standardized testing procedures and criteria to classify hazardous materials. Federal law (29 CFR 1910.1200 (OSHA) and 49 CFR 173.127 (DOT)) mandates that manufacturers selling, producing or transporting chemicals in the United States classify chemicals according to the GHS system and make the information readily available in product Safety Data Sheets (SDSs). This proposal aims to incorporate the readily available GHS (Revision 7) classifications into the I-code definitions to better align with federal standards for hazardous materials classification. Proper identification of multiple hazards and the degree of hazard are likely outcomes of utilizing the GHS. The six hazard class divisions of explosives in the IFC are aligned with the GHS subdivisions. The IFC definitions for explosives have historically been based on the classification system used by the US DOT which continues to remain aligned with accepted international standards.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the FCAC Website

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is meant to provide correlation with the Globally Harmonized System (GHS) of Classification and Labelling of Chemicals which is used globally and by OSHA. These revised definitions are well aligned with GHS and are not expected to impact to cost of construction.

F18-24

F19-24

IFC: SECTION 202; IBC: SECTION 202

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Lynne Kilpatrick, HMEx Assistant LLC, self (lynne.kilpatrick@hmexassistant.com); Megan Hall, UC Berkeley Fire Prevention, self (mchall@berkeley.edu)

2024 International Fire Code

Revise as follows:

FLAMMABLE GAS. A material that is a gas at 68°F (20°C) or less at 14.7 pounds per square inch atmosphere (psia) (101 kPa) of pressure [a material that has a *boiling point* of 68°F (20°C) or less at 14.7 psia (101 kPa)] subdivided as follows:

1. Category 1A. A gas that meets either of the following:
   1.1. Ignitable at 14.7 psia (101 kPa) when in a mixture of 13 percent or less by volume with air.
   1.2. A flammable range at 14.7 psia (101 kPa) with air of not less than 12 percent, regardless of the lower limit, unless data shows compliance with Category 1B.
2. Category 1B. A gas that meets the flammability criteria for Category 1A, is not pyrophoric or chemically unstable, and meets one of more of the following:
   2.1. A lower flammability limit of more than 6 percent by volume of air.
   2.2. A fundamental burning velocity of less than 3.9 inches/second (99 mm/s).

The limits specified shall be determined at 14.7 psi (101 kPa) of pressure and a temperature of 68°F (20°C) in accordance with ASTM E681.

Where not otherwise specified, the term “flammable gas” includes both Categories 1A and 1B.

<u>Under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS), Flammable Gases are categorized as a Flammable Gas (Category 1A or 1B).</u>

2024 International Building Code

Revise as follows:

[F] FLAMMABLE GAS. A material that is a gas at 68°F (20°C) or less at 14.7 pounds per square inch atmosphere (psia) (101 kPa) of pressure [a material that has a *boiling point* of 68°F (20°C) or less at 14.7 psia (101 kPa)] subdivided as follows:

1. Category 1A. A gas that meets either of the following:
   1.1. Ignitable at 14.7 psia (101 kPa) when in a mixture of 13 percent or less by volume with air.
   1.2. A flammable range at 14.7 psia (101 kPa) with air of at least 12 percent, regardless of the lower limit, unless data shows compliance with Category 1B.
2. Category 1B. A gas that meets the flammability criteria for Category 1A, is not pyrophoric or chemically unstable, and meets one or more of the following:
   2.1. A lower flammability limit of more than 6 percent by volume of air.
   2.2. A fundamental burning velocity of less than 3.9 inches/second (99 mm/s).

The limits specified shall be determined at 14.7 psi (101 kPa) of pressure and a temperature of 68°F (20°C) in accordance with ASTM E681.Where not otherwise specified, the term "flammable gas" includes both Category 1A and 1B.

Under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS), Flammable Gases are categorized as a Flammable Gas (Category 1A or 1B).

Reason: Fire Code officials must enforce the hazardous materials provisions of the International Fire Code (IFC) and the International Building Code (IBC) to ensure that people and property in our communities are safe. While code officials need to verify and validate the hazards of materials, classifying hazardous materials in accordance with definitions and hazard classes in the I-codes is the responsibility of facility owners and is an ongoing challenge. Consequences of missing or incorrect classification include increased fire and life safety risk and can lead to misclassification of an occupancy.

Due to the expansion of international chemical trade, the United Nations (UN) developed a Globally Harmonized System (GHS) of classification of hazardous materials. The GHS is an internationally agreed upon standard of classification and labeling that in most cases utilizes prescriptive, standardized testing procedures and criteria to classify hazardous materials. Federal law (29 CFR 1910.1200 (OSHA) and 49 CFR 173.127 (DOT)) mandates that manufacturers selling, producing or transporting chemicals in the United States classify chemicals according to the GHS system and make the information readily available in product Safety Data Sheets (SDSs).

This proposal aims to incorporate the readily available GHS (Revision 7) classifications into the I-code definitions to better align with federal standards for hazardous materials classification. Proper identification of multiple hazards and the degree of hazard are likely outcomes of utilizing the GHS.

The IFC definition of Flammable Gas was revised in the 2024 IFC to align with the GHS, so this proposal does not change the technical definition. Still, it adds the GHS categories users will find identified in a Safety Data Sheet for a Flammable Gas in order to be consistent with the overall effort to provide additional guidance to code users on GHS classification.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the FCAC Website

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is meant to provide correlation with the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) which is used globally and by OSHA. This revised definition will not affect the application of the code and will make compliance more straightforward. US manufacturers and distributors of hazardous materials have been required to use the GHS classification system to communicate the hazards of materials in Safety Data Sheets (SDS) since 2012.

F19-24

F20-24

IFC: SECTION 202; IBC: SECTION 202

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Megan Hall, UC Berkeley Fire Prevention, self (mchall@berkeley.edu); Lynne Kilpatrick, HMEx Assistant LLC, self (lynne.kilpatrick@hmexassistant.com)

2024 International Fire Code

Revise as follows:

FLAMMABLE SOLID. A solid that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as a Flammable Solid (Category 1 or 2). Where the GHS category is not known, the following is acceptable for classification purposes: > A solid, other than a blasting agent or *explosive*, that is capable of causing fire through friction, absorption of moisture, spontaneous chemical change or retained heat from manufacturing or processing, or which has an ignition temperature below 212°F (100°C) or which burns so vigorously and persistently when ignited as to create a serious hazard. A chemical shall be considered a flammable solid as determined in accordance with the test method of CPSC 16 CFR Part 1500.44, if it ignites and burns with a self-sustained flame at a rate greater than 0.0866 inch (2.2 mm) per second along its major axis.

2024 International Building Code

Revise as follows:

[F] FLAMMABLE SOLID. A solid that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as a Flammable Solid (Category 1 or 2). Where the GHS category is not known, the following is acceptable for classification purposes: A *solid*, other than a blasting agent or *explosive*, that is capable of causing fire through friction, absorption or moisture, spontaneous chemical change, or retained heat from manufacturing or processing, or which has an ignition temperature below 212°F (100°C) or which burns so vigorously and persistently when ignited as to create a serious hazard. A chemical shall be considered a flammable *solid* as determined in accordance with the test method of CPSC 16 CFR; Part 1500.44, if it ignites and burns with a self-sustained flame at a rate greater than 0.1 inch (2.5 mm) per second along its major axis.

Reason:
Fire Code officials must enforce the hazardous materials provisions of the International Fire Code (IFC) and the International Building Code (IBC) to ensure that people and property in our communities are safe. While code officials need to verify and validate the hazards of materials, classifying hazardous materials in accordance with definitions and hazard classes in the I-codes is the responsibility of facility owners which continues to be a challenge. Consequences of missing or incorrect classification include increased fire and life safety risk and can lead to misclassification of an occupancy.

Due to the expansion of international chemical trade, the United Nations (UN) developed a Globally Harmonized System (GHS) of classification of hazardous materials. The GHS is an internationally agreed upon standard of classification and labeling that in most cases utilizes prescriptive, standardized testing procedures and criteria to classify hazardous materials. Federal law (29 CFR 1910.1200 (OSHA) and 49 CFR 173.127 (DOT)) mandates that manufacturers selling, producing or transporting chemicals in the United States classify chemicals according to the GHS system and make the information readily available in product Safety Data Sheets (SDSs).

This proposal aims to incorporate the readily available GHS (Revision 7) classifications into the I-code definitions to better align with federal standards for hazardous materials classification. Proper identification of multiple hazards and the degree of hazard are likely outcomes of utilizing the GHS.

The current IFC definition for Flammable solids is fairly well aligned with the definitions of the GHS Flammable solid categories. However, the GHS definitions incorporate additional testing criteria which has not historically been used to assess IFC flammable solids, including a separate test for metal powders, which are reflected in the proposed definition change. The updated GHS test criteria is also utilized in NFPA 484, the Standard for Combustible Metals. Alignment with GHS and NFPA may, in some cases, expand the scope of current IFC flammable solids.

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Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is meant to provide correlation with the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) which is used globally and by OSHA. This revised definition will make compliance more straightforward. In some cases, this revised definition may more heavily regulate materials for new buildings as the revised definition widens what is considered a Flammable Solid. However, this is balanced out by the coordination and ease of enforcement that comes with being aligned with GHS, NFPA and OSHA. US manufacturers and distributors of hazardous materials have been required to use the GHS classification system to communicate the hazards of materials in Safety Data Sheets (SDS) since 2012.

F20-24

F21-24

IFC: SECTION 202; IBC: SECTION 202

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Robert J Davidson, Davidson Code Concepts LLC, Self (rjd@davidsoncodeconcepts.com); Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C., Self (jbengineer@aol.com)

2024 International Fire Code

Revise as follows:

FLAMMABLE GAS. A material that is a gas at 68°F (20°C) or less at 14.7 pounds per square inch atmosphere (psia) (101 kPa) of pressure [a material that has a *boiling point* of 68°F (20°C) or less at 14.7 psia (101 kPa)] subdivided as follows:

1. Category 1A. A gas that meets either of the following:
   - 1.1. Ignitable at 14.7 psia (101 kPa) when in a mixture of 13 percent or less by volume with air.
   - 1.2. A flammable range at 14.7 psia (101 kPa) with air of not less than 12 percent, regardless of the lower limit, unless data shows compliance with Category 1B.
2. Category 1B. A gas that meets the flammability criteria for Category 1A, is not pyrophoric or chemically unstable, and meets one of more of the following:
   - 2.1. A lower flammability limit of more than 6 percent by volume of air.
   - 2.2. A fundamental burning velocity of less than 3.9 inches/second (99 mm/s).

The limits specified shall be determined at 14.7 psi (101 kPa) of pressure and a temperature of 68°F (20°C) in accordance with ASTM E681.

Where not otherwise specified, the term “flammable gas” includes both Categories 1A and 1B.

<u>In the absence of test data demonstrating classification into Category 1B, a flammable gas that meets the criteria of a Category 1A gas shall default into Category 1A.</u>

2024 International Building Code

Revise as follows:

[F] FLAMMABLE GAS. A material that is a gas at 68°F (20°C) or less at 14.7 pounds per square inch atmosphere (psia) (101 kPa) of pressure [a material that has a *boiling point* of 68°F (20°C) or less at 14.7 psia (101 kPa)] subdivided as follows:

1. Category 1A. A gas that meets either of the following:
   - 1.1. Ignitable at 14.7 psia (101 kPa) when in a mixture of 13 percent or less by volume with air.
   - 1.2. A flammable range at 14.7 psia (101 kPa) with air of at least 12 percent, regardless of the lower limit, unless data shows compliance with Category 1B.
2. Category 1B. A gas that meets the flammability criteria for Category 1A, is not pyrophoric or chemically unstable, and meets one or more of the following:
   - 2.1. A lower flammability limit of more than 6 percent by volume of air.
   - 2.2. A fundamental burning velocity of less than 3.9 inches/second (99 mm/s).

The limits specified shall be determined at 14.7 psi (101 kPa) of pressure and a temperature of 68°F (20°C) in accordance with ASTM E681.

Where not otherwise specified, the term "flammable gas" includes both Category 1A and 1B.

In the absence of test data demonstrating classification into Category 1B, a flammable gas that meets the criteria of a Category 1A gas shall default into Category 1A

Reason: This additional language is a correlation with the definition in GHS version 7. It provides additional guidance to the code user on application of the definition. GHS 7 includes similar language to make it clear if the data is not available, particularly burning rate, then the flammable gas defaults to a Category 1A flammable gas.

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Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The added language simply correlates with GHS version 7 the source for the current definition. It simply provides additional guidance for the code user in terms of whether it is required to be classified as Category 1A or 1B.

F21-24

F22-24

IFC: SECTION 202

Proponents: John Swanson, NFSA, National Fire Sprinkler Association (swanson@nfsa.org); Jeffrey M Hugo, CBO, NFSA, National Fire Sprinkler Association (hugo@nfsa.org)

2024 International Fire Code

Revise as follows:

HIGH-PILED COMBUSTIBLE STORAGE. Storage of combustible materials in closely packed piles or combustible materials on pallets, in racks or on shelves where the top of storage is greater than 12 feet (3658 mm) in height. ~~Where required by the *fire code official*,~~ High ~~*h*~~ *igh-piled combustible storage* also includes ~~certain~~ high-hazard commodities, such as rubber tires, Group A plastics, *flammable liquids*, idle pallets and similar commodities, where the top of storage is greater than 6 feet (1829 mm) in height.

Reason: Commodities considered “high-hazard” are in that category because of the burning characteristics and heat release rate for the particular product. The prescriptive high-hazard requirements in Chapter 32 should be applicable regardless of the code official’s position. Removing the fire code official text and the word "certain" is a better definition.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Proposal clarifies the objective nature of the definition.

F22-24

F23-24

IFC: SECTION 202; IBC: SECTION 202

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Megan Hall, UC Berkeley Fire Prevention, self (mchall@berkeley.edu); Lynne Kilpatrick, HMEx Assistant LLC, self (lynne.kilpatrick@hmexassistant.com)

2024 International Fire Code

Revise as follows:

HIGHLY TOXIC. ~~A material which produces a lethal dose or lethal concentration which falls within any of the following categories:~~ A substance or mixture that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Acute Toxicity Oral Category 1 or 2, Dermal Category 1 or 2, Inhalation Gases Category 1, Inhalation Vapors Category 1, or Inhalation Dusts and Mists Category 1 or 2. Where the GHS category is not known, one of the following is acceptable for classification purposes:

1. A chemical that has a median lethal dose (LD_{50}) of 50 milligrams or less per kilogram of body weight when administered orally to albino rats weighing between 200 and 300 grams each.

2. A chemical that has a median lethal dose (LD_{50}) of 200 milligrams or less per kilogram of body weight when administered by continuous contact for 24 hours (or less if death occurs within 24 hours) with the bare skin of albino rabbits weighing between 2 and 3 kilograms each.

3. A chemical that has a median lethal concentration (LC_{50}) in air of 200 parts per million by volume or less of gas or vapor, or 2 milligrams per liter or less of mist~~, fume~~ or dust, when administered by continuous inhalation for one hour (or less if death occurs within 1 hour) to albino rats weighing between 200 and 300 grams each.

Mixtures of these materials with ordinary materials, such as water, might not warrant classification as highly toxic. While this system is basically simple in application, any hazard evaluation that is required for the precise categorization of this type of material shall be performed by experienced, technically competent persons.

TOXIC. ~~A chemical falling within any of the following categories:~~A substance or mixture that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Acute Toxicity Oral Category 3 or 4, Dermal Category 3, Inhalation Gases Category 2 or 3, Inhalation Vapors Category 2 or 3, or Inhalation Dusts and Mists Category 3 or 4. Where the GHS category is not known, one of the following is acceptable for classification purposes:

1. A chemical that has a median lethal dose (LD_{50}) of more than 50 milligrams per kilogram, but not more than 500 milligrams per kilogram of body weight when administered orally to albino rats weighing between 200 and 300 grams each.

2. A chemical that has a median lethal dose (LD_{50}) of more than 200 milligrams per kilogram but not more than 1,000 milligrams per kilogram of body weight when administered by continuous contact for 24 hours (or less if death occurs within 24 hours) with the bare skin of albino rabbits weighing between 2 and 3 kilograms each.

3. A chemical that has a median lethal concentration (LC_{50}) in air of more than 200 parts per million but not more than 2,000 parts per million by volume of gas or vapor, or more than 2 milligrams per liter but not more than 20 milligrams per liter of mist~~, fume~~ or dust, when administered by continuous inhalation for 1 hour (or less if death occurs within 1 hour) to albino rats weighing between 200 and 300 grams each.

2024 International Building Code

Revise as follows:

[F] HIGHLY TOXIC. ~~A material which produces a lethal dose or lethal concentration that falls within any of the following categories:~~ A substance or mixture that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Acute Toxicity Oral Category 1 or 2, Dermal Category 1 or 2, Inhalation Gases Category 1, Inhalation Vapors Category 1, or Inhalation Dusts and Mists Category 1 or 2. Where the GHS category is not known, one of the following is acceptable for classification purposes:

1. A chemical that has a median lethal dose (LD_{50}) of 50 milligrams or less per kilogram of body weight when administered orally to albino rats weighing between 200 and 300 grams each.

2. A chemical that has a median lethal dose (LD_{50}) of 200 milligrams or less per kilogram of body weight when administered by continuous contact for 24 hours (or less if death occurs within 24 hours) with the bare skin of albino rabbits weighing between 2 and 3 kilograms each.

3. A chemical that has a median lethal concentration (LC_{50}) in air of 200 parts per million by volume or less of gas or vapor, or 2 milligrams per liter or less of mist, fume or dust, when administered by continuous inhalation for 1 hour (or less if death occurs within 1 hour) to albino rats weighing between 200 and 300 grams each.

Mixtures of these materials with ordinary materials, such as water, might not warrant classification as *highly toxic*. While this system is basically simple in application, any hazard evaluation that is required for the precise categorization of this type of material shall be performed by experienced, technically competent persons.

[F] TOXIC. ~~A chemical falling within any of the following categories:~~
A substance or mixture that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Acute Toxicity Oral Category 3 or 4, Dermal Category 3, Inhalation Gases Category 2 or 3, Inhalation Vapors Category 2 or 3, or Inhalation Dusts and Mists Category 3 or 4. Where the GHS category is not known, one of the following is acceptable for classification purposes:

1. A chemical that has a median lethal dose (LD_{50}) of more than 50 milligrams per kilogram, but not more than 500 milligrams per kilogram of body weight when administered orally to albino rats weighing between 200 and 300 grams each.

2. A chemical that has a median lethal dose (LD_{50}) of more than 200 milligrams per kilogram, but not more than 1,000 milligrams per kilogram of body weight when administered by continuous contact for 24 hours (or less if death occurs within 24 hours) with the bare skin of albino rabbits weighing between 2 and 3 kilograms each.

3. A chemical that has a median lethal concentration (LC_{50}) in air of more than 200 parts per million, but not more than 2,000 parts per million by volume of gas or vapor, or more than 2 milligrams per liter but not more than 20 milligrams per liter of mist, fume or dust, when administered by continuous inhalation for 1 hour (or less if death occurs within 1 hour) to albino rats weighing between 200 and 300 grams each.

Reason: Fire Code officials must enforce the hazardous materials provisions of the International Fire Code (IFC) and the International Building Code (IBC) to ensure that people and property in our communities are safe. While code officials need to verify and validate the hazards of materials, classifying hazardous materials in accordance with definitions and hazard classes in the I-codes is the responsibility of facility owners which continues to be a challenge. Consequences of missing or incorrect classification include increased fire and life safety risk and can lead to misclassification of an occupancy.

Due to the expansion of international chemical trade, the United Nations (UN) developed a Globally Harmonized System (GHS) of classification of hazardous materials. The GHS is an internationally agreed upon standard of classification and labeling that in most cases utilizes prescriptive, standardized testing procedures and criteria to classify hazardous materials. Federal law (29 CFR 1910.1200 (OSHA) and 49 CFR 173.127 (DOT)) mandates that manufacturers selling, producing or transporting chemicals in the United States classify chemicals according to the GHS system and make the information readily available in product Safety Data Sheets (SDSs).

This proposal aims to incorporate the readily available GHS (Revision 7) classifications into the I-code definitions to better align with federal standards for hazardous materials classification. Proper identification of multiple hazards and the degree of hazard are likely outcomes of utilizing the GHS.

The GHS and current IFC definitions for Highly toxic materials are the same (perfect alignment), except that “fumes” are not included in GHS terminology. The term “fume” is not defined in the IFC and is likely to be included in the measurements for vapors, dusts, and/or mists. The table below shows the alignment between current IFC Highly Toxic (dark blue shading) and GHS Categories. Definitions for Toxic materials align perfectly between current IFC and GHS definitions based on dermal exposure routes and for inhalation dusts and mists exposure routes. However, Toxic materials by oral, inhalation gases, and inhalation vapors routes of exposure have different cut-off values between current IFC and GHS definitions. For the sake of alignment with GHS, this proposal expands the current IFC Toxic definitions for these three routes of exposure. This Table demonstrates the alignment for each exposure route. Current IFC Toxic is shaded in medium blue. The proposed definition of Toxic (aligns with GHS) is expanded to include the area shaded in light blue. Unshaded (white) areas are not regulated.

IFC current	IFC proposal
Highly Toxic	Highly Toxic
Toxic	Toxic
	Toxic

		GHS				
Exposure Route	**Category 1**	**Category 2**	**Category 3**		**Category 4**	
Oral (LD50, mg/kg)	<5	5 - 50	50 - 300		300 - 500	500 - 2,000
Dermal (LD50, mg/kg)	<50	50-200	200-1,000		1,000 – 2,000	
Inhalation – Gases (LC50 ppm, 4 hr)	<100	100 - 500	500 - 1,000	1,000 – 2,500	2,500 - 20,000	
Inhalation – Vapors (LC50 mg/L, 4 hr)*	<0.5	0.5 - 2	2 - 4	4 - 10	10 - 20	
Inhalation – Dusts and Mists (LC50 mg/L, 4 hr)	<0.05	0.05 - 0.5	0.5 - 1		1 - 5	

Inhalation values in the above table use 4-hr exposure values. IFC values have been converted from 1-hr to 4-hr exposures per GHS Section 3.1.2.6.1: divide by 2 for gases and vapors, divide by 4 for dusts and mists. *Because ppm is a mass-to-mass or volume-to-volume ratio and mg/l is a mass-to-volume ratio, the following conversion was used for vapors: To convert from units of mg/L to ppm, use the following equation. Endpoint (ppm) = [Endpoint (mg/L) x 1000 x 24.5] / [Molecular Weight] Source: https://www.epa.gov/rmp/toxic-endpoints-are-milligrams-liter-mg-l-equivalent-parts-million-ppm

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Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is meant to provide correlation with the Globally Harmonized System (GHS) of Classification and Labelling of Chemicals which is used globally and by OSHA. This revised definition will make compliance more straightforward. In some cases, this revised definition may more heavily regulate additional materials for new buildings as the revised definition widens what is considered Toxic. However, this is balanced out by the coordination and ease of enforcement that comes with being aligned with GHS and OSHA. US manufacturers and distributors of hazardous materials have been required to use the GHS classification system to communicate the hazards of materials in Safety Data Sheets (SDS) since 2012.

F23-24

F24-24

IFC: SECTION 202; IBC: SECTION 202

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Lynne Kilpatrick, HMEx Assistant LLC, self (lynne.kilpatrick@hmexassistant.com); Megan Hall, UC Berkeley Fire Prevention, self (mchall@berkeley.edu)

2024 International Fire Code

Revise as follows:

INERT COMPRESSED GAS. A compressed gas that is capable of reacting with other materials only under abnormal conditions such as high temperatures, pressures and similar extrinsic physical forces. Within the context of the code, inert compressed gases do not exhibit either physical or *health hazard* properties as defined (other than acting as a simple asphyxiant) or hazard properties other than those of a *compressed gas*. Some of the more common inert compressed gases include argon, helium, krypton, neon, nitrogen and xenon.

2024 International Building Code

Revise as follows:

[F] INERT COMPRESSED GAS. A compressed gas that is capable of reacting with other materials only under abnormal conditions such as high temperatures, pressures and similar extrinsic physical forces. Within the context of the code, inert compressed gases do not exhibit either physical or health hazard properties as defined (other than acting as a simple asphyxiant) or hazard properties other than those of a *compressed gas*. Some of the more common inert compressed gases include argon, helium, krypton, neon, nitrogen and xenon.

Reason: This modification is a clarification and is intended to distinguish inert compressed gases, which may be gaseous or liquefied, from inert cryogenic fluids. It aligns with the revised definition of Compressed Gas submitted under a separate proposal.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the FCAC Website

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is meant to provide clarification and correlation with the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) which is used globally and by OSHA. This revised definition will not affect the application of the code and will make compliance more straightforward. US manufacturers and distributors of hazardous materials have been required to use the GHS classification system to communicate the hazards of materials in Safety Data Sheets (SDS) since 2012.

F24-24

F25-24

IFC: SECTION 202, SECTION 202 (New); IBC: SECTION 202, SECTION 202 (New), [F] 412.5.5, [F] 415.9.1, [F] 415.9.1.1, [F] 415.9.1.4, 415.9.2 (New), 415.9.2.1 (New), 415.9.2.2 (New), 415.9.2.3 (New), 415.9.2.4 (New), 415.9.3 (New), 415.9.3.1 (New), 415.9.3.2 (New), [F] 415.9.3, [F] 415.9.2

Proponents: Kevin Scott, KH Scott & Associates LLC, self (khscottassoc@gmail.com)

2024 International Fire Code

Revise as follows:

LIQUID STORAGE ROOM. A room ~~classified as a Group H-3 occupancy~~ used for the storage of *flammable* or *combustible liquids* in ~~a closed condition~~ amounts exceeding the maximum allowable quantity per control area.

LIQUID STORAGE WAREHOUSE. A building ~~classified as a Group H-2 or H-3 occupancy~~or portion of a building used for the storage of *flammable* or *combustible liquids* in ~~a closed condition~~unlimited amounts.

Add new definition as follows:

LIQUID USE, DISPENSING AND MIXING ROOM. A room in which Class I, II and IIIA flammable or combustible liquids are stored, used, dispensed or mixed in amounts exceeding the maximum allowable quantity per control area.

2024 International Building Code

Revise as follows:

[F] LIQUID STORAGE ROOM. A room ~~classified as a Group H-3 occupancy~~ used for the storage of *flammable* or *combustible liquids* in ~~a closed condition~~amounts exceeding the maximum allowable quantity per control area.

Add new definition as follows:

[F] LIQUID STORAGE WAREHOUSE. A building or portion of a building used for the storage of flammable or combustible liquids in unlimited amounts.

Revise as follows:

[F] LIQUID USE, DISPENSING AND MIXING ROOM. A room in which Class I, II and IIIA *flammable* or *combustible liquids* are stored, *used*, dispensed or mixed in ~~open containers~~amounts exceeding the maximum allowable quantity per control area.

[F] 412.5.5 Storage.
Storage of *flammable or combustible liquids* exceeding the maximum allowable quantities per *control area* in Table 307.1(1) and not exceeding Table 5704.3.6.3(2) in the *International Fire Code* shall be in a *liquid storage room*. shall be in a liquid storage room. Storage of flammable or combustible liquids exceeding Table 5704.3.6.3(2) in the *International Fire Code* shall be in a liquid storage warehouse.

[F] 415.9.1 Flammable and combustible liquids.
The storage, *handling*, processing and transporting of *flammable* and *combustible liquids* in Group H-2 and H-3 occupancies shall be in accordance with Sections 415.9.1.1 through ~~415.9.1.9~~415.9.5, the *International Mechanical Code* and the *International Fire Code*.

[F] 415.9.1.1 ~~Mixed occupancies~~Storage in tanks.
Where ~~the storage tank area is~~stationary storage tanks are located in a *building* of two or more occupancies and the quantity of *liquid* exceeds the maximum allowable quantity for one *control area*, the use shall be completely separated from adjacent occupancies in accordance with the requirements of Section 508.4.

[F] 415.9.1.4 ~~Leakage containment~~ Containment.
~~A liquid-tight containment area compatible with the stored *liquid* shall be provided. The method of spill control, drainage control and~~

~~secondary containment shall be in accordance with the *International Fire Code*.~~

~~**Exception:** Rooms where only double-wall storage tanks conforming to Section 415.9.1.3 are used to store Class I, II and IIIA *flammable* and *combustible liquids* shall not be required to have a leakage containment area.~~

Spill control and secondary containment shall be provided as required in the *International Fire Code*.

Add new text as follows:

415.9.2 Storage. Indoor storage of flammable and combustible liquids in containers or portable tanks exceeding those quantities set forth in Table 307.1.1 shall be in a liquid storage room or liquid storage warehouse.

415.9.2.1 Liquid storage rooms. Liquid storage rooms shall be constructed as a Group H-2 or H-3 occupancy as applicable. The aggregate quantities shall not exceed those allowed in a liquid storage room in Table 5704.3.6.3(2) of the *International Fire Code.* Liquid storage rooms shall be separated from other portions of the building as required by Table 508.4.

415.9.2.2 Liquid storage warehouses. Liquid storage warehouses shall be constructed as a Group H-2 or H-3 occupancy as applicable. Liquid storage warehouses shall be constructed as a detached building or separated from other portions of the building by a fire wall with a minimum fire-resistance rating of 3-hours.

415.9.2.3 Explosion control. Liquid storage rooms and liquid storage warehouses shall be provided with explosion control where required by Table 414.5.1.

415.9.2.4 Basements. Liquid storage rooms and liquid storage warehouses shall not be located in basements.

415.9.3 Liquid use, dispensing and mixing rooms. Indoor use, dispensing and mixing of Class I, II or IIIA liquids exceeding those quantities set forth in Table 307.1.1 shall be in liquid use, dispensing and mixing rooms classified as Group H-2 or H-3 as applicable, and shall comply with this section and the *International Fire Code*.

415.9.3.1 Basements. Liquid use, dispensing and mixing rooms shall not be located in basements.

415.9.3.2 Explosion control. Liquid use, dispensing and mixing rooms shall be provided with explosion control where required by Table 414.5.1.

Revise as follows:

[F] ~~415.9.3~~415.9.4 Dry cleaning plants.
The construction and installation of dry cleaning plants shall be in accordance with the requirements of this code, the *International Mechanical Code*, the *International Plumbing Code* and NFPA 32. Dry cleaning solvents and systems shall be classified in accordance with the *International Fire Code*.

[F] ~~415.9.2~~415.9.5 Liquefied petroleum gas facilities.
The construction and installation of liquefied petroleum gas *facilities* shall be in accordance with the requirements of this code, the *International Fire Code*, the International Fuel Gas Code, the *International Mechanical Code* and NFPA 58.

Reason: Section 5704.3.8 in the IFC sends the code user to the IBC for construction and separation of a Liquid Storage Warehouse. However, the term “liquid storage warehouse” does not appear in the IBC and there is no specific guidance for construction of a liquid storage warehouse. This proposal intends to remedy this broken reference and provide construction criteria for liquid storage warehouses.

Background:
The definition of liquid storage room indicates clearly that it is a room within a building, and reads as follows:
LIQUID STORAGE ROOM. A room classified as a Group H-3 occupancy used for the storage of flammable or combustible liquids in a closed condition.

The definition of liquid storage warehouse indicates clearly that it is a building, and reads as follows:
LIQUID STORAGE WAREHOUSE. A building classified as a Group H-2 or H-3 occupancy used for the storage of flammable or combustible liquids in a closed condition.

Therefore, the code currently intends that a liquid storage warehouse is a separate building. This is logical because the aggregate quantities of flammable and combustible liquids are unlimited in a liquid storage warehouse.

Code Change Revisions:
The specific revisions in this proposal consist of the following:

1. The definitions of liquid storage room and liquid storage warehouse are revised. The occupancy classification is removed from the definitions. Occupancy classification is a requirement and should not be located in the definition. The appropriate classification would be determined by evaluating the amount, storage condition and characteristics of the liquids. The phrase “in amounts exceeding the maximum allowable quantity per control area” is utilized rather than the occupancy classification. It is correct, that the classification will be Group H-2 or H-3, but specifying it in the definition and not clarifying when one or the other applies can lead to confusion and misapplication.
2. The definition of liquid storage warehouse is revised to specify “building or portion of a building”. Since the construction of a fire wall no longer creates a separate building, when a liquid storage warehouse is attached, but separated by a 3-HR fire wall it is now a portion of the building. This revision will allow the building to be attached and not be misapplied to require a detached building.
3. The definition of liquid use, dispensing and mixing (UDM) room is modified in the IBC by deleting “open containers”. The IFC contains requirements applicable use-open activities and use-closed activities for UDM rooms. Also, the criteria for quantities above the MAQ is added since these requirements apply when above the MAQ. The definition of liquid use, dispensing and mixing room was also modified to include storage. This reflects the reality that in most of these rooms there is some storage of material waiting to be used. The definition of UDM room is not currently in the IFC, so it is proposed to be added.
4. Section 412.5.5 is revised to correlate with the requirements in the IFC and the maximum allowable quantity in a liquid storage room.
5. Section 415.9.1.1 contains editorial changes and a revised title because the section and the subsequent sections address storage tanks. Also, it is clarified to apply to stationary tanks. Section 415.9.1 covers storage in stationary tanks, Section 415.9.2 covers portable stationary tanks.
6. Section 415.9.1.4 is revised to match the appropriate language for spill control and secondary containment in the IFC. The exception is deleted, but not lost since secondary containment tanks are allowed as an approved method of secondary containment in IFC Section 5704.2.10.
7. Section 415.9.2 is added to address the requirement that when the MAQ is exceeded the IFC and IBC require storage in a liquid storage room.
8. Section 415.9.2.1 addresses liquid storage rooms. The occupancy classification is dependent on the pressure of the stored liquids, although most frequently will be Group H-3. These rooms must be separated as required for a mixed occupancy. The IFC limits the aggregate quantities in a liquid storage room.
9. Section 415.9.2.2 addresses liquid storage warehouses. The occupancy classification is again dependent on the pressure of the stored liquids, although most frequently will be Group H-3. The aggregate quantities in a liquid storage warehouse are unlimited, and the definition indicates that liquid storage warehouses are buildings, not a portion of a building. Therefore, this section requires a detached building or separation by a 3-hr fire wall. The 3-hr requirement is based on IBC Table 706.4 for Group H-3 occupancies. prior to the 2018 IBC, a fire wall was considered to create a separate building. Therefore, this section allows a 3-hr fire wall or requires a detached building.
10. Section 415.9.2.3 refers to Table 414.5.1 for explosion control which is dependent on the liquids.
11. Section 415.9.2.4 prohibits such uses in a basement.
12. Sections 415.9.3 through 415.9.3.2 address use, dispensing and mixing rooms and prohibit such rooms in basements and also refer to Table 414.5.1 for explosion control.

This proposal clarifies that a liquid storage warehouse is a detached building or separated by a fire wall, and provides requirements for the construction of a liquid storage warehouse. This will complete the reference from the IFC to the IBC for construction of a liquid storage warehouse.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This provisions in this proposal are currently contained in the I-Codes. This proposal simply completes the IFC reference for construction in accordance with the IBC.

F25-24

F26-24

IFC: SECTION 202; IBC: SECTION 202

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Lynne Kilpatrick, HMEx Assistant LLC, self (lynne.kilpatrick@hmexassistant.com); Megan Hall, UC Berkeley Fire Prevention, self (mchall@berkeley.edu)

2024 International Fire Code

Revise as follows:

ORGANIC PEROXIDE. Liquid or solid ~~An~~ organic ~~compound~~ substances that contain~~s~~ the bivalent -O-O- structure and which may be considered to be a structural derivative of hydrogen peroxide where one or both of the hydrogen atoms have been replaced by ~~an~~ organic radicals. The term also includes organic peroxide formulations (mixtures). Organic peroxides ~~can present an explosion hazard (*detonation* or *deflagration*) or they can be shock sensitive~~ are thermally unstable substances or mixtures, which can undergo exothermic self-accelerating decomposition. In addition, they can have one or more of the following properties:

1. Be liable to explosive decomposition;
2. Burn rapidly;
3. Be sensitive to impact or friction;
4. React dangerously with other substances;
5. ~~They can also decompose~~ Decompose into various unstable compounds over an extended period of time.

Class I. Any organic peroxide which, as packaged, is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as an Organic Peroxide (Type B). Where the GHS Category is not known, the following is acceptable for classification purposes:
~~Describes t~~Those formulations that are capable of *deflagration* but not *detonation*.
Class II. Any organic peroxide which, as packaged, is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as an Organic Peroxide (Type C) or (Type D). Where the GHS Category is not known, the following is acceptable for classification purposes:
~~Describes t~~Those formulations that burn very rapidly and that pose a moderate reactivity hazard.
Class III.
Any organic peroxide which, as packaged, is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as an Organic Peroxide (Type E). Where the GHS Category is not known, the following is acceptable for classification purposes:

~~Describes t~~T

hose formulations that burn rapidly and that pose a moderate reactivity hazard.
Class IV. Any organic peroxide which, as packaged, is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as an Organic Peroxide (Type F). Where the GHS Category is not known, the following is acceptable for classification purposes:
~~Describes t~~Those formulations that burn in the same manner as ordinary combustibles and that pose a minimal reactivity hazard.
Class V. Any organic peroxide which, as packaged, is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as an Organic Peroxide (Type G). Where the GHS Category is not known, the following is acceptable for classification purposes:
~~Describes t~~Those formulations that burn with less intensity than ordinary combustibles or do not sustain combustion and that pose no reactivity hazard.
Unclassified detonable.
Any organic peroxide which, as packaged, is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as an Organic Peroxide (Type A). Type A Organic Peroxides are forbidden in transportation. Where the GHS Category is not known, the following is acceptable for classification purposes:
Organic peroxides that are capable of *detonation*. These peroxides pose an extremely high *explosion* hazard through rapid *explosive* decomposition.

2024 International Building Code

Revise as follows:

[F] ORGANIC PEROXIDE. Liquid or solid ~~An~~ organic ~~compound~~ substances that contains the bivalent -O-O- structure and which may be considered to be a structural derivative of hydrogen peroxide where one or both of the hydrogen atoms have been replaced by ~~an~~ organic radicals. The term also includes organic peroxide formulations (mixtures). Organic peroxides ~~can pose an *explosion* hazard (*detonation* or *deflagration*) or they can be shock sensitive~~ are thermally unstable substances or mixtures, which can undergo exothermic self-accelerating decomposition. In addition, they can have one or more of the following properties:

1. Be liable to explosive decomposition;
2. Burn rapidly;
3. Be sensitive to impact or friction;
4. React dangerously with other substances;
5. ~~They can also decompose~~ Decompose into various unstable compounds over an extended period of time.

Class I.
Any organic peroxide which, as packaged, is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as an Organic Peroxide (Type B). Where the GHS Category is not known, the following is acceptable for classification purposes:
~~Describes t~~Those formulations that are capable of *deflagration* but not *detonation*.
Class II.
Any organic peroxide which, as packaged, is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as an Organic Peroxide (Type C) or (Type D). Where the GHS Category is not known, the following is acceptable for classification purposes:
~~Describes t~~Those formulations that burn very rapidly and that pose a moderate reactivity hazard.
Class III.
Any organic peroxide which, as packaged, is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as an Organic Peroxide (Type E). Where the GHS Category is not known, the following is acceptable for classification purposes:

~~Describes t~~T

hose formulations that burn rapidly and that pose a moderate reactivity hazard.
Class IV.
Any organic peroxide which, as packaged, is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as an Organic Peroxide (Type F). Where the GHS Category is not known, the following is acceptable for classification purposes:
~~Describes t~~Those formulations that burn in the same manner as ordinary combustibles and that pose a minimal reactivity hazard.
Class V.
Any organic peroxide which, as packaged, is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as an Organic Peroxide (Type G). Where the GHS Category is not known, the following is acceptable for classification purposes:
~~Describes t~~Those formulations that burn with less intensity than ordinary combustibles or do not sustain combustion and that pose no reactivity hazard.
Unclassified detonable.
Any organic peroxide which, as packaged, is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as an Organic Peroxide (Type A). Type A Organic Peroxides are forbidden in transportation. Where the GHS Category is not known, the following is acceptable for classification purposes:
Organic peroxides that are capable of *detonation*. These peroxides pose an extremely high *explosion* hazard through rapid *explosive* decomposition.

Reason: Fire Code officials must enforce the hazardous materials provisions of the International Fire Code (IFC) and the International Building Code (IBC) to ensure that people and property in our communities are safe. While code officials need to verify and validate the hazards of materials, classifying hazardous materials in accordance with definitions and hazard classes in the I-codes is the responsibility of facility owners and is an ongoing challenge. Consequences of missing or incorrect classification include increased fire and life safety risk and can lead to misclassification of an occupancy.

Due to the expansion of international chemical trade, the United Nations (UN) developed a Globally Harmonized System (GHS) of classification of hazardous materials. The GHS is an internationally agreed upon standard of classification and labeling that in most cases utilizes prescriptive, standardized testing procedures and criteria to classify hazardous materials. Federal law (29 CFR 1910.1200 (OSHA) and 49 CFR 173.127 (DOT)) mandates that manufacturers selling, producing or transporting chemicals in the United States classify chemicals according to the GHS system and make the information readily available in product Safety Data Sheets (SDSs).

This proposal aims to incorporate the readily available GHS (Revision 7) classifications into the I-code identification of multiple hazards and the degree of hazard are likely outcomes of utilizing the GHS. The current definition for Organic Peroxide in the IFC is subjective and is not based on a defined test method or standardized set of criteria. Under the GHS, Organic Peroxide types are assigned based on the physical state, a determination of the formulations control and emergency temperature if applicable, and its performance under the testing protocol specified in the UN Manual of Tests and Criteria for Organic Peroxides. The GHS types and definitions proposed here are comparable to the generic transport types defined by the US Department of Transportation and reflect the relative hazard when packaged for transportation. This proposal aligns six DOT and GHS transport types with the five existing sub-categories of IFC Organic Peroxides. In that regard, transport Types C and D are proposed to be classified as Class II Organic Peroxides since both Types can present a moderate reactivity hazard.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the FCAC Website

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is meant to provide correlation with the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) which is used globally and by OSHA. This revised definition is not likely to affect the application of the code and will make compliance more straightforward. US manufacturers and distributors of hazardous materials have been required to use the GHS classification system to communicate the hazards of materials in Safety Data Sheets (SDS) since 2012.

F26-24

F27-24

IFC: SECTION 202; IBC: SECTION 202

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Megan Hall, UC Berkeley Fire Prevention, self (mchall@berkeley.edu); Lynne Kilpatrick, HMEx Assistant LLC, self (lynne.kilpatrick@hmexassistant.com)

2024 International Fire Code

Revise as follows:

OXIDIZER. A material that readily yields oxygen or other oxidizing gas, or that readily reacts to promote or initiate combustion of combustible materials and, if heated or contaminated, can result in vigorous self-sustained decomposition.

Class 1.

<u>A solid or liquid that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as either Oxidizing Solids (Category 3) or Oxidizing Liquids (Category 3). Where the GHS category is not known, the following is acceptable for classification purposes:</u>

An oxidizer that does not moderately increase the burning rate of combustible materials.

Class 2.

<u>A solid or liquid that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as either Oxidizing Solids (Category 2) or Oxidizing Liquids (Category 2). Where the GHS category is not known, the following is acceptable for classification purposes:</u>

An oxidizer that will cause a moderate increase in the burning rate of combustible materials with which it comes in contact.

Class 3.

<u>A solid or liquid that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as either Oxidizing Solids (Category 1) or Oxidizing Liquids (Category 1) and is not otherwise classified as Class 4. Where the GHS category is not known, the following is acceptable for classification purposes:</u>

An oxidizer that causes a severe increase in the burning rate of combustible materials with which it comes in contact.

Class 4.

<u>A solid or liquid that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as either Oxidizing Solids (Category 1) or Oxidizing Liquids (Category 1) and which have evidence of explosive properties or are packaged for transport in Packing Group I. Where the GHS category is not known, the following is acceptable for classification purposes:</u>

An oxidizer that can undergo an *explosive* reaction due to contamination or exposure to thermal or physical shock and that causes a severe increase in the burning rate of combustible materials with which it comes into contact. Additionally, the oxidizer causes a severe increase in the burning rate and can cause spontaneous ignition of combustibles.

2024 International Building Code

Revise as follows:

[F] OXIDIZER. A material that readily yields oxygen or other *oxidizing gas*, or that readily reacts to promote or initiate combustion of combustible materials and, if heated or contaminated, can result in vigorous self-sustained decomposition.

Class 1.

<u>A solid or liquid that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as either Oxidizing Solids (Category 3) or Oxidizing Liquids (Category 3). Where the GHS category is not known, the following is acceptable for classification purposes:</u>

An oxidizer that does not moderately increase the burning rate of combustible materials.

Class 2.

<u>A solid or liquid that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as either Oxidizing Solids (Category 2) or Oxidizing Liquids (Category 2). Where the GHS category is not known, the following is acceptable for classification purposes:</u>

An oxidizer that will cause a moderate increase in the burning rate of combustible materials with which it comes in contact.

Class 3.

<u>A solid or liquid that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as either Oxidizing Solids (Category 1) or Oxidizing Liquids (Category 1) and is not otherwise classified as Class 4. Where the GHS category is not known, the following is acceptable for classification purposes:</u>

An oxidizer that causes a severe increase in the burning rate of combustible materials with which it comes in contact.

Class 4.

<u>A solid or liquid that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as either Oxidizing Solids (Category 1) or Oxidizing Liquids (Category 1) and which have evidence of explosive properties or are packaged for transport in Packing Group I. Where the GHS category is not known, the following is acceptable for classification purposes:</u>

An oxidizer that can undergo an *explosive* reaction due to contamination or exposure to thermal or physical shock and that causes a severe increase in the burning rate of combustible materials with which it comes into contact. Additionally, the oxidizer causes a severe increase in the burning rate and can cause spontaneous ignition of combustibles.

Reason:

Fire Code officials must enforce the hazardous materials provisions of the International Fire Code (IFC) and the International Building Code (IBC) to ensure that people and property in our communities are safe. While code officials need to verify and validate the hazards of materials, classifying hazardous materials in accordance with definitions and hazard classes in the I-codes is the responsibility of facility owners which continues to be a challenge. Consequences of missing or incorrect classification include increased fire and life safety risk and can lead to misclassification of an occupancy.

Due to the expansion of international chemical trade, the United Nations (UN) developed a Globally Harmonized System (GHS) of classification of hazardous materials. The GHS is an internationally agreed upon standard of classification and labeling that in most cases utilizes prescriptive, standardized testing procedures and criteria to classify hazardous materials. Federal law (29 CFR 1910.1200 (OSHA) and 49 CFR 173.127 (DOT)) mandates that manufacturers selling, producing or transporting chemicals in the United States classify chemicals according to the GHS system and make the information readily available in product Safety Data Sheets (SDSs).

This proposal aims to incorporate the readily available GHS (Revision 7) classifications into the I-code definitions to better align with federal standards for hazardous materials classification. Proper identification of multiple hazards and the degree of hazard are likely outcomes of utilizing the GHS.

Oxidizing solids and liquids can cause fires to burn more intensely, they can cause substances that do not normally burn to ignite, and can even cause explosions due to shock or contamination. Oxidizers are commonly used in the pool industry, in agriculture (fertilizers), in healthcare (disinfectants), and are precursors to explosives (rocket fuel, ammunition, and improvised explosive devices).

Unregulated storage of oxidizers has led to serious injuries, property damage, and hundreds of deaths, including the ammonium nitrate explosion in West Texas in 2013 where 150 buildings were damaged or destroyed and 15 people (mostly emergency responders) were killed. In Beirut, Lebanon in 2020, unregulated storage of ammonium nitrate caused an explosion resulting in over 200 deaths, 300,000 displaced people, and over $15 billion in damage.

The current IFC definitions of oxidizers are largely subjective, making it difficult for Fire Code officials to verify accurate classification of different oxidizers and to enforce proper storage and use. The GHS definitions, however, are based upon prescriptive, quantitative test criteria outlined in the UN Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria (Revision 6). Use of standardized, quantitative test methodology to classify chemicals with physical hazards is expected to provide more accurate and consistent classification. Consequences of missing or incorrect classification include increased risk of fires that burn more intensely than expected. This puts people at risk, elevates danger to fire fighters who may enter spaces with unknown physical hazards, and increases preventable hazards in locations that may store any quantity of oxidizer.

IFC and GHS alignment:

The proposed alignment with IFC oxidizer classes and GHS oxidizer categories is based upon comparison of 30 oxidizing solids defined by the International Fire Code (Appendix E) and the Globally Harmonized System (GHS) of classification. Alignment, as outlined below, was not statistically different between IFC and GHS oxidizers (Chi-Squared goodness of fit test, $p = 0.102$).

GHS H271, Category 1 Oxidizers include IFC **Oxidizers, Class 4 and Class 3**
GHS H272, Category 2 Oxidizers are equivalent to IFC **Oxidizers, Class 2**

GHS H272, Category 3 Oxidizers align with IFC **Oxidizers, Class 1**

Although GHS Category 1 Oxidizers include both IFC Class 3 and 4 Oxidizers, there are additional methods which the Code Official can use to identify more hazardous Class 4 Oxidizers. If the Category 1 Oxidizer has either evidence of explosive properties or is packaged for transport in accordance with US DOT regulations in Packing Group I, then the materials are considered Class 4 Oxidizers. In the absence of any evidence of explosive properties or if the material is packaged for transport in Packing Group II or III, a Category 1 Oxidizer is considered Class 3.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the FCAC Website

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is meant to provide correlation with the Globally Harmonized System (GHS) of Classification and Labelling of Chemicals which is used globally and by OSHA. This revised definition will make compliance more straightforward. In some cases, this revised definition may more heavily regulate additional materials for new building; conversely, in other cases this definition will result in reduced classification of materials as the revised definitions use explicit quantitative test criteria to classify Oxidizing solids and liquids. However, any differences are balanced out by the coordination and ease of enforcement that comes with being aligned with GHS and OSHA. US manufacturers and distributors of hazardous materials have been required to use the GHS classification system to communicate the hazards of materials in Safety Data Sheets (SDS) since 2012.

F27-24

F28-24

IFC: SECTION 202; IBC: SECTION 202

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Megan Hall, UC Berkeley Fire Prevention, self (mchall@berkeley.edu); Lynne Kilpatrick, HMEx Assistant LLC, self (lynne.kilpatrick@hmexassistant.com)

2024 International Fire Code

Revise as follows:

OXIDIZING GAS. A compressed gas that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as an Oxidizing Gas, Category 1. Where the GHS category is not known, the following is acceptable for classification purposes: A gas that can support and accelerate combustion of other materials more than air does.

2024 International Building Code

Revise as follows:

[F] OXIDIZING GAS. A compressed gas that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as an Oxidizing Gas, Category 1. Where the GHS category is not known, the following is acceptable for classification purposes:A gas that can support and accelerate combustion of other materials more than air does.

Reason: Fire Code officials must enforce the hazardous materials provisions of the International Fire Code (IFC) and the International Building Code (IBC) to ensure that people and property in our communities are safe. While code officials need to verify and validate the hazards of materials, classifying hazardous materials in accordance with definitions and hazard classes in the I-codes is the responsibility of facility owners and is an ongoing challenge. Consequences of missing or incorrect classification include increased fire and life safety risk and can lead to misclassification of an occupancy.

Due to the expansion of international chemical trade, the United Nations (UN) developed a Globally Harmonized System (GHS) of classification of hazardous materials. The GHS is an internationally agreed upon standard of classification and labeling that in most cases utilizes prescriptive, standardized testing procedures and criteria to classify hazardous materials. Federal law (29 CFR 1910.1200 (OSHA) and 49 CFR 173.127 (DOT)) mandates that manufacturers selling, producing or transporting chemicals in the United States classify chemicals according to the GHS system and make the information readily available in product Safety Data Sheets (SDSs).

This proposal aims to incorporate the readily available GHS (Revision 7) classifications into the I-code definitions to better align with federal standards for hazardous materials classification. Proper identification of multiple hazards and the degree of hazard are likely outcomes of utilizing the GHS.Oxidizing gas definitions are virtually identical between IFC and GHS. No changes are anticipated by using the proposed definition.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the FCAC Website

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is meant to provide correlation with the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) which is used globally and by OSHA. This revised definition will not affect the application of the code and will make compliance more straightforward. US manufacturers and distributors of hazardous materials have been required to use the GHS classification system to communicate the hazards of materials in Safety Data Sheets (SDS) since 2012.

F28-24

F29-24

IFC: SECTION 202; IBC: SECTION 202

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Lynne Kilpatrick, HMEx Assistant LLC, self (lynne.kilpatrick@hmexassistant.com); Megan Hall, UC Berkeley Fire Prevention, self (mchall@berkeley.edu)

2024 International Fire Code

Revise as follows:

PYROPHORIC. <u>A substance or mixture that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Pyrophoric Gas, Pyrophoric Solid (Category 1), or Pyrophoric Liquid (Category 1). Where the GHS category is not known, the following is acceptable for classification purposes:</u> A chemical with an autoignition temperature in air, at or below a temperature of 130°F (54.<u>4</u>°C).

2024 International Building Code

Revise as follows:

[F] PYROPHORIC. <u>A substance or mixture that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Pyrophoric Gas, Pyrophoric Solid (Category 1), or Pyrophoric Liquid (Category 1). Where the GHS category is not known, the following is acceptable for classification purposes:</u> A chemical with an auto-ignition temperature in air, at or below a temperature of 130°F (54.4°C).

Reason: Fire Code officials must enforce the hazardous materials provisions of the International Fire Code (IFC) and the International Building Code (IBC) to ensure that people and property in our communities are safe. While code officials need to verify and validate the hazards of materials, classifying hazardous materials in accordance with definitions and hazard classes in the I-codes is the responsibility of facility owners and is an ongoing challenge. Consequences of missing or incorrect classification include increased fire and life safety risk and can lead to misclassification of an occupancy.

Due to the expansion of international chemical trade, the United Nations (UN) developed a Globally Harmonized System (GHS) of classification of hazardous materials. The GHS is an internationally agreed upon standard of classification and labeling that in most cases utilizes prescriptive, standardized testing procedures and criteria to classify hazardous materials. Federal law (29 CFR 1910.1200 (OSHA) and 49 CFR 173.127 (DOT)) mandates that manufacturers selling, producing or transporting chemicals in the United States classify chemicals according to the GHS system and make the information readily available in product Safety Data Sheets (SDSs).

This proposal aims to incorporate the readily available GHS (Revision 7) classifications into the I-code definitions to better align with federal standards for hazardous materials classification. Proper identification of multiple hazards and the degree of hazard are likely outcomes of utilizing the GHS. The current IFC definition of Pyrophoric is somewhat aligned with the definitions of the GHS categories listed. The IFC definition, which applies to all physical states; solids, liquids and gases, is identical to the GHS definition for Pyrophoric Gases. However, the GHS definitions and test methods (*UN Manual of Tests and Criteria, 33.4.4 Test N.2 and 33.4.5 Test N.3*) used for evaluating liquids and solids specifies testing at high temperatures and prescribes a time limit (5 minutes) within which the material must demonstrate pyrophoricity. The IFC does not currently specify a time period, nor a specific test method, to evaluate materials. Rather, under the IFC, pyrophorocity is entirely dependent on autoignition temperature, a physical property of the material. Thus, there may be some liquids and solids that are classified as Pyrophoric under the IFC that do not meet the prescriptive pyrophoric test criteria under the GHS. And, some materials, like powdered metals, that do not have an autoignition temperature below 130°F may be categorized as Pyrophoric under the GHS. Liquids and solids that do not meet the GHS definition of pyrophoric, but are capable of spontaneous combustion may be categorized under the GHS as self-heating substances.The minor change reflecting a more accurate unit conversion from Fahrenheit to Celsius is intended to align with the unit conversion existing in the IBC.

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Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is meant to provide correlation with the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) which is used globally and by OSHA. This revised definition will not affect the application of the code and will make compliance more straightforward. In some cases, this revised definition may regulate additional materials as the revised definition potentially widens what is considered Pyrophoric. However, this is balanced out by the coordination and ease of enforcement that comes with being aligned with the GHS and OSHA. US manufacturers and distributors of hazardous materials have been required to use the GHS classification system to communicate the hazards of materials in Safety Data Sheets (SDS) since 2012.

F29-24

F30-24

IFC: SECTION 202 (New)

Proponents: Geoffrey Raifsnider, Global Finishing Solutions, Self (graifsnider@globalfinishing.com)

2024 International Fire Code

Add new definition as follows:

SMOKING. Possessing a pipe, cigar or cigarette or operation of an e-cigarette, vape pen or similar apparatus that is heated, lighted or burning.

Reason: Adding definition of smoking to include vaping so that current no smoking requirements would also be applicable for vaping.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The code change proposal will not increase or decrease the cost of construction as the cost of the proposed sign does not appear to be significantly different than current no smoking signs.

F30-24

F31-24

IFC: SECTION 202

Proponents: Jonathan Siu, Jon Siu Consulting, LLC, Self

2024 International Fire Code

Revise as follows:

TEMPORARY SPECIAL EVENT STRUCTURE. Any temporary ground-supported structure, platform, stage, stage scaffolding or rigging, canopy, tower ~~supporting audio or visual effects equipment or similar structures not regulated within the scope of the *International Building Code*~~or similar structure supporting entertainment-related equipment or signage.

Reason: This proposal is intended to align the 2027 IFC with the 2024 IBC, as well as clarify that most temporary special event structures are regulated by the IFC, making the code internally consistent.

Aside from the actual text of the definitions being misaligned in the two codes, in the process of investigating the application of the building code and the fire code to temporary structures for a separate proposal, it became apparent that there are some discrepancies between the provisions in the 2024 IFC and my understanding of current practice.

- The current definition of Temporary Special Event Structure says that they are "temporary...structures not regulated by the building code." However, the only temporary structures that aren't in the scope of the IBC are those that are less than 120 square feet in area and are for gatherings of less than 10 people (see 2024 IBC 3103.1.3). It is clear that the intent of having regulations for temporary special event structures in the IFC is that the code would apply to more than just the limited subset of small temporary structures that are not regulated by the IBC. IFC Section 3105.2 requires compliance when a permit is required by Section 105.5 or 105.6. Section 105.5.51 scopes in all special event structures, with a couple of exceptions for tents. (Section 105.6.25 just points back to 105.5.51.) This intent is reflected in current practice, in my experience.
- Code Change Proposal G147-18 introduced the definition of "Special Event Structure" to the 2021 IBC. According to the reason statement, the intent was to coordinate the IBC with a change made to the IFC by F308-16, introduced by FCAC. However, the definition in G147-18 differs from F308-16, and the published reason statements by the proponent and the IBC General Committee for G147-18 did not address the difference (primarily, elimination of the "not regulated by the building code" language). I could find no record of a follow-up code change to re-align the IFC definition with the IBC in the 2024 I-codes cycle.

This proposal takes the approach that the definitions in the IFC and IBC should be essentially the same, with the exception that the IFC refers to "temporary" special event structures, whereas the IBC refers to all special event structures. In addition, the reference to "structures not regulated by the IBC" in the IFC definition is unnecessary and limiting, thus the proposal to change the IFC's definition rather than the IBC's. Removing the phrase will have no effect on whether the IBC applies but will clarify the language of the IFC to cover the intent and current practice.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The clear intent of the regulations in the IFC is that the code would apply to all temporary special event structures, not just the small structures that aren't in the scope of the IBC. This proposed change aligns the language in the code with current practice, so there is no change in enforcement.

F31-24

F32-24

IFC: SECTION 202; IBC: SECTION 202

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Lynne Kilpatrick, HMEx Assistant LLC, self (lynne.kilpatrick@hmexassistant.com); Megan Hall, UC Berkeley Fire Prevention, self (mchall@berkeley.edu)

2024 International Fire Code

Revise as follows:

UNSTABLE (REACTIVE) MATERIAL. A material, other than an *explosive*, which in the pure state or as commercially produced, will vigorously polymerize, decompose, condense or become self-reactive and undergo other violent chemical changes, including explosion, when exposed to heat, friction or shock, or in the absence of an inhibitor~~, or in the presence of contaminants, or in contact with *incompatible materials*~~. Unstable (reactive) materials are subdivided as follows:

Class 1. Materials that in themselves are normally stable but which can become unstable at elevated temperatures and pressure. This Class includes liquid or solid materials that are categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Self-Reactive (Category E or F).

Class 2. Materials that in themselves are normally unstable and readily undergo violent chemical change but do not detonate. This class includes materials that can undergo chemical change with rapid release of energy at *normal temperatures and pressures*, and that can undergo violent chemical change at elevated temperatures and pressures. This Class includes liquid or solid materials that are categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Self-Reactive (Category C or D).

Class 3. Materials that in themselves are capable of *detonation* or of explosive decomposition or explosive reaction but which require a strong initiating source or which must be heated under confinement before initiation. This class includes materials that are sensitive to thermal or mechanical shock at elevated temperatures and pressures. This Class includes liquid or solid materials that are categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Self-Reactive (Category B) and can include compressed gases categorized as Chemically Unstable (Type B).

Class 4. Materials that in themselves are readily capable of *detonation* or explosive decomposition or explosive reaction at *normal temperatures and pressures*. This class includes materials that are sensitive to mechanical or localized thermal shock at *normal temperatures and pressures*. This Class includes liquid or solid materials that are categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Self-Reactive (Category A) and can include compressed gases categorized as Chemically Unstable (Type A).

2024 International Building Code

Revise as follows:

[F] UNSTABLE (REACTIVE) MATERIAL. A material, other than an *explosive* , which in the pure state or as commercially produced, will vigorously polymerize, decompose, condense or become self-reactive and undergo other violent chemical changes, including *explosion*, when exposed to heat, friction or shock, or in the absence of an inhibitor, ~~or in the presence of contaminants, or in contact with *incompatible materials.*~~ Unstable (reactive) materials are subdivided as follows:

Class 1. Materials that in themselves are normally stable but which can become unstable at elevated temperatures and pressure. This Class includes liquid or solid materials that are categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Self-Reactive (Category E or F).

Class 2. Materials that in themselves are normally unstable and readily undergo violent chemical change but do not detonate. This class includes materials that can undergo chemical change with rapid release of energy at *normal temperatures and pressures*, and that can undergo violent chemical change at elevated temperatures and pressures. This Class includes liquid or solid materials that are categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Self-Reactive (Category C or D).

Class 3. Materials that in themselves are capable of *detonation* or of explosive decomposition or explosive reaction but which require a strong initiating source or which must be heated under confinement before initiation. This class includes materials that are sensitive to thermal or mechanical shock at elevated temperatures and pressures. This Class includes liquid or solid materials that are categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Self-Reactive

(Category B) and can include compressed gases categorized as Chemically Unstable (Type B).

Class 4. Materials that in themselves are readily capable of *detonation* or explosive decomposition or explosive reaction at *normal temperatures and pressures*. This class includes materials that are sensitive to mechanical or localized thermal shock at *normal temperatures and pressures*. This Class includes liquid or solid materials that are categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Self-Reactive (Category A) and can include compressed gases categorized as Chemically Unstable (Type A).

Reason: Fire Code officials must enforce the hazardous materials provisions of the International Fire Code (IFC) and the International Building Code (IBC) to ensure that people and property in our communities are safe. While code officials need to verify and validate the hazards of materials, classifying hazardous materials in accordance with definitions and hazard classes in the I-codes is the responsibility of facility owners and is an ongoing challenge. Consequences of missing or incorrect classification include increased fire and life safety risk and can lead to misclassification of an occupancy.

Due to the expansion of international chemical trade, the United Nations (UN) developed a Globally Harmonized System (GHS) of classification of hazardous materials. The GHS is an internationally agreed upon standard of classification and labeling that in most cases utilizes prescriptive, standardized testing procedures and criteria to classify hazardous materials. Federal law (29 CFR 1910.1200 (OSHA) and 49 CFR 173.127 (DOT)) mandates that manufacturers selling, producing or transporting chemicals in the United States classify chemicals according to the GHS system and make the information readily available in product Safety Data Sheets (SDSs).

This proposal aims to incorporate the readily available GHS (Revision 7) classifications into the I-code definitions to better align with federal standards for hazardous materials classification. Proper identification of multiple hazards and the degree of hazard are likely outcomes of utilizing the GHS.

Like the GHS definition of Self-reactive, the IFC definition of Unstable (reactive) considers a material's potential to react with itself to create a hazardous condition. However, unlike the GHS definition, the IFC definition also considers the stability of a material in the presence of contaminants and incompatible materials. Given the nearly infinite number of possible contaminants and incompatible materials a substance could be exposed to, it does not seem reasonable to include this as a criterion to define Unstable (reactive). Further, the current definitions of the individual classes of unstable (reactive) materials all begin with the phrase "materials that in themselves are...". This phrase implies that a hazardous reaction or condition must occur without influence, introduction, or combination with any other material, which is then in conflict with the primary definition of Unstable (reactive). For this reason, this proposal modifies the primary definition by striking the phrase "or, in the presence of contaminants or in contact with incompatible materials". It is expected that a proper evaluation and risk assessment of storage and use conditions will be conducted to ensure contaminants are kept away and contact with incompatible materials is prevented.

Because the GHS definition of Self-reactive applies only to liquid and solid substances, the GHS category Chemically Unstable gases could also apply to gases the IFC currently defines as an Unstable (reactive) gas. Under the GHS, Chemically Unstable gases are always Class 1A Flammable Gases, but it is possible that some nonflammable gases are defined as Unstable (reactive) under the IFC such as, phosphorus trichloride and chlorine dioxide. As a result, for gases the current IFC definition is broader that the GHS. This proposal adds the GHS categories that are expected to best align with the current IFC classes for Unstable (reactive) materials, however because there is not clear and direct correlation, they are only provided as guidance for code users.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the FCAC Website

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is meant to provide correlation with the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) which is used globally and by OSHA. This revised definition will not affect the application of the code and will make compliance more straightforward. US manufacturers and distributors of hazardous materials have been required to use the GHS classification system to communicate the hazards of materials in Safety Data Sheets (SDS) since 2012.

F32-24

F33-24

IFC: SECTION 202; IBC: SECTION 202

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Megan Hall, UC Berkeley Fire Prevention, self (mchall@berkeley.edu); Lynne Kilpatrick, HMEx Assistant LLC, self (lynne.kilpatrick@hmexassistant.com)

2024 International Fire Code

Revise as follows:

WATER-REACTIVE MATERIAL. A material that explodes; violently reacts; produces flammable, toxic or other hazardous gases; or evolves enough heat to cause autoignition or ignition of combustibles upon exposure to water or moisture. Water-reactive materials are subdivided as follows:

Class 1. Materials that react with water with some release of energy, but not violently. Under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS), these are classified as substances or mixtures which, in contact with water, emit flammable gases (Category 3).

Class 2. Materials that react violently with water or have the ability to boil water. Materials that produce *flammable*, *toxic* or other hazardous gases or evolve enough heat to cause autoignition or ignition of combustibles upon exposure to water or moisture. Under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS), these are classified as substances or mixtures which, in contact with water, emit flammable gases (Category 2).

Class 3. Materials that react explosively with water without requiring heat or confinement. Under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS), these are classified as substances or mixtures which, in contact with water, emit flammable gases (Category 1).

2024 International Building Code

Revise as follows:

[F] WATER-REACTIVE MATERIAL. A material that explodes; violently reacts; produces *flammable*, *toxic* or other hazardous gases; or evolves enough heat to cause autoignition or ignition of combustibles upon exposure to water or moisture. Water-reactive materials are subdivided as follows:

Class 1. Materials that react with water with some release of energy, but not violently. Under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS), these are classified as substances or mixtures which, in contact with water, emit flammable gases (Category 3).

Class 2. Materials that react violently with water or have the ability to boil water. Materials that produce *flammable*, *toxic* or other hazardous gases or evolve enough heat to cause autoignition or ignition of combustibles upon exposure to water or moisture. Under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS), these are classified as substances or mixtures which, in contact with water, emit flammable gases (Category 2).

Class 3. Materials that react explosively with water without requiring heat or confinement. Under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS), these are classified as substances or mixtures which, in contact with water, emit flammable gases (Category 1).

Reason: Fire Code officials must enforce the hazardous materials provisions of the International Fire Code (IFC) and the International Building Code (IBC) to ensure that people and property in our communities are safe. While code officials need to verify and validate the hazards of materials, classifying hazardous materials in accordance with definitions and hazard classes in the I-codes is the responsibility of facility owners which continues to be a challenge. Consequences of missing or incorrect classification include increased fire and life safety risk and can lead to misclassification of an occupancy.

Due to the expansion of international chemical trade, the United Nations (UN) developed a Globally Harmonized System (GHS) of classification of hazardous materials. The GHS is an internationally agreed upon standard of classification and labeling that in most cases utilizes prescriptive, standardized testing procedures and criteria to classify hazardous materials. Federal law (29 CFR 1910.1200 (OSHA) and 49 CFR 173.127 (DOT)) mandates that manufacturers selling, producing or transporting chemicals in the United States classify chemicals according to the GHS system and make the information readily available in product Safety Data Sheets (SDSs).

This proposal aims to incorporate the readily available GHS (Revision 7) classifications into the I-code definitions to better align with federal standards for hazardous materials classification. Proper identification of multiple hazards and the degree of hazard are likely outcomes of utilizing the GHS.

The current IFC definitions of water reactive materials are largely subjective, making it difficult for Fire Code officials to verify accurate classification of different water reactives and to enforce proper storage and use. The GHS definitions, however, are based upon prescriptive, quantitative test criteria outlined in the *UN Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria* (Revision 6). Use of standardized, quantitative test methodology to classify chemicals with physical hazards is expected to provide more accurate and consistent classification.

One notable difference between IFC and GHS definitions of water reactive materials is that the GHS test methods do not account for the formation of toxic or other hazardous gases when materials come in contact with water. The proposed definitions use the original IFC water reactive criteria, with added reference to GHS classifications. While GHS water reactives will also be IFC water reactives, the reverse is not necessarily true.

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Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is meant to provide correlation with the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) which is used globally and by OSHA. This revised definition will make compliance more straightforward. In some cases, this revised definition may more heavily regulate additional materials for new buildings; conversely, in other cases this definition will result in reduced classification of materials. However, any differences are balanced out by the coordination and ease of enforcement that comes with being aligned with GHS and OSHA. US manufacturers and distributors of hazardous materials have been required to use the GHS classification system to communicate the hazards of materials in Safety Data Sheets (SDS) since 2012.

F33-24

F34-24

IFC: 203.6.1

Proponents: Kevin Scott, KH Scott & Associates LLC, self (khscottassoc@gmail.com)

2024 International Fire Code

Revise as follows:

203.6.1 Occupancy exemptions. Storage, use and handling of hazardous materials in accordance with Table ~~307.1.1 of the *International Building Code*~~ 5003.1.1(5) shall not be counted as contributing to maximum allowable quantities and shall not cause classification of an occupancy to be Group H. Such storage, use and handling shall comply with applicable provisions of this code.

Staff Analysis: Note that this section is correlated with IBC Section 307.1.1 but is looking for an IFC specific reference.

Reason: The new section 203 dealing with occupancies will be a great benefit to code users and assist in the application of the code.

Section 203.6.1 refers to a table of functions and activities where the quantity of hazardous materials is not included in the maximum allowable quantity. This section refers to table in the IBC. This means that to properly classify an occupancy with hazardous materials it takes both the IFC and the IBC to accomplish the evaluation.

The reality is that the table is located in the IFC, and is the new Table 5003.1.1(5). The table in the IFC and the table in the IBC are identical. therefore, rather than sending the code user to the IBC, the reference is changed to Table 5003.1.1(5) in the IFC. In this manner, the code user can complete the occupancy classification using either the IBC or IFC, but does not need to use both.

This is an editorial change to simply reference the table in the IFC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is an editorial code change. The reference is changed from a table in the IBC to a table in the IFC.

F34-24

F35-24

IFC: SECTION 303, 303.1, 303.2, 303.3, 303.4, 303.5, 303.6, 303.7, 303.8, 303.9, 3305.10, 3305.10.1, 3305.10.2

Proponents: Mark Graham, National Roofing Contractors Association (NRCA) (mgraham@nrca.net)

2024 International Fire Code

Revise as follows:

SECTION 303
ROOFING KETTLES

303.1 Transporting. ~~Asphalt (tar)~~ Roofing kettles shall not be transported over any highway, road or street when the heat source for the kettle is operating.

Exception: ~~Asphalt (tar)~~ Roofing kettles in the process of patching road surfaces.

303.2 Location. ~~Asphalt (tar)~~ Roofing kettles shall not be located within 20 feet (6096 mm) of any combustible material, combustible building surface or any building opening and within a controlled area identified by the use of traffic cones, barriers or other *approved* means. ~~Asphalt (tar)~~ Roofing kettles and pots shall not be utilized inside or on the roof of a building or structure. Roofing kettles and operating ~~asphalt (tar)~~ roofing kettles shall not block *means of egress*, gates, roadways or entrances.

303.3 Location of fuel containers. Fuel containers shall be located not less than 10 feet (3048 mm) from the burner.

Exception: Containers properly insulated from heat or flame are allowed to be within 2 feet (610 mm) of the burner.

303.4 Attendant. An operating roofing kettle shall be attended by not less than one employee knowledgeable of the operations and hazards. The employee shall be within 100 feet (30 480 mm) of the kettle and have the kettle within sight. Ladders or similar obstacles shall not form a part of the route between the attendant and the kettle.

Revise as follows:

303.5 Fire extinguishers. There shall be a portable fire extinguisher complying with Section 906 and with a minimum 40-B:C rating within 25 feet (7620 mm) of each ~~asphalt (tar)~~ roofing kettle during the period such kettle is being utilized. Additionally, there shall be one portable fire extinguisher with a minimum 3-A:40-B:C rating on the roof being covered.

303.6 Lids. ~~Asphalt (tar)~~ Roofing kettles shall be equipped with tight-fitting lids.

303.7 Hi-boys. Hi-boys shall be constructed of noncombustible materials. Hi-boys shall be limited to a capacity of 55 gallons (208 L). Fuel sources or heating elements shall not be allowed as part of a hi-boy.

303.8 Roofing kettles. Roofing kettles shall be constructed of noncombustible materials.

303.9 Fuel containers under air pressure. Fuel containers that operate under air pressure shall not exceed 20 gallons (76 L) in capacity and shall be *approved*.

3305.10 Safeguarding roofing operations.
Roofing operations utilizing heat-producing systems or other ignition sources shall be conducted in accordance with Sections 3305.10.1 and 3305.10.2 and Chapter 35.

Revise as follows:

3305.10.1 ~~Asphalt and tar~~ Roofing kettles.

~~Asphalt and tar~~ Roofing kettles shall be operated in accordance with Section 303.

3305.10.2 Fire extinguishers for roofing operations.
Fire extinguishers shall comply with Section 906. There shall be not less than one multiple-purpose portable fire extinguisher with a minimum 3-A 40-B:C rating on the roof being covered or repaired.

Reason: This code change proposal is intended to clarify the code by using terminology consistently. The term "...asphalt (tar) kettle..." and "...roofing kettle..." are used interchangeably in Section 303. Usages of "...asphalt (tar) kettle..." are changed to "...roofing kettle..." in Section 303 and Section 3305.10 for consistency and clarity.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This change is strictly editorial and does not increase or decrease the stringency of the code.

F35-24

F36-24

IFC: 304.1.3

Proponents: Matthew Dobson, VSI, VSI (mdobson@vinylsiding.org)

2024 International Fire Code

Revise as follows:

304.1.3 Vegetation and Combustible Mulch.
Weeds, grass, vines, combustible mulch or other growth that is capable of being ignited and endangering property, shall be cut down or prohibited and removed by the *owner* or occupant of the premises. Vegetation and combustible mulch clearance requirements in wildland-urban interface areas shall be in accordance with the *International Wildland-Urban Interface Code*.

Reason: Over the past code cycles there has been concern over smoker habits and wildfires and combustible mulch, and the potential hazard they pose with combustion of exterior walls. This change focuses on providing protections from two ignition sources discarded cigarettes or pre-rolls (joints) and wildfires. Many fire service members, the UL fire fighter safety institute, and other material stakeholders, like the Vinyl Siding Institute, have been focused on this issue over close to 10 years or more. The problem identified is the spread of fire from the exterior into the unprotected attic space and then spreading quickly to other parts of the building either through discarded cigarettes or wildfire. The term that is used in the proposal is "combustible mulch" rather than "combustible ground cover" because there is the potential for misinterpretation when describing "ground cover", as it might be thought to refer to products placed on the ground during repairs or renovations and should not be regulated.

Over the decade, fire departments in the Washington, DC region (Loudon County, VA) have been confronted with structure fires which have demonstrated a consistent pattern of starting on the outside. These fires have the potential for rapid loss of structural integrity and catastrophic collapse before occupants are alerted. As attention has grown locally, it is apparent that this type of fire is becoming common on a national basis.

These fires tend to follow a distinct pattern. These fires start at a low point on the exterior ground or in a waste basket with discarded cigarette and spread vertically along the exterior wall producing flammable gases, which are readily admitted into the attic area through ventilation soffits. If not cooled, these heated gases accumulate and combust, creating rapidly spreading fire conditions in the attic area, often without occupant awareness. The unchecked fire can result in full roof involvement, creating a dangerous and difficult situation for occupants and fire fighters.

The group examined a number of structure fires which have exhibited the pattern described above. There is agreement over 3 common aspects. First, these fires often result from careless smoking habits or wildfires. Second, when the smoking materials are not properly disposed of, they come into contact with combustible ground cover adjacent to a building and, very commonly, this is mulch or wildfires (flying embers) start the combustible ground cover (kindling). And, last, the combustible exterior wall is a factor in the the growth of these fires into the attic space.

The careless smoker is an impediment to effective fire prevention efforts. The fire service has consistently provided data that shows smoking is the leading cause of fatal fires in the United States. Public fire and life safety efforts have been reasonably effective at communicating the message to not smoke in bed, and various medical organizations have demonstrated the health risk associated with “second hand” smoke. We now see that people are routinely smoking outside, at or near the entrance to a building, which increases the possibility of an accidental ignition of outside combustibles.

If one were to chronicle the actions of today’s smoker, it shows the last action they take when exiting a building is to “light up.” When returning inside, they often drop the cigarette near the entrance. Many smokers seem to believe that dropping a match or cigarette onto the combustible ground cover or into a flower pot is an effective method of extinguishment, however, this behavior often places the smoking material directly into the mulch, initiating the low fire described earlier.

Combustible mulch has become a common exterior decorative material which aids in suppressing weed growth while enhancing a building’s curb appeal. However, most mulch is a dead organic material, comprised of chipped wood, tree bark or pine needles. Mulch is most effective when it is maintained in a moist state, however it can dry out very quickly and become a readily ignitable fuel source. Because of its relatively small mass in comparison to its surface area, when ignited, it will progress and sustain open flame.

The group discussed a method in which to proceed, the interest being to add ress, in the quickest manner, industrial and social changes which could reduce the possibility of a fire on the outside of a building. Each aspect presents unique challenges for fire prevention efforts:

1. Changing the behavior of the smoker is an ongoing and difficult challenge, especially as social pressures have resulted in regulatory changes to require people to smoke outside of a building. Further development of the “fire safe” cigarette, by way of testing using mulch, could be deemed too costly for the industry, and would have no effect on improper disposal of matches. Thus, the quickest and most practical strategy for this aspect of the problem is to expand public fire and life safety education to focus on the hazards of improper disposal of smoking materials, coupled with enforcement of applicable requirements for regulation of smoking and disposal of products. However, in this age of “information overflow” it is questionable if this would result in widespread behavioral changes for smokers.

2. Regulating the use and placement of mulch, that the study group believes could have the quickest and most significant impact toward reducing the exterior fire problem, while additional strategies to address the other problems noted are pursued. The use of wood and wood related mulch for building decoration is purely optional. It is not a required construction component under current building codes. Therefore, regulations to curtail its use or require that it be separated from a building’s combustible exterior are reasonable and could be codified on a national basis. On a large scale, the mere action of creating separation of combustible materials has been a wildland fire tactic for years. Several states and local jurisdictions have already employed this theory by either recommending or requiring that wood-based mulch be separated from exterior combustible walls:

1. The Virginia Department of Forestry recommends to “provide a minimum of an 18 inch clearance between landscaping mulch beds and combustible building materials” and to “ensure proper clearance to electric devices, such as decorative lights, by following the manufacturer’s instructions;”

2. In Raleigh, NC, following a disastrous fire in a multi-family building, the city passed a pine straw mulch ordinance that bans the use of pine straw as ground cover within 10 feet of multi-family dwellings. The ordinance exempts 1 and 2-family dwellings, however, the city strongly encourages these homeowners to comply with the pine straw restrictions;

3. The Commonwealth of Massachusetts prohibits the new application of mulch within 18 inches around combustible exteriors of buildings, such as wood or vinyl but not brick or concrete. Residential buildings with six units or less are exempted from this regulation, but it is recommended that all homeowners adopt these safety practices. The regulation applies to all other buildings including commercial properties.

4. Ventura County, CA prohibits mulch and wood chips within the required “defensible space” zone (which ranges from 0’ to 30’ from the exterior of a building).

Cost Impact: Increase

Estimated Immediate Cost Impact:

This change could increase the cost of construction and maintenance, as non-combustible mulch can be more expensive than combustible mulch.

Estimated Immediate Cost Impact Justification (methodology and variables):

Typical retail cost of non-combustible mulch (pea gravel) vs. combustible mulch, can range from 2-5 times more expensive.

Estimated Life Cycle Cost Impact:

However typical combustible mulch will need to be replaced every 1-2 years vs. non-combustible mulch which may last 10+ years.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

Based on estimated lifecycle of typical combustible mulch vs. non-combustible mulch.

F36-24

F37-24

IFC: 304.3.2, O102.5

Proponents: Marcelo Hirschler, GBH International, GBH International (mmh@gbhint.com)

2024 International Fire Code

304.3.2 Low heat release materials.
Where required by this section, low heat release materials shall exhibit a peak rate of heat release not exceeding 300 kW/m^2 where tested in accordance with ASTM E1354 at an incident heat flux of 50 kW/m^2 in the horizontal orientation.

Revise as follows:

O102.5 Construction materials.
Containers and lids used for *valet trash collections* shall be constructed entirely of noncombustible materials or of materials that comply with Section 304.3.2 ~~meet a peak rate of heat release not exceeding 300 kW/m^2 when tested in accordance with ASTM E1354 at an incident heat flux of 50 kW/m^2 in the horizontal orientation~~.

Reason: At the last cycle, most of the requirements for waste container materials from chapters 3 and 8 were consolidated so that the requirements for low heat release materials (which are the same in various locations in the 2021 code) have all been placed into a new section 304.3.2 in the 2024 code. This proposal simply does the same with the heat release requirements for valet trash containers in Appendix O. The proposal deletes the details from the Appendix section and sends the user to that same section in Chapter 3, which can be used for these containers also.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is purely editorial and simply consolidates requirements.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The requirements are not being changed. Instead a reference is simply being made back to the identical requirements in the body of the code.

F37-24

F38-24

IFC: 304.3.2, 318.1, 2310.5.3, 3304.1.3, 3603.4

Proponents: Marcelo Hirschler, GBH International, GBH International (mmh@gbhint.com)

2024 International Fire Code

304.3.2 Low heat release materials.
Where required by this section, low heat release materials shall exhibit a peak rate of heat release not exceeding 300 kW/m^2 where tested in accordance with ASTM E1354 at an incident heat flux of 50 kW/m^2 in the horizontal orientation.

Revise as follows:

318.1 Laundry carts with a capacity of 1 cubic yard or more.
Laundry carts with an individual capacity of 1 cubic yard [200 gallons (0.76 m^3)] or more, used in laundries within Group B, E, F-1, I, M and R-1 occupancies, shall be constructed of noncombustible materials or <u>of </u>materials <u>complying with Section 304.3.2</u> ~~having a peak rate of heat release not exceeding 300 kW/m^2 at a flux of 50 kW/m^2 where tested in a horizontal orientation in accordance with ASTM E1354~~.

Exceptions:

1. Laundry carts in areas protected by an *approved automatic sprinkler system* installed throughout in accordance with Section 903.3.1.1.
2. Laundry carts in coin-operated laundries.

2310.5.3 Rubbish containers.
Containers with tight-fitting or self-closing lids shall be provided for temporary storage of combustible debris, rubbish and waste material. The rubbish containers shall be constructed entirely of <u>noncombustible materials or of materials complying with Section 304.3.2.</u> ~~materials that comply with any one of the following:~~

1. ~~Noncombustible materials.~~
2. ~~Materials that meet a peak rate of heat release not exceeding 300 kW/m^2 when tested in accordance with ASTM E1354 at an incident heat flux of 50 kW/m^2 in the horizontal orientation.~~

3304.1.3 Rubbish containers.
Where rubbish containers with a capacity exceeding 5.33 cubic feet (40 gallons) (0.15 m^3) are used for temporary storage of combustible debris, rubbish and waste material, they shall have tight-fitting or self-closing lids. Such rubbish containers shall be constructed entirely of <u>noncombustible materials or of materials complying with Section 304.3.2.</u>~~materials that comply with either of the following:~~

1. ~~Noncombustible materials.~~
2. ~~Materials that meet a peak rate of heat release not exceeding 300 kW/m^2 when tested in accordance with ASTM E1354 at an incident heat flux of 50 kW/m^2 in the horizontal orientation.~~

3603.4 Rubbish containers.
Containers with tight-fitting or self-closing lids shall be provided for temporary storage of combustible debris, rubbish and waste material. The rubbish containers shall be constructed entirely of <u>noncombustible materials or of materials complying with Section 304.3.2.</u> ~~materials that comply with any one of the following:~~

1. ~~Noncombustible materials.~~
2. ~~Materials that meet a peak rate of heat release not exceeding 300 kW/m^2 where tested in accordance with ASTM E1354 at an incident heat flux of 50 kW/m^2 in the horizontal orientation.~~

Reason: At the last cycle, all the requirements for waste container materials from chapters 3 and 8 were consolidated (as a result of proposal F9-21) so that the requirements for low heat release materials for most such containers (which are the same in various locations in the code) have all been placed into a new section 304.3.2. This proposal simply does the same with the heat release requirements for rubbish containers (and laundry carts) elsewhere in the code and deletes the details from the sections where they are now and sends the user to that same section (304.3.2) in Chapter 3, which can be used for all of them.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This change is purely editorial since it sends the code user for the remaining requirements based on cone calorimeter testing of laundry carts and rubbish containers towards Chapter 3, where several other are already contained.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The requirements are not being changed. See reason statement.

F38-24

F39-24

IFC: 307.5, 307.5.1 (New), 307.5.2 (New)

Proponents: Scott Plumer, Arvada Fire Protection District, Arvada Fire Protection District

2024 International Fire Code

Revise as follows:

307.5 Attendance.
Open burning, *bonfires*, *recreational fires* and use of *portable outdoor fireplaces* shall be constantly attended until the fire is verified to be fully extinguished.~~Not fewer than one portable fire extinguisher complying with Section 906 with a minimum 4-A rating or other approved on-site fire-extinguishing equipment, such as dirt, sand, water barrel, garden hose or water truck, shall be available for immediate utilization.~~

Add new text as follows:

307.5.1 Open burning and bonfire extinguishing equipment. Not fewer than one means of fire-extinguishing equipment located on site and approved by the fire code official shall be available for immediate utilization.

307.5.2 Recreational fires and portable outdoor fireplaces extinguishing equipment. Not fewer than one portable fire extinguisher complying with Section 906 with a minimum 4-A rating or other approved on-site fire-extinguishing equipment, such as a garden hose, shall be available for immediate utilization.

Reason: This proposal seeks to clean up the language surrounding open burning extinguishment methods/equipment. The current code allows for a 4-A rated fire extinguisher for open burning and bonfires. For reference, UL 711 Rating and Fire Testing of Fire Extinguishers states that a 4-A rating can extinguish a wood crib that is 36" (914mm) high by 29" (483mm) wide by 29" (483mm) deep (per UL 711 Table 2). This is just slightly larger than the pile size allowed for a recreational fire. The lower bound for pile size of open burning is 36" (914mm) wide by 24" (610mm) high. However, by definition, open burning has no upper bound for the pile size. Therefore, it is inappropriate to allow a single 4-A extinguisher for open burning and bonfires. The size/type of extinguishing method should be left up to the fire code official to be determined during the permit process since open burning requires an operational permit per section 105.6.32. This proposal also removes sand, dirt, water barrel, and a water truck as suggested extinguishing methods. The 2021 Marshall Fire outside Boulder, Colorado, which killed two people, destroyed over 1,000 buildings, and caused hundreds of millions of dollars in damage is reported to have started from open burning that was "extinguished" using dirt which was later blown away during a high wind event, per the United States Forest Service investigation report. The added language regarding verification of extinguishment further reinforces the need for the entity conducting the burning to verify the fire has been extinguished and not just covered with dirt or sprayed with water. A water barrel and water truck should also be removed from the suggestions because they are not available for immediate utilization. Since this proposal still has the word *approved* in the code, a fire code official could still allow sand, dirt, water barrel, or a water truck, but it would have to be acceptable to the fire code official rather than explicitly being in the code.

Bibliography: United States Forest Service investigation report: https://assets.bouldercounty.gov/wp-content/uploads/2023/06/usfs-case-report-lunders-1.pdf

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

There is no immediate or ongoing cost impact for this proposal as it only seeks to clarify language and extinguishment methods.

F39-24

F40-24

IFC: APPENDIX O, SECTION 202, 304.1.1, O101.1, O102.1, O102.2, O102.3, O102.4, O102.5, O103.1, O103.2, O103.3, O104.1, O104.2, O104.3, SECTION O101, SECTION O102, SECTION O103, SECTION O104, SECTION O105, O105.1, TABLE O105.1

Proponents: William Koffel, Koffel Associates, Inc., National Trash and Recycling Valet Association (wkoffel@koffel.com)

2024 International Fire Code

Delete and substitute as follows:

~~APPENDIX O VALET TRASH AND RECYCLING COLLECTION IN GROUP R-2 OCCUPANCIES~~

SECTION 305 VALET TRASH COLLECTION

Revise as follows:

VALET TRASH COLLECTION. A~~n intermediary~~ service that removes trash or recycling materials placed outside of *dwelling units* or *sleeping units* for ~~final~~ collection.

Delete without substitution:

~~**304.1.1 Valet trash.**~~
~~*Valet trash collection* shall be permitted only where *approved*. The *owner* and *valet trash collection* service provider shall comply with the rules and limitations established by the jurisdiction.~~

Revise as follows:

~~O101.1~~ 305.1 General..
Valet trash collection in Group R-2 occupancies shall comply with this ~~appendix~~ section.

~~O102.1~~ 305.2 ~~General~~ Containers.
Containers used for *valet trash collection* shall comply with Sections ~~O102.2~~ 305.2.1 through ~~O102.5~~ 305.2.4.

~~O102.2~~ 305.2.1 Integrity.
Valet trash or recycling materials shall be stored in containers that are of liquid-tight construction and equipped with lids. Lids shall be in the fully closed position.

~~O102.3~~ 305.2.2 Height.
Containers shall not exceed 30 inches (762 mm) in height.

~~O102.4~~ 305.2.3 Capacity and limit.
Individual containers shall not exceed 2.0 cubic feet (15 gallons; 56.8 L) in capacity. Only one trash or recycling container per *dwelling unit*or*sleeping unit*shall be permitted to be placed outside the *dwelling unit*or *sleeping unit*at one time. Trash and recycling containers shall not be placed outside a *dwelling unit*or *sleeping unit* at the same time.

~~O102.5~~ 305.2.4 Construction materials.
Containers and lids used for *valet trash collections* shall be constructed entirely of noncombustible materials or of materials that meet a peak rate of heat release not exceeding 300 kW/m^2 when tested in accordance with ASTM E1354 at an incident heat flux of 50 kW/m^2 in the horizontal orientation.

~~O103.1~~ 305.3 ~~General~~ Placement of containers..
Placement of containers used for *valet trash collection* outside a *dwelling unit* or *sleeping unit* shall comply with Sections ~~O103.2~~ 305.3.1

and ~~O103.3~~ 305.3.2.

~~O103.2~~ 305.3.1 Minimum means of egress width.
Containers used for *valet trash collection* shall not obstruct the minimum required egress width.

~~O103.3~~ 305.3.2 Stairways.
Containers used for *valet trash collection*shall not be placed on stair risers, within minimum required stairway landing dimensions or anywhere in an *interior exit stairway*.

~~O104.1~~ 305.4 Time limits.
Filled containers used for valet trash or recycling services shall not be placed outside a *dwelling unit* for more than 6 hours within any 24-hour period. Empty *approved* containers used for valet trash or recycling services shall not remain in a *corridor* for more than 12 continuous hours in a 24-hour period.

~~O104.2~~ 305.5 Collection rules.
The property owner or manager shall have written valet service rules, hours and penalties provided to all tenants and occupants. The property owner or manager shall be responsible for implementing, monitoring and enforcing all *valet trash collection* rules. A copy of the rules shall be provided to the *fire code official*upon request.

~~O104.3~~ 305.6 Suspension of service.
The *fire code official* has the authority to order the suspension of *valet trash collection* that is not in compliance with this ~~appendix~~ Section.

Delete without substitution:

~~SECTION O101~~ ~~SCOPE~~

~~SECTION O102~~ ~~CONTAINERS~~

~~SECTION O103~~ ~~CONTAINER LOCATION~~

~~SECTION O104~~ ~~ADDITIONAL REQUIREMENTS~~

~~SECTION O105~~ ~~REFERENCED STANDARDS~~

~~O105.1 General.~~
~~See Table O105.1 for standards that are referenced in various sections of this appendix. Standards are listed by the standard identification with the effective date, standard title, and the section or sections of this appendix that reference the standard.~~

~~TABLE O105.1 REFERENCED STANDARDS~~

STANDARD ACRONYM	STANDARD NAME	SECTIONS HEREIN REFERENCED
ASTM E1354—17	*Standard Test Method for Heat and Visible Smoke Release Rates for Materials and Products Using an Oxygen Consumption Calorimeter*	O102.5

Reason: The proponents of F8-21 indicated that Section 304.1.1 was needed because prior editions of the IFC did not prohibit valet trash collection services. As such, the proponents felt the need for users of valet trash collection serviced to receive approval and for the owner and code official to determine the appropriate requirements.

At the same time, the FCAC and industry worked to develop Appendix O which contains requirements for valet trash collection services where Appendix O is adopted. The purpose of the proposal is to relocate the provisions of Appendix O into a new Section of the IFC. As such, there will be specific requirements that apply to valet trash collection services.

The proposed text requires that the collection rules established between the service provider and the building owner/manager be provided to the fire official. The fire official has the authority to suspend the service when the collection rules and the requirements of Section 305 are not met. As such, the intent of the proponents of F8-21 is met because the fire official has stated requirements that must be met and ability to suspend the service when the requirements are not met.

Technically, the proposal does not change the provisions of Appendix O.

It should also be noted that similar provisions are included in the 2024 Edition of NFPA 101.

The change to the definition is consistent with concerns expressed during the last revision cycle related to the definition contained in F8-21. Actually, the ICC membership approved two definitions during the last cycle since there was also a definition in Appendix O that was also approved. The concern with the existing definition is that it could apply more broadly to the curb side trash collection services.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Moving the requirements in Appendix O do the body of the IFC does not result in an impact on the cost of construction.

F40-24

F41-24

IFC: 308.3.1 (New)

Proponents: Bruce Swiecicki, National Propane Gas Association, National Propane Gas Association (bswiecicki@npga.org)

2024 International Fire Code

Add new text as follows:

308.3.1 Open-flame decorative devices. Open-flame decorative devices shall comply with all of the following restrictions:

1. Class I and Class II liquids shall not be used.
2. Fuel gas appliances shall be listed and installed in accordance with the *International Fuel Gas Code*.
3. Liquid- or solid-fueled lighting devices containing more than 8 ounces (237 ml) of fuel must self-extinguish and not leak fuel at a rate of more than 0.25 teaspoon per minute (1.26 ml per minute) if tipped over.
4. The device or holder shall be constructed to prevent the spillage of liquid fuel or wax at the rate of more than 0.25 teaspoon per minute (1.26 ml per minute) when the device or holder is not in an upright position.
5. The device or holder shall be designed so that it will return to the upright position after being tilted to an angle of 45 degrees (0.79 rad) from vertical.

    Exception: Devices that self-extinguish if tipped over and do not spill fuel or wax at the rate of more than 0.25 teaspoon per minute (1.26 ml per minute) if tipped over.

6. The flame shall be enclosed except where openings on the side are not more than 0.375-inch (9.5 mm) diameter or where openings are on the top and the distance to the top is such that a piece of tissue paper placed on the top will not ignite in 10 seconds.
7. Chimneys shall be made of noncombustible materials and securely attached to the open-flame device.

    Exception: A chimney is not required to be attached to any open-flame device that will self-extinguish if the device is tipped over.

8. Fuel canisters shall be safely sealed for storage.
9. Storage and handling of *combustible liquids* shall be in accordance with Chapter 57.
10. Shades, where used, shall be made of noncombustible materials and securely attached to the open-flame device holder or chimney.
11. Candelabras with flame-lighted candles shall be securely fastened in place to prevent overturning, and shall be located away from occupants using the area and away from possible contact with drapes, curtains or other combustibles.

Reason: There is no reason to prohibit fuel gas appliances for use with natural gas or propane when those appliances are listed and installed in accordance with the fuel gas code. The International Fuel Gas Code references the following decorative appliances that may have open flames:

ANSI Z21.60 Decorative Gas Appliances for Installation in Solid-Fuel Burning Fireplaces

ANSI Z21.97 Outdoor Decorative Appliances

There are potentially other listed appliances that may be suitable for this application as well. LP-Gas systems are closed systems that cannot spill like a container for a combustible or flammable liquid. There are safety features built into the performance standards for these appliances that other open flame devices may not have.

Bibliography: The following documents are referenced in the reason statement:

International Fuel Gas Code

ANSI Z21.60 Decorative Gas Appliances for Installation in Solid-Fuel Burning Fireplaces

ANSI Z21.97 Outdoor Decorative Appliances

Cost Impact: Increase

Estimated Immediate Cost Impact:

There may be an increased cost associated with installing fuel gas decorative appliances as opposed to other open flame, decorative appliances. The cost of the appliance installed can be a few hundred dollars. If the appliance is fueled by a hard-piped gas system, the cost to run that piping may be a few hundred dollars as well. Total cost could be between $500 and $1,000, depending on the type of appliance and additional features.

Estimated Immediate Cost Impact Justification (methodology and variables):

The methodology I used to determine the cost impact was based on personal experience.

Estimated Life Cycle Cost Impact:

Assuming that the fuel gas appliance functions properly for 15 years, the life cycle cost impact would include the initial installation and the fuel gas that it takes to operate the appliance. Roughly, the cost of the fuel gas over that 15-year period would be $1,500, so the total life cycle cost impact would be between $2,000 and $2,500.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

I used current gas pricing for propane and an estimated 200 hours of operation per year, or 3,000 hours over the life of the appliance. For a 20,000 Btuh appliance, that equates to about 750 gallons of propane. At $2.00 per gallon, that equates to $1,500 over the life cycle.

F41-24

F42-24

IFC: SECTION 202 (New), SECTION 202, SECTION 309, 309.1, 309.2.1 (New), 309.3, 309.4, 309.5, 309.6, 309.3.1 (New), 309.3.2 (New), 309.3.3 (New), 309.4 (New), 309.5 (New), 309.7

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Fire Code

Add new definition as follows:

FUEL-POWERED INDUSTRIAL EQUIPMENT.
A motorized hand truck, floor scrubber or buffer or similar device with an internal combustion engine intended to be personally driven or guided, powered by a hydrogen fuel cell, flammable or combustible liquid or flammable gas.

Revise as follows:

FUEL-POWERED INDUSTRIAL TRUCK. A forklift, tractor, platform lift truck or similar apparatus ~~motorized hand truck~~ powered by an ~~electrical motor~~ or internal combustion engine fueled by a hydrogen fuel-cell, flammable or combustible liquid or flammable gas. ~~Powered industrial trucks do not include farm vehicles or automotive vehicles for highway use.~~

SECTION 309
FUEL-POWERED INDUSTRIAL TRUCKS AND EQUIPMENT

309.1 General.
Fuel-Powered industrial trucks and *fuel-powered industrial equipment* ~~similar equipment including, but not limited to, floor scrubbers and floor buffers~~, shall be operated and maintained in accordance with this Section ~~Sections 309.2 through 309.7.~~

Add new text as follows:

309.2.1 Fuel-powered industrial equipment.. *Fuel-powered industrial equipment* shall be *listed* for their intended use and shall be operated in accordance with their listing and the manufacturer's instructions.

Delete without substitution:

~~**309.3 Battery chargers.** Battery chargers shall be of an *approved* type. Combustible storage shall be kept not less than 3 feet (915 mm) from battery chargers. Battery charging shall not be conducted in areas open to the public.~~

~~**309.4 Ventilation.** Ventilation shall be provided in an *approved* manner in battery-charging areas to prevent a dangerous accumulation of *flammable gases*.~~

~~**309.5 Fire extinguishers.**~~
~~Battery-charging areas shall be provided with a fire extinguisher complying with Section 906 having a minimum 4-A:20-B:C rating within 20 feet (6096 mm) of the battery charger.~~

Revise as follows:

~~309.6~~ 309.3 Refueling.
Fuel-Powered industrial trucks ~~using liquid fuel, LP-gas or hydrogen~~ shall be refueled outside of buildings or in areas specifically *approved* for that purpose. ~~Fixed fuel-dispensing equipment and associated fueling operations shall be in accordance with Chapter 23. Other fuel-dispensing equipment and operations, including cylinder exchange for LP-gas-fueled vehicles, shall be in accordance with Chapter 57 for *flammable* and *combustible liquids* or Chapter 61 for LP-gas.~~

Add new text as follows:

309.3.1 Fuel dispensing equipment. Fixed fuel-dispensing equipment and associated fueling operations shall be in accordance with Chapter 23.

309.3.2 Fuel dispensing operations.. Other fuel-dispensing equipment and operations, including cylinder exchange for LP-gas-fueled vehicles, shall be in accordance with Chapter 57 for *flammable* and *combustible liquids* or Chapter 61 for LP-gas.

309.3.3 Fire extinguishers.. Indoor refueling areas shall be provided with a fire extinguisher complying with Section 906 having a minimum 4-A:20-B:C rating within 20 feet (6096 mm) of the refueling area.

309.4 Hydrogen fueled industrial trucks. Fuel-powered industrial trucks utilizing hydrogen as a fuel shall be operated and maintained in accordance with applicable requirements in Chapter 23 of this code, the International Mechanical Code and NFPA 2.

309.5 Automatous fuel-powered industrial trucks. Automatous fuel-powered industrial trucks shall immediately return to an approved predetermined location upon activation of the manual fire alarm system or automatic fire detection system and shall remain stationary until manually reactivated following the reset of the fire alarm system.

Revise as follows:

~~**309.7**~~ **309.6 Repairs.** Repairs to fuel systems~~, electrical systems~~ and repairs utilizing open flame or welding shall be done in *approved* locationsoutside of buildings or in areas specifically *approved* for that purpose in accordance with applicable requirements in Section 2311.

Reason: FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

This proposal adds a new definition (FUEL-POWERED INDUSTRIAL EQUIPMENT) and revises the definition (FUEL-POWERED INDUSTRIAL TRUCK).

Section 309 will now contain only requirements for fuel-powered industrial trucks and equipment. All requirements for battery powered equipment, devices and similar apparatus will be consolidated into a new IFC Section (322).This proposal also clarifies and contains the requirements for all types of fuel sources, other than those that are battery-powered, used in powered trucks and equipment.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

There are no new requirements associated with this proposal and no impact to cost of construction. This simply focuses on the requirements for industrial trucks and equipment other than those powered by batteries.

F42-24

F43-24

IFC: 309.2

Proponents: Jonathan Roberts, UL Solutions, UL Solutions (jonathan.roberts@ul.com)

2024 International Fire Code

Revise as follows:

309.2 ~~Use in hazardous (classified) locations~~ Listing.
Powered industrial trucks ~~used in areas designated as hazardous (classified) locations in accordance with NFPA 70~~ shall be *listed* and *labeled* for use in the environment intended in accordance with NFPA 505.

Reason: Regardless of the environment where used, powered industrial trucks should be listed and labeled for the environment intended in accordance with NFPA 505 (Fire Safety Standard for Powered Industrial Trucks Including Type Designations, Areas of Use, Conversions, Maintenance, and Operations).

This proposal clarifies the intended reference to and compliance with NFPA 505. The scope of NFPA 505 covers all environments, not just hazardous (classified) environments.

The standards, UL 558 (Industrial Trucks, Internal Combustion Engine Powered and UL 583 (Electric Battery Powered Industrial Trucks) are both referenced in NFPA 505 and address the associated hazards for both internal combustion engine powered (such as LP-gas, gasoline, diesel and CNG) and electric battery powered (such as Li-ion battery) industrial trucks.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

No increase in the cost of construction. NFPA 505 is already in use and compliance is an existing IFC requirement.

F43-24

F44-24

IFC: CHAPTER 3, SECTION 310, 310.1, 310.1.1 (New), 310.2, 310.2.1, 310.3, 310.4, 310.5, 310.6, 310.7, 310.8, 1207.10.4.1, 1207.10.7.7

Proponents: Marcelo Hirschler, GBH International, GBH International (mmh@gbhint.com); Geoffrey Raifsnider, Global Finishing Solutions, Self (graifsnider@globalfinishing.com)

2024 International Fire Code

CHAPTER 3 GENERAL REQUIREMENTS

Revise as follows:

SECTION 310
SMOKING AND VAPING

310.1 General.
~~The smoking~~ Smoking, vaping or carrying of a lighted pipe, cigar, cigarette or any other type of smoking or vaping paraphernalia or material is prohibited in the areas indicated in Sections 310.2 through 310.8.

Add new text as follows:

310.1.1 Applicability. Wherever, sections of the present code reference smoking, both smoking and vaping are intended to be referenced, unless otherwise stated.

Revise as follows:

310.2 Prohibited areas. Smoking and vaping shall be prohibited where conditions are such as to make such practices ~~smoking~~ a hazard, and in spaces where flammable or combustible materials are stored or handled.

> **Exception:** In Group I-2 occupancies, patients shall be permitted to smoke or vape in designated patient care areas based on the clinical needs of the patient.

310.2.1 Group I-2. In Group I-2 occupancies, smoking and vaping shall be prohibited in patient care areas or where oxygen is used, stored or handled.

310.3 "No Smoking" signs.
The *fire code official* is authorized to order the posting of "No Smoking" or "No Vaping" signs or the international symbol for no smoking in a conspicuous location in each structure or location in which smoking or vaping is prohibited. The content, lettering, size, color and location of required "No Smoking" or "No Vaping" signs shall be *approved*.

> **Exception:** "No Smoking" or "No Vaping" signs are not required in interior locations of the facility where signs are displayed at all major entrances into the facility.

310.4 Removal of signs prohibited. ~~A posted~~ Posted "No Smoking" or "No Vaping" signs ~~sign~~ shall not be obscured, removed, defaced, mutilated or destroyed.

310.5 Compliance with "No Smoking" or "No Vaping" signs. Smoking or vaping shall not be permitted nor shall a person smoke, vape, throw or deposit any lighted or smoldering substance in any place where "No Smoking" or "No Vaping" signs are posted.

310.6 Ash trays. Where smoking or vaping are ~~is~~ permitted, suitable noncombustible ash trays or match receivers shall be provided on each table and at other appropriate locations. In Group I-2 occupancies, noncombustible metal containers with self-closing covers shall be provided in areas where smoking is permitted.

310.7 Burning objects. Lighted matches, cigarettes, cigars or other burning object shall not be discarded in such a manner that could cause ignition of other combustible material.

Revise as follows:

310.8 Hazardous environmental conditions. Where the *fire code official* determines that hazardous environmental conditions necessitate controlled use of smoking or vaping materials, the ignition or use of such materials in mountainous, brush-covered or forest-covered areas or other designated areas is prohibited except in *approved* designated smoking or vaping areas.

1207.10.4.1 Deployment documents.
The following information shall be provided with the operation permit applications for mobile ESS deployments:

1. Relevant information for the mobile ESS equipment and protection measures in the *construction documents* required by Section 1207.1.5.
2. Location and layout diagram of the area in which the mobile ESS is to be deployed, including a scale diagram of all nearby exposures.
3. Location and content of signage, including no smoking or no vaping signs.
4. Description of fencing to be provided around the ESS, including locking methods.
5. Details on fire suppression, smoke and automatic fire detection, system monitoring, thermal management, exhaust ventilation and explosion control, if provided.
6. For deployment, the intended duration of operation, including anticipated connection and disconnection times and dates.
7. Location and description of local staging stops during transit to the deployment site. See Section 1207.10.7.5.
8. Description of the temporary wiring, including connection methods, conductor type and size, and circuit overcurrent protection to be provided.
9. Description of how fire suppression system connections to water supplies or extinguishing agents are to be provided.
10. Contact information for personnel who are responsible for maintaining and servicing the equipment, and responding to emergencies as required by Section 1207.1.8.1. [material based on NFPA 855 (2023)]

1207.10.7.7 Smoking and Vaping.
Smoking and vaping shall be prohibited within 10 feet (3048 mm) of mobile ESS. Signs shall be posted in accordance with Section 310.

Reason: Recently it was found that vaping and vaping materials can also provide an ignition hazard. In fact, in California a severe fire incident has been determined to be related to vaping.

Cost Impact: Increase

Estimated Immediate Cost Impact:

There will be some added cost associated with revised or new signs dealing with vaping. Research indicates that new “no smoking signs” and “no smoking no vaping signs” are available at the same cost. The additional cost would be in the replacement of existing signage. The cost impact for new construction should be negligible or $0.

Estimated Immediate Cost Impact Justification (methodology and variables):

The submitters are not able to estimate the added cost.

F44-24

F45-24

IFC: SECTION 312, 312.1, 312.2, 312.3, 1207.11.7.1, FIGURE 1207.11.7.1, 1207.11.7.2, 1207.11.7.3, 1207.11.7

Proponents: Robert J Davidson, Davidson Code Concepts LLC, Self (rjd@davidsoncodeconcepts.com); Darcy Davidson, Carlsbad Fire Department, California Fire Prevention Officers (darcy.davidson@carlsbadca.gov)

2024 International Fire Code

SECTION 312
VEHICLE IMPACT PROTECTION

Revise as follows:

312.1 General.
Vehicle impact protection required by this code within a garage or elsewhere ~~shall be provided by posts that comply with Section 312.2 or by other *approved* physical barriers that comply with Section 312.3~~ in accordance with Section 312.1.1 or 312.1.2 shall be provided with impact protection in accordance with Section 312.1.3.

Delete without substitution:

~~**312.2 Posts.** Guard posts shall comply with all of the following requirements:~~

1. ~~Constructed of steel not less than 4 inches (102 mm) in diameter and concrete filled.~~
2. ~~Spaced not more than 4 feet (1219 mm) between posts on center.~~
3. ~~Set not less than 3 feet (914 mm) deep in a concrete footing of not less than a 15-inch (381 mm) diameter.~~
4. ~~Set with the top of the posts not less than 3 feet (914 mm) above ground.~~
5. ~~Located not less than 3 feet (914 mm) from the protected object.~~

~~**312.3 Other barriers.**~~
~~Barriers, other than posts specified in Section 312.2, that are designed to resist, deflect or visually deter vehicular impact commensurate with an anticipated impact scenario shall be permitted where *approved*.~~

Revise as follows:

~~1207.11.7.1~~ 312.1.1 Garages.
Where ~~an ESS~~ equipment or appliances are ~~is~~ installed or located in the normal driving path of vehicle travel within a garage, impact protection complying with Section ~~1207.11.3~~ 312.1.3 shall be provided. The normal driving path is a space between the garage vehicle opening and the interior face of the back wall to a height of 48 inches (1219 mm) above the finished floor. The width of the normal driving path shall be equal to the width of the garage door opening. Impact protection shall also be provided for an ESS installed at either of the following locations (see Figure ~~1207.11.7.1~~ 312.1.2):

1. On the interior face of the back wall and located within 36 inches (914 mm) to the left or to the right of the normal driving path.
2. On the interior face of a side wall and located within 24 inches (610 mm) of the back wall and 36 inches (914 mm) of the normal driving path.

Exception: Where the clear height of the vehicle garage opening is 7 feet 6 inches (2286 mm) or less, ~~ESS~~ equipment or appliances installed not less than 36 inches (914 mm) above the finished floor are not subject to vehicle impact protection requirements.

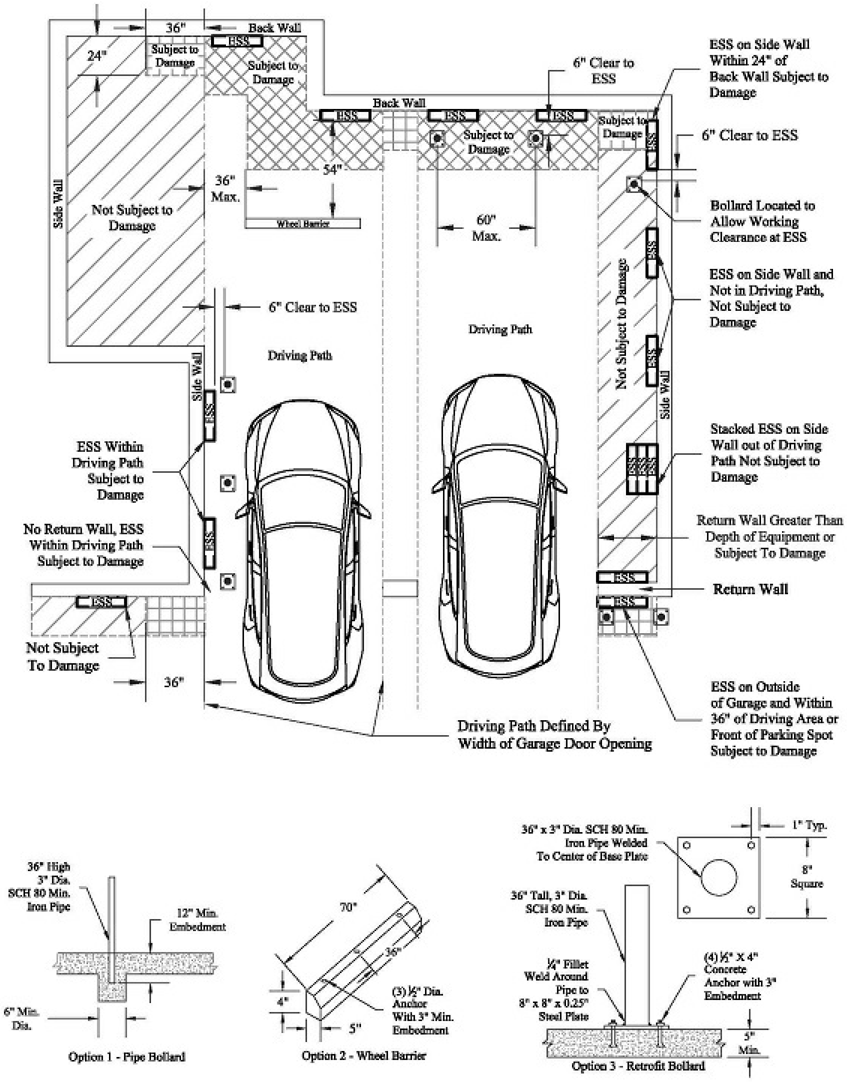


FIGURE ~~1207.11.7.1~~ 312.1.1 ~~ESS~~ VEHICLE IMPACT PROTECTION

~~1207.11.7.2~~ 312.1.2 Other locations subject to vehicle impact.

Where ~~an ESS~~ a feature, appliance or equipment is installed in a location other than as defined in Section ~~1207.11.7.1~~ 312.1.1 and is subject to vehicle damage, impact protection shall be provided in accordance with Section ~~1207.11.7.3~~ 312.1.3.

~~1207.11.7.3~~ 312.1.3 Impact protection options.

Where ~~ESS~~ a feature, appliance or equipment is required to be protected from impact in accordance with Section ~~1207.11.7.1~~ 312.1.1 or ~~1207.11.7.2~~ 312.1.2, such protection shall comply with one of the following:

1. Bollards constructed in accordance with one of the following:
   1.1. Minimum 48 inches (1219 mm) in length by 3 inches (76 mm) in diameter Schedule 80 steel pipe embedded in a concrete pier not less than 12 inches (304 mm) deep and 6 inches (152 mm) in diameter, with at least 36 inches (914 mm) of pipe exposed, filled with concrete and spaced at a maximum interval of 5 feet (1524 mm). Each bollard shall be located not less than 6 inches (152 mm) from ~~an ESS~~ a feature appliance or equipment.
   1.2. Minimum 36 inches (914 mm) in height by 3 inches (76 mm) in diameter Schedule 80 steel pipe fully welded to a minimum 8 inches (203 mm) by ¼-inch (6.4 mm) thick steel plate and bolted to a concrete floor by means of four ½-inch (13 mm) concrete anchors with 3-inch (76 mm) minimum embedment. Spacing shall be not greater than 60 inches (1524 mm), and each bollard shall be located not less than 6 inches (152 mm) from the ~~ESS~~ feature, appliance or equipment.
   1.3. Premanufactured steel pipe bollards shall be filled with concrete and anchored in accordance with the manufacturer's installation instructions, with spacing not greater than 60 inches (1524 mm). Each bollard shall be located not less than 6 inches (152 mm) from the ~~ESS~~ feature, appliance or equipment.

2. Wheel barriers constructed in accordance with one of the following:
   2.1. Four inches (102 mm) in height by 5 inches (127 mm) in width by 70 inches (1778 mm) in length wheel barrier made of concrete or polymer, anchored to the concrete floor not less than every 36 inches (914 mm) and located not less than 54 inches (1372 mm) from the ~~ESS~~ feature, appliance or equipment. Minimum 3½-inch (89 mm) diameter concrete anchors with 3-inch (76 mm) embedment per barrier shall be used. Spacing between barriers shall be not greater than 36 inches (914 mm).
   2.2. Premanufactured wheel barriers shall be anchored in accordance with the manufacturer's installation instructions.
3. *Approved* method designed to resist a 2,000-pound-force (8896 N) impact in the direction of travel at 24 inches (610 mm) above grade.

1207.11.7 Protection from impact.
ESS installed in a location subject to vehicle damage ~~in accordance with Section 1207.11.7.1 or 1207.11.7.2~~ shall be provided with impact protection in accordance with Section ~~1207.11.7.3~~ 312.

Reason: Last cycle comprehensive guidance was developed in Section 1207 for ESS subject to vehicle impact due to the lack of sufficient guidance within the International Series of codes. Recognized options for impact protection within garages was added in addition to ballads.

This proposal takes that comprehensive language and replaces the existing language in Section 312 to provide for the more comprehensive guidance for any location the fire code requires impact protection for.

Section 1207.11.7 is modified to point to Section 312 as occurs throughout the fire code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal does not create a new reuirement, it takes existing language proividing greater detail and increased methods of compliance and relocates it to a section covering the same topic.

F45-24

F46-24

IFC: 315.3.4; IBC: 311.1.2, 413.1, 413.2

Proponents: Jeffrey Michael Hugo, National Fire Sprinkler Association, National Fire Sprinkler Association (hugo@nfsa.org); John Swanson, National Fire Sprinkler Association, NFSA (swanson@nfsa.org)

2024 International Fire Code

Revise as follows:

315.3.4 Attic, under-floor and concealed spaces. Attic, under-floor and concealed spaces used for storage of combustible materials shall be protected on the storage side as required for 1-hour *fire-resistance-rated* construction. Openings shall be protected by assemblies that are self-closing and are of noncombustible construction or solid wood core not less than $1^3/_4$ inches (44.5 mm) in thickness. Storage shall not be placed on exposed joists.

Exceptions:

1. Where spaces are ~~Areas~~ protected by *approved automatic sprinkler systems*.
2. Group R-3 and Group U occupancies.

2024 International Building Code

Revise as follows:

311.1.2 Combustible storage.
High-piled combustible ~~stock or rack~~ *storage,* or *attic*, under-floor and concealed spaces used for storage of combustible materials, shall be in accordance with Section 413.

413.1 General.
High-piled combustible ~~stock or rack~~ *storage* in any occupancy group shall comply with Section 315 or Chapter 32 of the *International Fire Code* .

413.2 Attic, under-floor and concealed spaces.
Attic, under-floor and concealed spaces used for storage of combustible materials shall be protected on the storage side as required for 1-hour fire-resistance-rated construction. Openings shall be protected by assemblies that are *self-closing* and are of noncombustible construction or solid wood core not less than $1^3/_4$ inches (45 mm) in thickness.

Exception: Neither fire-resistance-rated construction nor opening protectives are required in any of the following locations:

1. Where spaces are ~~Areas~~ protected by *approved automatic sprinkler systems*.
2. Group R-3 and U occupancies.

Reason: This proposal addresses the combustible storage references in the IBC and IFC.

Throughout: Removes the specific terms “stock and rack” as these terms limit the application of this section. Storage protection can be high-piled and rack, but these terms leave out other methods, such as shelf storage. This change uses the IFC definition of high-piled combustible storage, which reads:

HIGH-PILED COMBUSTIBLE STORAGE. Storage of combustible materials in closely packed piles or combustible materials on pallets, in racks or on shelves where the top of storage is greater than 12 feet (3658 mm) in height. Where required by the fire code official, high-piled combustible storage also includes certain high-hazard commodities, such as rubber tires, Group A plastics, flammable liquids, idle pallets and similar commodities, where the top of storage is greater than 6 feet (1829 mm) in height.

IBC 413.1: Uses the italicized definition of high-piled storage and then points the IBC user to the specific sections of the IFC.

IBC 413.2 and IFC 315.3.4: The title of these sections and the first sentence of these sections use the term “space”, but both exception 1 uses the term “areas”. It would be important to have these terms correlated for consistency in the document. The change in both exception 1 sections clarify that sprinklers would be required in these spaces to gain the exception. NFPA 13 does prohibit storage in unsprinklered concealed spaces but would require sprinklers in these spaces if storage is present. This change notifies the user that sprinklers would need to be installed in these spaces if storage is present.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is a correlation on the application of the codes.

F46-24

F47-24

IFC: 316.5

Proponents: Stephen Burd, VP Enterprise Security, Essence USA, Essence USA (stephenbu@essence-usa.com)

2024 International Fire Code

Revise as follows:

316.5 Security device. Any security device or system that unexpectedly emits any medium that could obscure a *means of egress* in any building, structure or premise shall be prohibited.

Reason: Unfortunately, the nature of crime has changed for the worse with more violent crimes, shootings, and smash-and-grabs causing high levels of retail theft and personnel safety issues. Security systems like all technology must be allowed to evolve to address these issues. When properly installed and with proper 1st responder prior notification, a controlled partial obscuration can effectively address these issues and save property and lives without egress concerns.

Bibliography: Vice President, Enterprise Security Solutions, Vice President Enterprise Security Solutions

- - Essence is a global provider of IoT connected-living and cybersecurity solutions for communication, security, and healthcare service providers, serving households and small-medium businesses. Leveraging 25 years of experience and innovation with a global presence and 50 million devices deployed worldwide, Essence is committed to developing and supporting solutions that enhance partners' businesses and enable people to live fuller, better lives. The Essence USA video solutions and security division is committed to serving smart-city and enterprise space with camera with AI and edge-analytics as well as personal security devices to ensure the safety of our people and investments.

    In the Vice President and Business Development role, supporting Essence efforts to introduce new technologies into the North American market in the video, AI, security, smart home, IoT, 5G, personal safety and healthcare markets.

https://www.linkedin.com/in/stephenburd/

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This change will have no cost impact on construction.

F47-24

F48-24

IFC: 316.7 (New), 316.7.1 (New), 316.7.2 (New), 316.7.2.1 (New), 316.7.2.2 (New), 316.7.3 (New)

Proponents: James Carver, Self, Southern California Fire Prevention Officer's Association

2024 International Fire Code

Add new text as follows:

316.7 Electrified fences. Electrified fences for securing commercial and industrial property shall meet the requirements of Sections 316.7.1 to 316.7.3.

316.7.1 Power requirements. The fence shall be powered by an electrical energizer with both of the following output characteristics:

1. The impulse repetition rate does not exceed 1 hertz (hz).
2. The impulse duration does not exceed 10 milliseconds, or $^{10}/_{10000}$ of a second.

316.7.2 Signage. The fence shall be identified by prominently placed and legible warning signs.

316.7.2.1 Placement. The warning signs shall be placed at each gate and access point, and on both sides of the fence, at intervals along the fence not exceeding 30 feet.

316.7.2.2 Marking. The warning signs shall be marked with a written warning or a commonly recognized symbol for shock, a written warning or a commonly recognized symbol to warn people with pacemakers, and a written warning or commonly recognized symbol about the danger of touching the fence in wet conditions.

316.7.3 System shut off switch. An approved shut off switch shall be installed allowing controlled access to the electrified fence system for the fire department to shut of power. The shut off switch shall be readily marked.

Reason: Electrified fences have been used for a very long time but have seen an increase for protecting commercial and warehouse properties from theft. Often, these fences are not marked or identified and pose a hazard to firefighters responding to emergencies. This section is provided to bring requirements for electrified fences, including electrical charge and pulse rate, signage and emergency shut of by firefighters to the Fire Code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

These requirements are only applicable if an electrified fence system is being installed, there is no additional cost to comply with the proposed sections. The requirements coincide with electrified fence requirements in the California Civil Code, and are considered an industry standard.

F48-24

F49-24

IFC: SECTION 317, 317.1, 317.2, 317.2.1, 317.2.2, 317.3, 317.4

Proponents: Mark Chubb, ManitouNW LLC, ManitouNW LLC (mark.chubb@manitounw.com)

2024 International Fire Code

Revise as follows:

SECTION 317
VEGETATIVE <u>WALLS</u> AND LANDSCAPED ROOFS

317.1 General.
Vegetative ~~roofs~~ <u>walls</u> and landscaped roofs shall comply with Sections <u>1405, 1412,</u> 1505 and 1507.15 of the International Building Code and be installed and maintained in accordance with Sections 317.2 through 317.4.

317.2 Vegetation.
Vegetation shall be maintained in accordance with Sections 317.2.1 and 317.2.2.

Revise as follows:

317.2.1 Irrigation. Supplemental irrigation shall be provided to maintain levels of hydration necessary to keep green plants alive and to keep dry foliage to a minimum.

317.2.2 Dead foliage. Excess biomass, such as overgrown vegetation, leaves and other dead and decaying material, shall be removed at regular intervals not less than two times per year.

Revise as follows:

317.3 Maintenance plan.
The *fire code official* is authorized to require a maintenance plan for ~~vegetation placed on roofs due to the size of a vegetative roof or landscaped roof area, materials used or where a fire hazard exists to the building or exposures doe to the lack of maintenance~~ vegetative walls and landscaped roofs. <u>The maintenance plan shall specify the number and types of plants used, the level of irrigation required to maintain plant health, the manner in which plant growth will be managed, and the manner and method for removing, collecting, and disposing dead foliage or biomass.</u>

317.4 Maintenance equipment.
Fueled equipment ~~stored on roofs and used~~ for the care and maintenance of vegetation on walls or roofs of buildings or structures shall be stored in accordance with Section 313.

Reason: The introduction and use of landscaping features to reduce climate impacts on buildings has expanded to include vertical as well as horizontal surfaces. Demand for vegetative wall features as a biophilic design element or as a measure for reducing urban heat island effects has become more common. These features, like landscaped roofs, have the potential to affect fire growth and spread via internal and external wall assemblies. The addition of language to this section expands and clarifies the intention to address these hazards whether they involve horizontal or vertical elements of the building, Changes in the section on maintenance equipment bring the language into closer alignment with the scope of the referenced section, which is unconcerned with whether the equipment is stored on the roof or elsewhere in or around the building.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The application of these requirements to vertical as well as horizontal surfaces is consistent with the original intent of the provisions and reflects changes in the demand for the biophilic building features. The proposed language addresses a hazard that introduces additional fixed and ongoing costs without adding a substantial additional cost burden beyond that already associated with the features themselves.

F49-24

F50-24

IFC: SECTION 202, 319.2.1, 319.3.2, 319.3.7

Proponents: Jonathan Roberts, UL Solutions, UL Solutions (jonathan.roberts@ul.com)

2024 International Fire Code

ADDITIVE MANUFACTURING. A process of joining materials to make objects from 3D model data, usually layer upon layer, sometimes referred to as 3D printing. This code recognizes two types of additive manufacturing:

Revise as follows:

319.2.1 Listing.
3D printers used in nonindustrial *additive manufacturing* shall be *listed* and *labeled* in accordance with ~~UL 2011~~, UL 60950-1 or UL 62368-1. The listing shall also verify:

1. The 3D printers are self-contained, ~~and~~ utilize maximum 6-liter ~~30-liter~~ prepackaged production materials, and have a maximum 3-liter build volume.
2. The operation of the 3D printers shall not create a hazardous (classified) electrical area or zone outside the unit.
3. If any hazardous (classified) electrical area or zone exists inside the unit's outer enclosure, the area shall be protected by intrinsically safe electrical construction or other acceptable protection methods.
4. The 3D printers shall not utilize inert gas or an external *combustible dust* collection system.

319.3.2 Listing.
~~3D printers used in~~ Industrial *additive manufacturing* equipment shall be *listed* and *labeled* in accordance with UL 2011 ~~or *approved* for the application based on a field evaluation conducted by an *approved* agency~~

319.3.7 Ancillary equipment. Pre-processing and post-processing ~~Ancillary~~ equipmentused in industrial additive manufacturing, including equipment provided for recycling, sieving, vacuuming or handling combustible powders,shall comply with 319.3.2 ~~be designed and *approved* for such use~~.

Reason:

1. Revises the definition of industrial additive manufacturing to clarify that it also covers pre-processing and post-processing operations. Examples of typical post-processing equipment are included in 319.3.7. Also, depending on the equipment and production materials used, the process may or may not include inert gases and dust collection.
2. Corrects a typo in the nonindustrial manufacturing definition.
3. Revises 319.2.1 to deletes reference to UL 2011 since the scope of that standard covers industrial machines (not nonindustrial equipment). Also adds limits on 3D printer build volume and pre-packaged production material package size that are appropriate for nonindustrial 3D printing in offices and other non-factory settings where this equipment is typically used.
4. 319.3.2 - The listing in this section should cover all 3D printing equipment not just the printer. This includes the 3D printer and ancillary equipment (319.3.7) used for pre-processing and post-processing operations.
5. 319.3.2 - The reference to a field evaluation was deleted because this already an option for any equipment, not just 3D printers, and is addressed in Section 104.
6. The 319.3.7 requirements for ancillary equipment were revised to clarify that they only apply to industrial additive manufacturing operations, and that this equipment should comply with the 319.3.2 listing requirements. As written no guidance is provided to the code official on how to approve this equipment.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The changes in the definitions provide clarification and correct a typo. Deleting UL 2011 from 319.2.1 has no cost impact because we are not aware of any 3D printers intended for use in nonindustrial applications that are listed to UL 2011, or exceed the build and prepackaged sizes noted.

The change to 319.3.2 provides clarification on the types of industrial additive manufacturing equipment that are to be listed.

Among other things the change to 319.3.7 clarifies that the requirements do not apply to ancillary equipment used in nonindustrial additive manufacturing applications.

F50-24

F51-24

IFC: 320.1

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Fire Code

Revise as follows:

320.1 General. The storage of lithium-ion and lithium metal batteries shall comply with Section 320.

Exceptions:

1. New or refurbished batteries installed in the equipment, devices or vehicles they are designed to power.
2. New or refurbished batteries packed for use with the equipment, devices or vehicles they are designed to power.
3. Batteries in original retail packaging that are rated at not more than 300 watt-hours for lithium-ion batteries or contain not more than 25 grams of lithium metal for lithium metal batteries.
4. Temporary storage of batteries or battery components during the battery manufacturing process prior to completion of final quality control checks.
5. Temporary storage of batteries during the vehicle manufacturing or repair process.
6. Batteries in use, staged for use after charging, or charging for use with equipment that are rated at 300 watt-hours or less for lithium-ion batteries or contain 25 grams or less of lithium metal for lithium metal batteries.

Reason: FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

This proposal adds Exemption 6 to clarify it is not the intent of this section to regulate miscellaneous small consumer size batteries in equipment (radios, power tools, etc.) or batteries staged or charging as is commonly found in maintenance areas, fire stations, contractor shops, etc.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposal is editorial in nature to clarify small battery-powered equipment are not intended to be regulated by the Section of the IFC. It reduces cost by eliminating incorrect application of the section's requirements.

F51-24

F52-24

IFC: 320.4, 320.4.1 (New), 320.4.1, 320.4.1.2 (New), 320.4.1.3 (New), 320.4.2.3

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Fire Code

320.4 Storage requirements.
Lithium-ion and lithium metal batteries shall be stored in accordance with Section 320.4.1, 320.4.2 or 320.4.3, as applicable.

Add new text as follows:

320.4.1 Limited indoor storage in containers. A maximum volume of 15 cubic feet (0.42 m3) of lithium-ion or lithium metal batteries per fire area shall be permitted where stored in accordance with any of the methods provided in Sections 320.4.1.1 through 320.4.1.3.

Revise as follows:

~~320.4.1~~ 320.4.1.1 ~~Limited indoor storage in containers~~ Used or unwanted battery collection.. ~~Not more than 15 cubic feet (0.42 m^3) of lithium-ion or lithium metal batteries be permitted to be stored in containers in accordance with all of the following:~~
Areas where used or unwanted lithium-ion or lithium metal batteries are collected from the public or employees shall comply with all of the following:

1. Containers shall be open top and constructed of noncombustible materials or shall be *approved* for battery collection.
2. Individual containers and groups of containers shall not exceed a capacity of 7.5 cubic feet (0.21 m^3).
3. A second container or group of containers shall be separated by not less than 3 feet (914 mm) of open space or 10 feet (3048 mm) of space that contains combustible materials.
4. Containers shall be located not less than 5 feet (1524 mm) from *exits* or *exit access* doors.

Add new text as follows:

320.4.1.2 Waste storage. Waste batteries that are packaged in accordance with DOTn shipping requirements.

320.4.1.3 Miscellaneous storage. Limited storage of lithium-ion or lithium metal batteries, other than collection of used or unwanted batteries, or waste storage, shall comply with any of the following:

1. Stored in containers complying with Section 320.4.1.1.
2. Stored in original wholesale packaging or containers complying with DOTn regulations.
3. Approved battery storage cabinets.
4. Other approved storage methods.

Revise as follows:

320.4.2.3 Fire protection systems.
Indoor storage areas for lithium-ion and lithium metal batteries shall be protected by an *automatic sprinkler system* complying with Section 903.3.1.1 or an *approved* alternative fire suppression system. ~~The system design shall be based on recommendations in the *approved* technical opinion and report required by Section 320.4.2.1.~~

Reason: FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting

open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

This proposal accomplishes several things:

320.4.1.1 Revised the Limited Storage section to clarify the open top container storage (e.g., batteries placed loose into drums) are for collection of used or unwanted batteries from public or employees (identical to NFPA 855).

320.4.1.2 adds a provision for limited storage DOTn regulations require batteries placed in bags to prevent short circuiting, and space between filled with vermiculite. This is common practice and is safer than loose used battery collection into open drums. The quantity limit is still limited to 15 cf.

320.4.1.3 Adds a section general miscellaneous storage (still limited to 15 cf) to clarify that other storage configurations are allowed, and often are safer, than just the open top unwanted battery collection. This includes storage in original wholesale shipping containers and DOT packaging which has undergone extensive testing for shipping for lithium-ion batteries and cells. Tests include impact, crushing, altitude, discharge, overcharge, thermal testing, external short circuit, vibration, and shock. Batteries and cells in packaging complying with transport regulations provide a high-level of safety. See https://www.phmsa.dot.gov/sites/phmsa.dot.gov/files/2021-09/Lithium-Battery-Guide.pdf

320.4.2.3 – A revision is included to correct an oversight in this section. It required the automatic fire sprinkler system design to be based on a Technical Report per 320.4.2.1, however many scenarios will have batteries with less than 30% SOC which exempts the Technical Report requirement. 903.3.1.1 has also been revised to provide additional guidance on the automatic fire sprinkler system design for lithium-ion battery protection. This section should simply point to 903.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0.00

Estimated Immediate Cost Impact Justification (methodology and variables):

The core requirements relating to construction costs are currently included in the code now. Other than editorial clarifications, this proposal increases recognition of other currently available safe storage methods and eliminates an unnecessary technical report for those cases where storage is of batteries at 30% or less state of charge. These modifications reduce operating costs.

F52-24

F53-24

IFC: 320.4.3, 320.4.3.1 (New), 320.4.3.1, 320.4.3.2, 320.4.3.3, 320.4.3.5 (New), 320.4.3.6 (New)

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Fire Code

Revise as follows:

320.4.3 Outdoor storage.
Outdoor storage of lithium-ion or lithium metal batteries shall comply with Sections 320.4.3.1 through ~~320.4.3.3~~ 320.4.3.6.

Add new text as follows:

320.4.3.1 Technical opinion and report. A technical opinion and report complying with Section 104.8.2 shall be prepared to evaluate the fire and explosion risks associated with outdoor storage of lithium ion and lithium metal batteries and to make recommendations for fire and explosion protection. The report shall be submitted to the fire code official and shall require the fire code official's approval. In addition to the requirements of Section 104.2.2, the technical opinion and report shall evaluate all of the following:

1. Compliance with this section.
2. Firefighting access and water supply for emergencies involving outdoor battery storage.
3. Outdoor battery fire and explosion hazards
4. Hazards involving flying debris during fire incidents igniting adjacent storage areas, buildings, or other exposure hazards.
5. Handling, storage and monitoring of damaged batteries and post-fire monitoring.

Revise as follows:

~~320.4.3.1~~ 320.4.3.2 Distance from storage to exposures. Outdoor storage of lithium-ion or lithium metal batteries~~, including storage beneath weather protection in accordance with Section 414.6.1 of the *International Building Code*,~~ shall comply with one of the following:

1. Battery storage shall be located not less than 20 feet (6096 mm) from any building, *lot line*, public street, public alley, public way or *means of egress*.
2. Battery storage shall be located not less than 3 feet (914 mm) from any building, *lot line*, public street, public alley, public way or *means of egress*, where the battery storage is separated by a 2-hour fire-resistance-rated assembly without openings or penetrations and extending 5 feet (1524 mm) above and to the sides of the battery storage area.
3. Battery storage shall be located not less than 3 feet (914 mm) from any building, *lot line*, public street, public alley, public way or *means of egress*, where batteries are contained in *approved,* prefabricated portable structures providing a complete 2-hour fire-resistance-rated enclosure.
4. A maximum of 15 cubic feet of lithium-ion or lithium metal batteries or cells packaged in accordance with DOTn shipping requirements where not less than 3 feet (914 mm) from any building with non-combustible exterior walls, lot line, public street, public alley, public way or means of egress.

~~320.4.3.2~~ 320.4.3.3 Storage area size limits and separation.
Outdoor storage areas for lithium-ion or lithium metal batteries~~, including storage beneath weather protection in accordance with Section 414.6.1 of the *International Building Code*,~~ shall not exceed 900 square feet (83.6 m^2). The height of battery storage in such areas shall not exceed 10 feet (3048 mm). Multiple battery storage areas shall be separated from each other by not less than ~~10 feet (3048 mm)~~ 20 feet (6096 mm) of open space.

~~320.4.3.3~~ 320.4.3.4 Fire detection.

Outdoor storage areas for lithium-ion or lithium metal batteries exceeding 900 sq. ft. (371 m^2), regardless of whether such areas are open, under weather protection or in a prefabricated portable structure, shall be provided with an *approved* automatic fire detection and alarm system complying with Section 907. The fire detection system shall use radiant energy-sensing fire detection.

Add new text as follows:

320.4.3.5 Containers. Containers for outdoor storage of used or waste batteries shall be open-top and constructed of noncombustible materials; containers complying with DOTn regulations for lithium-ion and lithium metal transportation or shall be approved for battery collection and storage.

320.4.3.6 Weather protection. Where weather protection is provided for sheltering outdoor lithium ion or lithium metal battery storage or use areas, such areas shall be considered outdoor storage or use where the weather protection structure complies with all of the following:

1. Walls shall not obstruct more than one side or more than 25 percent of the perimeter of the storage area.
2. The overhead structure shall be of approved noncombustible construction with a maximum area of 3,600 square feet (334.5 m2).
3. The distance from the structure to buildings, lot lines, public ways or means of egress to a public way shall be not less than the distance required for an outside storage in Section 320.4.3.2.
4. Weather protection structures used for sheltering lithium ion or lithium metal battery storage shall be separated from lithium ion or lithium metal battery piles or additional weather protection structures used to shelter lithium ion or lithium metal battery storage by no less than 20 feet (4572mm).
5. The height of battery storage in such areas shall not exceed 10 feet (3048 mm).

Reason: FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

This proposal accomplishes the following:

320.4.3.1 removed reference to IBC Weather protection which only applies to hazardous materials, currently we don't treat this battery storage as hazardous materials, but we were pointing to a hazardous material provision for the weather protection. Added 320.4.3.6 to provide weather protection specific to battery storage which is consistent with the requirements of NFPA 855.

320.4.3.1 #4: provides some relief by adding a provision for limited storage for waste batteries as they are collected/packaged for offsite shipping (typically in 55-gallon drums) with batteries in bags to prevent short circuiting, and space between filled with vermiculite. This is common practice and allows for waste pack containers to be outside vs inside, which is generally a much safer option. The quantity limit is still limited to 15 cf consistent with indoor storage allowance. See https://www.phmsa.dot.gov/sites/phmsa.dot.gov/files/2021-09/Lithium-Battery-Guide.pdf

320.4.3.2 eliminates the reference to IBC weather protection, it is now addressed directly in its own section.

320.4.3.4 Adds a size threshold for fire detection, which can be complicated and expensive for outdoor design and maintenance. Increases consistency with NFPA 855.

320.4.3.5 Adds a container section for outdoor storage which prescribes allowable container types. .

320.4.3.5 Adds the weather protection requirements.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0.00

Estimated Immediate Cost Impact Justification (methodology and variables):

The provisions of this revised section are focused upon outdoor storage and generally do not affect construction costs. This proposal increases storage options at locations where lithium-ion or lithium metal batteries are being stored outside, though the required technical report could present additional cost for locations that only have outdoor storage, (the report is currently necessary for any indoor storage over 15 cu. ft.), the permit costs are what are potentially increased in the short term, but overall costs are reduced in the long term by providing for an increase in storage options, increased weather protection structure size and allowance for small quantities in DOT shipping containers.

The justification is that by providing for recognition of approved DOT shipping container use and increasing the permissible size of the weather enclosure the over costs to a site storing batteries outside are reduced. Increasing storage options provides for cost containment. Requiring the technical report upfront identifies hazards and mitigation methods for those hazards, reducing long term operational costs for the facility and the emergency responders.

F53-24

F54-24

IFC: SECTION 320, 320.1, 320.1.1 (New), 320.1.2 (New), 320.5 (New), 320.5.1 (New), 320.5.2 (New), 320.5.3 (New), 320.5.4 (New), 320.5.5 (New), 320.5.6 (New)

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Robert J Davidson, Davidson Code Concepts LLC, Self (rjd@davidsoncodeconcepts.com)

2024 International Fire Code

Revise as follows:

SECTION 320
~~LITHIUM-ION AND LITHIUM METAL~~ BATTERY STORAGE

320.1 General. The storage of ~~lithium-ion and lithium metal~~ batteries shall comply with Section 320.

Exceptions:

1. New or refurbished batteries installed in the equipment, devices or vehicles they are designed to power.
2. New or refurbished batteries packed for use with the equipment, devices or vehicles they are designed to power.
3. Batteries in original retail packaging that are rated at not more than 300 watt-hours for lithium-ion batteries or contain not more than 25 grams of lithium metal for lithium metal batteries.
4. Temporary storage of batteries or battery components during the battery manufacturing process prior to completion of final quality control checks.
5. Temporary storage of batteries during the vehicle manufacturing or repair process.

Add new text as follows:

320.1.1 Lithium-ion and lithium metal batteries.. The storage of Lithium-ion and lithium metal batteries shall comply with Sections 320.2 through 320.4.3.3.

320.1.2 Other battery types. Batteries in storage, other than Lithium-Ion or Lithium metal batteries, shall comply with 320.5 through 320.5.6.

320.5 Other battery types general. Batteries in storage, other than Lithium-Ion or Lithium metal batteries, with a volume more than 15 cubic feet (0.42 m3) within a fire area shall be in compliance with 320.5.1 through 320.5.6.

320.5.1 Structural and seismic design.. Storage shall be protected against accidental dislodgement. Racks and shelving used for storage shall be designed in accordance with the *International Building Code* as applicable.

320.5.2 Impact protection.. Where battery storage is subject to vehicle traffic, the storage shall be protected against impact in accordance with Section 312 or other approved method.

320.5.3 Battery charging.
Battery charging shall be performed in accordance with manufacturer instructions utilizing listed or approved charging devices.

320.5.4 Mechanical exhaust system.. Where battery charging can produce flammable gases a mechanical exhaust system shall be provided in accordance with the International Mechanical Code. The mechanical exhaust system shall be designed to limit the maximum concentration of flammable gas to 25 percent of the lower flammable limit (LFL) of the total volume of the room, or area during the worst-case event of simultaneous charging of batteries at the maximum charge rate, in accordance with nationally recognized standards.

320.5.5 Spill control. Spill control supplies shall be provided to control liquid electrolyte spills. The method shall be capable of controlling a spill from the single largest battery stored or handled.

320.5.6 Hazard warning signage.. The entrances to battery storage areas shall be provided with warning signage that states, “BATTERY STORAGE AREA”, “ENERGIZED ELECTRICAL DEVICES" and lists the types of batteries present. The size, color and lettering shall be *approved.*

Reason: FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

The purpose of this proposal is to provide some general guidance for safe storage of batteries other than lithium-ion and lithium metal. Numerous battery types can present a hazard if damaged or involved in an event. The basic requirements added here are current standards of care in the industry.

Structural and seismic protection are current code requirements, and that section reminds the user of this code that the topics be addressed as required in the International Building Code.

Impact protection is an industry regulatory standard and is a level of care applied by responsible operators.

Battery charging does occur if batteries are stored long enough for a discharge to occur down to an unacceptable level, that section informs the user of the code that the charging must be done properly.

Mechanical exhaust would be required currently based upon the general requirements of the IFC and IMC, this provision highlights that for the code user.

Spill control capabilities has long been a core requirement within the code, this section highlights the need and provides for the level of capability expected to be present.

The hazard warning sign is for emergency responder awareness, some jurisdictions require NFPA 704 placarding, but from a practical matter it is difficult to decide what the NFPA 704 markings should be when dealing with articles such as batteries. We went thru the same issue with ESS signage requirements an settled on straight forward informational signage as to the hazard which is what this requirement does.

In summary, there is nothing new in this new language that isn't already an industry requirement, adding the language gives all building owner/operators and code officials guidance on the standard of care. This proposal is part of a set of broader proposals including the creation of a new chapter addressing batteries.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The items provided in this proposal are either currently required by code in some manner or a current industry standard. Including these sections in the code provides necessary guidance for code officials and facility owner/operators who may lack knowledge of the current standards of care. They deal with operations someone chooses to move into a building, not the direct construction of the building itself.

F54-24

F55-24

IFC: 321.1

Proponents: Marcelo Hirschler, GBH International, GBH International (mmh@gbhint.com); Kevin Scott, KH Scott & Associates LLC, self (khscottassoc@gmail.com)

2024 International Fire Code

Revise as follows:

321.1 Artificial combustible vegetation on roofs and near buildings.
Artificial combustible vegetation exceeding 6 feet (1829 mm) in height and permanently installed outdoors within 5 feet (1524 mm) of a building or on the roof of a building shall comply with Section 807.4.1. The placement of artificial combustible vegetation shall also comply with Sections 806.3 and 807.4.2.

~~**Exception:** Artificial decorative vegetation located more than 30 feet (9144 mm) from the *exterior wall* of a building.~~

Reason: This proposal deletes the exception because the exception contradicts the provisions in the charging section.

The charging section states that artificial combustible vegetation must comply with the requirements if located within 5 feet of a building, and states that when there is more than a 5 foot separation the artificial vegetation does not need to comply.

The exception applies to artificial combustible vegetation located more than 30 feet from the *exterior wall* of a building, stating that if more than 30 feet. If it is more than 30 feet away from the building it is clearly more than 5 feet away and the section does not apply. The exception is not needed.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The exception has no affect and by deleting the exception it still has no affect.

This proposal removes an exception that is unclear on its application and contradicts the main requirement. If this requirement was actually being enforced, then there will be a decrease in construction costs because the owner will not need to purchase artificial vegetation meeting the flammability requirements.

F55-24

F56-24

IFC: SECTION 322 (New), 322.1 (New), 322.2 (New)

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Fire Code

Add new text as follows:

SECTION 322
NONCOMBUSTIBLE MATERIALS

322.1 Testing. Noncombustible materials shall be those materials that comply with Section 703.3.1 of the *International Building Code.*

322.2 Inherently noncombustible materials. Inherently noncombustible materials, such as concrete and steel, shall not be required to be tested to be acceptable as noncombustible materials.

Reason: In the area of material regulation, materials that pass ASTM E136 have long been considered to be those that are noncombustible materials.

Note that ASTM E136 is one of the very few ASTM fire test standards that has acceptance criteria. The acceptance criteria are different from the theoretical definition of a noncombustible material. The IBC includes in Chapter 7 added details on testing building materials to ASTM E136. Section 703.3.1 of the IBC includes also an exception that clarifies that some materials are acceptable for use as noncombustible materials irrespective of whether they "pass" ASTM E136.

There are definitions contained in the 2024 IMC and 2024 IFGC, and in the 2021 IPC, but they are actually more of a requirement than a definition.

In the area of material regulation, materials that pass ASTM E136 have long been considered in the US to be those that are noncombustible materials, and that concept is consistent with what IBC section 703.3 states.

The requirement for what constitutes a noncombustible material should be placed in a general requirement section, in Chapter 3.

If no requirement (or a definition containing a requirement) exists experience indicates that some material manufacturers have claimed that their material is noncombustible when it simply exhibits improved fire performance. When searching the internet, multiple web sites offer materials or products that are alleged to be noncombustible when that claim is incorrect. There is often a confusion in the public mind when considering a material that performs better than typical combustible materials, but should not be considered noncombustible.

This proposal recommends including a correct requirement for what materials shall be considered noncombustible materials and it is to comply with the IBC section 703.3.1. A second section states that a requirement for what is a noncombustible material does not mean that clearly noncombustible materials, such as steel, concrete, or masonry, need to be tested (for example to ASTM E136).

The language in section 703.3.1 of the IBC reads as follows:

> ***703.3.1 Noncombustible materials.*** *Materials required to be noncombustible shall be tested in accordance with ASTM E136. Alternately, materials required to be noncombustible shall be tested in accordance with ASTM E2652 using the acceptance criteria prescribed by ASTM E136.*
>
> ***Exception:*** *Materials having a structural base of noncombustible material as determined in accordance with ASTM E136, or with ASTM E2652 using the acceptance criteria prescribed by ASTM E136, with a surfacing of not more than 0.125 inch (3.18 mm) in thickness having a flame spread index not greater than 50 when tested in accordance with ASTM E84 or UL 723 shall be acceptable as noncombustible.*

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting

open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This proposal adds a definition, which is consistent with long-held understanding of what is a noncombustible material.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal simply adds a clarification that is consistent with the existing requirement in the IBC.

F56-24

F57-24

IFC: 105.5.5 (New), SECTION 322, 322.1, 322.6 (New), 322.6.1 (New), 322.6.2 (New), 322.7 (New), UL Chapter 80 (New)

Proponents: Robert J Davidson, Davidson Code Concepts LLC, Self (rjd@davidsoncodeconcepts.com)

2024 International Fire Code

Add new text as follows:

105.5.5 Battery exchange operations. An operational permit is required for facilities providing battery exchange programs, or equipment provided for exchange of li-ion batteries, as regulated by Section 322.

SECTION 322
POWERED MICROMOBILITY DEVICES

Revise as follows:

322.1 General.
Lithium-ion and lithium metal battery *powered micromobility devices* shall be operated , charged, and maintained in accordance with this section.

Exceptions:

1. Storage, repair and charging in residential occupancies of *powered mobility devices*, provided that such devices are for personal use by its owner.
2. Charging of a single *powered mobility device* in any occupancy by its owner.

Add new text as follows:

322.6 Battery exchange.. Equipment or facilities providing battery exchange operations shall comply with Sections 322.6.1 and 322.6.2, and be *approved* by the fire code official.

322.6.1 Permit.. Facilities providing battery exchange programs or equipment provided for exchange of li-ion batteries shall require an operational permit in accordance with Section 105.5.5.

322.6.2 Listed and labeled.. Charging equipment utilized for battery exchange facilities or equipment shall be listed and labeled in accordance with UL 4900.

322.7 Damaged equipment.. The charging of damaged devices or batteries shall be prohibited.

Add new standard(s) as follows:

UL

Underwriters Laboratories LLC
333 Pfingsten Road
Northbrook, IL 60062

4900-2023	Outline of Investigation for Micromobility Charging Equipment

Staff Analysis: A review of the standard proposed for inclusion in the code, ***Outline of Investigation for Micromobility Charging Equipment (UL 4900-2023)***, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: A new and growing operation is to provide for battery exchanges for devices that have removable batteries. As has been identified with mobility devices and batteries, approval and listing of the equipment used to charge the batteries is important to prevent thermal runaway events.

This proposal provides for an operation permit for these activities, approval of the fire code official and listing and labeling of the equipment used for charging activities.

An additional section added is to prohibit the charging of damage devices or batteries.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This new language does not impact construction. It provides for safely conducting battery charging operations.

F57-24

F58-24

IFC: SECTION 202, SECTION 202 (New), 105.5, 105.5.5 (New), SECTION 322, 322.1, 322.1.1, 322.1.1 (New), 322.2, 322.1.3 (New), 322.1.4 (New), 322.1.5 (New), 322.1.5.1 (New), 322.2 (New), 322.2.1 (New), 322.2.2 (New), 322.2.2.1 (New), 322.2.2.2 (New), 322.2.2.3 (New), 322.2.2.4 (New), 322.2.2.5 (New), 322.2.2.6 (New), 322.2.2.7 (New), 322.2.2.8 (New), 322.3 (New), 322.4, 322.4 (New), 322.5, 322.3, 322.6.1 (New), 322.6.2 (New), 322.6.3 (New), 322.6.4 (New), 322.7 (New), TABLE 903.2.11.6, UL Chapter 80 (New)

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Fire Code

Revise as follows:

BATTERY-POWERED MICROMOBILITY DEVICES. Products or equipment that include Motorized bicycles, motorized scooters and other personal mobility devices intended for one or more riders powered by a lithium-ion or lithium metal battery. The term does not include automobiles and trucks built to DOT requirements. ~~motor vehicles that are required to be registered with the Department of Motor Vehicles for the state or jurisdiction~~

Add new definition as follows:

BATTERY-POWERED APPLIANCE.
A device or apparatus with an electric motor powered by a battery.

BATTERY-POWERED INDUSTRIAL EQUIPMENT.
A motorized hand truck, floor scrubber or buffer or similar device with an electric motor intended to be personally driven or guided, powered by a battery.

BATTERY-POWERED INDUSTRIAL TRUCK.
A forklift, tractor, platform lift truck or similar apparatus with an electric motor powered by a battery.

BATTERY-POWERED AUTOMATED MOBILE PLATFORMS (AMPs).
A device with an electric motor powered by a battery that provides an automated function involving lifting, carrying, product picking, towing, and similar operations. These devices may also be capable of automatous movement including operating, moving and completing automated functions independently, without direct human guidance or control.

BATTERY POWERED ROBOTIC EQUIPMENT.
A machine or device with an electric motor powered by a battery capable of automatically carrying out a complex series of actions using computer programing. This equipment may be permanently mounted or capable of autonomous movement where they have the means to determine path selection by processing data from sensors, powered by a battery.

Revise as follows:

105.5 Required operational permits.
The *fire code official* is authorized to issue operational permits for the operations set forth in Sections 105.5.2 through ~~105.5.54~~ 105.5.58.

Add new text as follows:

105.5.5 Battery powered devices, trucks, equipment and appliances. An operational permit is required for the use of a battery powered device, truck, equipment or appliance with a battery capacity greater than 300 Whs.

Revise as follows:

SECTION 322
BATTERY-POWERED ~~MICROMOBILITY~~ DEVICES, TRUCKS, EQUIPMENT

AND APPLIANCES

322.1 General.
~~Lithium-ion and lithium metal~~ *Battery-powered micromobility devices, battery-powered industrial trucks, battery-powered industrial equipment, battery-powered robotic equipment and battery-powered appliances* shall be operated and maintained in accordance with this section.

Exceptions:

1. Batteries with a capacity less than 300 Whs.
2. ~~1.~~ 2. Storage, ~~repair~~ and use ~~charging in residential occupancies~~ of powered mobility devices, in Group R-2 dwelling units or detached one- and two-family dwellings and townhouses, other than Group R-4, Condition 2 Occupancies, provided that such devices are for personal use by its owner. The charging location shall not obstruct the means of egress.
3. ~~2. Charging of a single powered mobility device in any occupancy by its owner.~~

Delete without substitution:

~~**322.1.1 Prohibited locations**~~**.**
~~The use of a residential occupancy as a business for the charging of commercially owned *powered micromobility devices* as part of a rental or sales service shall not be permitted.~~

Add new text as follows:

322.1.1 Operational permit. An operational permit shall be obtained from the *fire code official* in accordance with Section 105.5 for the use and battery charging operations regulated by this Section.

Revise as follows:

~~322.2~~ 322.1.2 Battery charging operations ~~chargers and equipment~~.
~~*Powered micromobility devices* shall be charged~~ Battery charging operations shall be in accordance with their device listing and the manufacturer's instructions using only the original equipment manufacturer-supplied charging equipment or charging equipment in accordance with the listing and manufacturer's instructions.

Add new text as follows:

322.1.3 Ventilation. Mechanical exhaust ventilation to the exterior shall be provided at the source in the charging location in accordance with *the International Mechanical Code*Chapter 5 to prevent the dangerous accumulation of any flammable or other hazardous gases that are produced or discharged by the battery during normal charging operation.

322.1.4 Spill control and neutralization. Approved methods and materials shall be provided for the control and neutralization of spills of electrolyte or other hazardous materials in areas containing batteries as follows:

1. For batteries with free-flowing electrolyte, the method and materials shall be capable of neutralizing a spill of the total capacity from the largest cell or block to a pH between 5.0 and 9.0.2.
2. For batteries with immobilized electrolyte, the method and material shall be capable of neutralizing a spill of 3.0 percent of the capacity of the largest cell or block in the room to a pH between 5.0 and 9.0.

322.1.5 Battery charging locations. Charging of any battery powered industrial equipment, battery powered industrial truck, battery powered robotic equipment or battery-powered appliance in any occupancy shall be in an approved outdoor location or in an indoor area that complies with Section 322.2.

322.1.5.1 Prohibited locations. Repair or charging operations for business purposes shall not be permitted in the following locations:

1. In a detached one- and two-family dwelling or townhouse occupied under the International Residential Code or R2, R3, or R4 Occupancies
2. In sleeping rooms or means of egress paths of R-1 Occupancies.

322.2 Requirements for indoor charging locations. Indoor charging operations shall be provided with fire detection, fire suppression and other hazard mitigation measures as required by this Section.

322.2.1 Charging requirements for lead-acid batteries. Indoor charging areas for lead-acid batteries shall comply with Section 322.1 and 322.2.2.8

322.2.2 Charging requirements for lithium-ion and lithium metal batteries. Indoor charging areas for lithium-ion and lithium metal batteries shall comply with Section 322.1 and 322.2.2.1 through 322.2.2.8

322.2.2.1 Fire suppression. The *fire area* containing the indoor charging location shall be protected by an *automatic sprinkler system* installed in accordance with Section 903.3.

322.2.2.2 Fire detection. The indoor charging location shall be protected by a fire alarm system utilizing a smoke detection system, thermal imaging system or radiant energy-sensing fire detection system

322.2.2.3 Electrical recepticles. The indoor charging location shall be provided with sufficient electrical receptacles to allow the charging equipment for each device to be directly connected to a receptacle installed in accordance with NFPA 70. The use of extension cords or relocatable power taps shall not be permitted.

322.2.2.4 Prohibited storage. Storage of combustible materials, combustible waste or hazardous materials shall not be permitted in the indoor charging location.

322.2.2.5 Means of egress. The charging operation shall not be conducted in or obstruct any required means of egress.

322.2.2.6 Storage enclosure. Removable batteries shall not be stacked or stored in an enclosed cabinet unless the cabinet is *listed* or is a specially designed battery containment enclosure *approved* for such purpose.

322.2.2.7 Battery charging seperation. A minimum distance of 18 inches (457.2 mm) shall be maintained between each removable storage battery during charging operations unless each battery is isolated from neighboring batteries by an *approved* fire-resistant material or is within a specially designed rack or cabinet designed and *approved* for such purpose.

322.2.2.8 Device charging seperation. A minimum of 18 inches (457.2 mm) shall be maintained between the locations of the batteries on each powered micromobility device, industrial truck, equipment, robot or appliance during charging operations.

322.3 Repairs. Repairs of *battery-powered micromobility devices*, *battery-powered industrial trucks*, *battery-powered industrial equipment*, *battery-powered appliances* and *battery-powered robotic equipment* shall be performed in *approved* locations outside of buildings or within buildings in areas specifically *approved* for that purpose.

Delete without substitution:

~~**322.4 Battery charging areas.**~~

~~Where *approved*, *powered micromobility devices* shall permitted to be charged in a room or area that complies with all of the following:~~

1. ~~Only *listed* devices utilizing *listed* charging equipment shall be permitted to be charged.~~

2. ~~Is provided with sufficient electrical receptacles to allow the charging equipment for each device to be directly connected to a receptacle. Extension cords and relocatable power taps shall not be used.~~
3. ~~Storage of combustible materials, combustible waste or hazardous materials shall not be permitted.~~
4. ~~The charging operation shall not be conducted in or obstruct any required means of egress.~~
5. ~~Removable storage batteries shall not be stacked or charged in an enclosed cabinet unless the cabinet is specially designed and *approved* for such purpose.~~
6. ~~A minimum distance of 18 inches (457.2 mm) shall be maintained between each removable storage battery during charging operations unless each battery is isolated from neighboring batteries by an *approved* fire-resistant material.~~
7. ~~A minimum of 18 inches (457.2 mm) shall be maintained between the location of the battery on each *powered micromobility device* during charging operations.~~
8. ~~The indoor room or area shall be protected by a *fire alarm system* utilizing air-aspirating smoke detectors or radiant energy-sensing fire detection.~~

Add new text as follows:

322.4 Replacement batteries and chargers. Replacement batteries and chargers shall be the equipment manufacturer supplied or the replacement battery or charger shall be in compliance with the manufacturer's instructions for the certified equipment or device.

Revise as follows:

322.5 Fire safety plan.
A fire safety plan shall be provided in accordance with Section 403.10.6. In addition, the fire safety plan shall include emergency response actions to be taken upon detection of a fire or possible fire involving lithium-ion or lithium metal battery storage.

~~322.3~~ 322.6 Listing.
~~*Powered micromobility devices*~~ Battery powered equipment shall be *listed* and *labeled* in accordance with this Section where applicable and shall be operated and charged in accordance with its listing and the manufacturers instructions. ~~with UL 2272 or UL 2849, as applicable.~~

Add new text as follows:

322.6.1 Battery-powered micromobility devices. Battery-powered micromobility devices shall be listed and labeled in accordance with UL 2272 or UL 2849, as applicable.

322.6.2 Battery-powered Automated mobile platforms (AMPs). Battery-powered Automated mobile platforms (AMPs) shall be listed and labeled in accordance with UL 3100.

322.6.3 Battery-powered Robotic equipment. Battery-powered robotic equipment shall be *listed* and *labeled* in accordance with UL 3300.

322.6.4 Portable battery-powered equipment and appliances. Where installed or used, portable battery-powered equipment and appliances shall be *listed* and *labeled* in accordance with UL 2595 or the applicable standard for its use.

322.7 Hazardous (classified) locations. Battery powered micromobility devices, trucks, equipment, appliances and battery powered tools operated in in areas designated as hazardous (classified) locations in accordance with NFPA 70 shall be *listed* and *labeled* or approved for use in the environment intended.

Revise as follows:

TABLE 903.2.11.6 ADDITIONAL REQUIRED FIRE PROTECTION SYSTEMS

SECTION	SUBJECT
320.2	Lithium-ion and lithium metal battery storage
322.2.2.1	Lithium-ion and lithium metal battery charging locations
903.2.10.2	Mechanical-access enclosed parking garages
914.2.1	Covered and open mall buildings
914.3.1	High-rise buildings
914.4.1	Atriums
914.5.1	Underground structures
914.6.1	Stages
914.7.1	Special amusement area
914.8.2	Airport traffic control towers
914.8.3, 914.8.6	Aircraft hangars
914.9	Flammable finishes
914.10	Drying rooms
914.11.1	Ambulatory care facilities
1030.6.2.3	Smoke-protected assembly seating
1103.5.1	Existing Group A occupancies
1103.5.5	Pyroxylin plastic storage in existing buildings
1103.5.2	Existing Group I-2 occupancies
1103.5.3	Existing Group I-2, Condition 2 occupancies
1103.5.5	Pyroxylin plastics
Table 1206.9, Table 1206.10, Table 1207.7, Table 1207.8	Stationary and mobile energy storage systems
2108.2	Dry cleaning plants
2108.3	Dry cleaning machines
2309.3.1.5.2	Hydrogen motor fuel-dispensing area canopies
2404.4	Spray finishing in Group A, E, I or R
2404.6	Spray booths and spray rooms
2405.2	Dip-tank rooms in Group A, I or R
2405.4.1	Dip tanks
2405.9.4	Hardening and tempering tanks
2703.10	HPM facilities
2703.10.1.1	HPM workstation exhaust
2703.10.2	HPM gas cabinets and exhausted enclosures
2703.10.3	HPM exit access corridor
2703.10.4	HPM exhaust ducts
2703.10.4.1	HPM noncombustible ducts
2703.10.4.2	HPM combustible ducts
2807.3	Lumber production conveyor enclosures
2808.7	Recycling facility conveyor enclosures
3006.1	Class A and B ovens
3006.2	Class C and D ovens
Table 3206.2	Storage fire protection
3206.4	Storage
3210.1.1	Record storage over 12 feet
3704.5	Storage of more than 1,000 cubic feet of loose combustible fibers
5003.8.4.1	Gas rooms
5003.8.5.3	Exhausted enclosures
5004.5	Indoor storage of hazardous materials
5005.1.8	Indoor dispensing of hazardous materials
5104.4.1	Aerosol product warehouses
5106.3.2	Aerosol display and merchandising areas
5306.2.1	Exterior medical gas storage room
5306.2.2	Interior medical gas storage room
5306.2.3	Medical gas storage cabinet
5606.5.2.1	Storage of smokeless propellant
5606.5.2.3	Storage of small arms primers
5704.3.7.5.1	Flammable and combustible liquid storage rooms
5704.3.8.4	Flammable and combustible liquid storage warehouses
5705.3.7.3	Flammable and combustible liquid Group H-2 or H-3 areas
6004.1.2	Gas cabinets for highly toxic and toxic gas
6004.1.3	Exhausted enclosures for highly toxic and toxic gas
6004.2.2.6	Gas rooms for highly toxic and toxic gas
6004.3.3	Outdoor storage for highly toxic and toxic gas
6504.1.1	Pyroxylin plastic storage cabinets
6504.1.3	Pyroxylin plastic storage vaults
6504.2	Pyroxylin plastic storage and manufacturing

For SI: 1 cubic foot = 0.023 m^3.

Add new standard(s) as follows:

UL

Underwriters Laboratories LLC
333 Pfingsten Road
Northbrook, IL 60062

3100-2021 Automated Mobile Platforms

3300-2020 Outline of Investigation for Service, Communication, Information, Education and Entertainment Robots

2595-2015 General Requirements for Battery-Powered Appliances

Staff Analysis: A review of the following standards proposed for inclusion in the code regarding some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024:

- ***Automated Mobile Platforms (UL 3100-2021)***
- ***Outline of Investigation for Service, Communication, Information, Education and Entertainment Robots (UL 3300-2020)***
- ***General Requirements for Battery-Powered Appliances (UL 2595-2015)***

Reason: FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

This proposal does several things.

The proposal consolidates all the requirements for battery powered *micromobility devices*, *industrial trucks*, *industrial equipment*, *robotic equipment* and *appliances* into this section.

Definitions are added for guidance on what types of devices, trucks, equipment and appliances are intended to be regulated.

Where a code requirement is specifying the "use" of a battery powered device, "use" is intended to be all operations relating to the device, including battery charging operations.

Further to the definition for BATTERY POWERED ROBOTIC EQUIPMENT, the automated functions of a battery-powered automated mobile platform (AMPs) may be provided by a gripping, suction attachment, scope or similar attachment to lift or carry the load, powered by a battery.

Cost Impact: Increase

Estimated Immediate Cost Impact:

$0.00

Estimated Immediate Cost Impact Justification (methodology and variables):

The building and fire code already have triggers in current editions for fire suppression and detection, so there are no increases in construction cost associated with this proposal.

The proposal does impose operational requirements based on the storage, use, repair and/or charging of battery powered devices and equipment, but those requirements do not impose or increase construction cost.

F58-24

F59-24

IFC: 322.6 (New), UL Chapter 80 (New)

Proponents: Jonathan Roberts, UL Solutions, UL Solutions (jonathan.roberts@ul.com)

2024 International Fire Code

Add new text as follows:

322.6 Battery containment enclosures. Where provided, containment enclosures for storage or charging of lithium-ion batteries or lithium-ion battery powered appliances shall be in accordance with one of the following:

1. *Listed* and *labeled* in accordance with UL 1487.
2. Specially designed and *approved* for such purpose.

Add new standard(s) as follows:

UL

Underwriters Laboratories LLC
333 Pfingsten Road
Northbrook, IL 60062

1487-2024 Battery Containment Enclosures

Staff Analysis: A review of the standard proposed for inclusion in the code, ***Battery Containment Enclosures (UL 1487-2024)***, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: This proposal will require that all battery containment enclosures be either listed or specifically approved (nonlisted) for the intended purpose. This option provides the fire code official with flexibility to approve battery enclosures that they determine provide appropriate safety measures (thermal runaway hazard mitigation) for unique applications or require a listed battery enclosure.

UL 1487, Standard for Battery Containment Enclosures evaluates the ability of an enclosure product to mitigate the fire and explosion hazards generated by lithium-ion battery thermal runaway. These products may be used for permanent (stationary)or temporary storage of lithium-ion cells, batteries, and battery packs for short-term or long-term storage. The enclosures are not intended for use in transportation applications.

The enclosure product may also include internal power distribution for charging lithium-ion cells, batteries, battery packs and battery-powered devices.

This new UL Standard is currently under review by the Standard Technical Committee. A draft of this Standard will be provided to ICC Staff in accordance with CP-28. It is anticipated that the final version will be published as ANSI Consensus Standard late in 2024.

Cost Impact: Increase

Estimated Immediate Cost Impact:

This proposal allows for the use of either listed or approved (non-listed) battery containment enclosures. The cost for obtaining listed battery containment enclosures may or may not represent an increase over obtaining non-listed battery containment enclosures that have not been independently investigated to applicable product safety standards. Data is not available to accurately estimate the exact cost impact of the proposal, but the factors identified below can be considered in determining cost differentials.

Estimated Immediate Cost Impact Justification (methodology and variables):

Obtaining and maintaining a listing for battery containment enclosures involves both product investigation costs and costs for periodic inspection of production, as required by the definition of "listed". These costs are often insignificant compared to the overall production, distribution, marketing and installation costs associated with the product. However, the impact of any potential cost increase must be considered against the user and code official safety benefits derived from the proposed changes, as well as additional effort needed to demonstrate or determine compliance.

F60-24

IFC: SECTION 202 (New), 322.8 (New), 322.8.1 (New), 322.8.1.1 (New), 322.8.1.2 (New), 322.8.1.3 (New), 322.8.1.4 (New), 322.9 (New), UL Chapter 80 (New)

Proponents: Jonathan Roberts, UL Solutions, UL Solutions (jonathan.roberts@ul.com)

2024 International Fire Code

Add new definition as follows:

MICROMOBILITY CHARGING EQUIPMENT.
An electrical device intended for recharging batteries utilized in *battery-powered micromobility devices*. This equipment is intended to charge multiple *battery-powered micromobility devices* simultaneously.

Add new text as follows:

322.8 Battery-powered micromobility device batteries and chargers. The batteries and chargers used with *battery-powered micromobility devices* shall comply with this section.

322.8.1 Batteries and battery chargers. Batteries and battery chargers shall be in accordance with 322.8.1.1 through 322.8.1.4 as applicable.

322.8.1.1 Original equipment manufacturer's devices. Batteries and battery chargers shall be provided as part of the *listed battery-powered micromobility device*. This includes both non-removable and removable batteries.

322.8.1.2 Replacement batteries. Batteries not provided as part of the *listed battery-powered micromobility device* shall be compatible with the *listed battery-powered micromobility device* in accordance with the *battery-powered micromobility device* manufacturer's instructions.

322.8.1.3 Replacement battery chargers. Single unit battery changers notprovided as part of the *listed battery-powered micromobility device* shall be compatible with the *listed battery-powered micromobility device* in accordance with the *battery-powered micromobility device* manufacturer's instructions.

322.8.1.4 Aftermarket devices. The use of batteries and battery chargers that do not comply with 322.8.1.2 and 322.8.1.3 shall be prohibited.

322.9 Micromobility charging equipment. *Battery-powered micromobility device charging equipment that* are multi-unit and do not comply with 322.8.1 shall be *listed* and *labeled* in accordance with UL 4900 and installed and operated in accordance with its listing and the manufacturer's instructions. *Micromobility charging equipment* shall only be used to charge the *battery-powered micromobility devices* identified in the instructions. The installation location shall be *approved* by the *fire code official.*

Add new standard(s) as follows:

UL

Underwriters Laboratories LLC
333 Pfingsten Road
Northbrook, IL 60062

4900-2023 Outline of Investigation for Micromobility Charging Equipment

Staff Analysis: A review of the standard proposed for inclusion in the code, ***Outline of Investigation for Micromobility Charging Equipment (UL 4900-2023)***, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: An important safety aspect associated with battery powered micromobility device safety is the use of batteries and charging equipment that have been evaluated as part of the product listing standard. This proposal introduces requirements that effectively prohibit the use of unlisted (aftermarket) batteries and battery chargers. It also requires batteries and chargers to be compatible with the micromobility devices with which they are being used.

The UL 4900 Outline of Investigation for Micromobility Charging Equipment addresses the safety of micromobility charging equipment intended to only be used with micromobility systems, subassemblies, and/or components listed in accordance with UL 2849, UL 2272, or UL 2271.

This outline has not been evaluated for charging micromobility devices that are not listed in accordance with these standards. UL 4900 evaluates for Micromobility Charging Equipment for both indoor and outdoor use and requires the equipment to be labeled for the intended environment. Equipment is typically installed in outdoor or approved indoor spaces and/or public environments.

Cost Impact: Increase

Estimated Immediate Cost Impact:

$0 or as explained below.

Part 1 - The battery powered micromobility devices are currently required to be listed. This proposal adds requirements to ensure the battery and battery charger are compatible and evaluated as part of the powered micromobility device listing. Any replacement chargers or batteries must also be evaluated as part of the listing of the original micromobility device and compatible as required by the manufacturers instructions.

Part 2 - The multi-unit charging equipment charging equipment isn't part of the device listing, but does provide another option for charging these devices. The addition of UL 4900 is a new technical/safety requirement and the cost for obtaining listed battery powered micromobility devices may or may not represent an increase over obtaining non-listed battery powered micromobility devices that has not been independently investigated to applicable product safety standards. Data is not available to accurately estimate the exact cost impact of the proposal, but the factors identified below can be considered in determining cost differentials.

Estimated Immediate Cost Impact Justification (methodology and variables):

Obtaining and maintaining a listing for battery powered micromobility devices involves both product investigation costs and costs for periodic inspection of production, as required by the definition of “listed”. These costs are often insignificant compared to the overall production, distribution, marketing and installation costs associated with the product. However, the impact of any potential cost increase must be considered against the user and code official safety benefits derived from the proposed changes, as well as additional effort needed to demonstrate or determine compliance.

F60-24

F61-24

IFC: SECTION 202 (New), SECTION 323 (New), 323.1 (New), NFPA Chapter 80 (New)

Proponents: Kevin Duerr-Clark, NYS DOS, NYS DOS (kevin.duerr-clark@dos.ny.gov); Chad Sievers, NYS, NYS DOS (chad.sievers@dos.ny.gov); Daniel Carroll, New York State Department of State, Department of State (daniel.carroll@dos.ny.gov); John R Addario - NYS Department of State, NEW YORK STATE CODES DIVISION, New York State Department of State Division of Building Standards and Codes (john.addario@dos.ny.gov); Brian Tollisen, NYS Department of State, NYS Department of State (brian.tollisen@dos.ny.gov); Jeanne Rice, NYSDOS (jeanne.rice@dos.ny.gov); China Clarke, New York State Dept of State, Manager Technical Support Unit (china.clarke@dos.ny.gov)

2024 International Fire Code

Add new definition as follows:

LIVE FIRE TRAINING BUILDING. A building in which live fire training evolutions are conducted on a repetitive basis.This shall include, but not be limited to, containerized training structures, live fire training structures, and training towers.

Add new text as follows:

SECTION 323
LIVE FIRE TRAINING BUILDINGS

323.1 Live fire training buildings. Live fire training buildings and any appurtenances connected or attached to such buildings or structures shall be designed, constructed and maintained in accordance with the applicable provisions of NFPA 1402, this code and the *International Building Code*.

Add new standard(s) as follows:

NFPA

National Fire Protection Association
1 Batterymarch Park
Quincy, MA 02169-7471

1402-2019	Standard on Facilities for Fire Training and Associated Props

Staff Analysis: A review of the standard proposed for inclusion in the code, ***Standard on Facilities for Fire Training and Associated Props (NFPA 1402-2019)***, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: Live fire training facilities contain unique types of buildings/structures that are in some instances, purposely designed to not meet building codes and/or simulate potentially hazardous conditions. NFPA 1402, when combined with the building codes of the jurisdiction, provides for the necessary design and construction provisions of these types of buildings and gives the code enforcement community the tools necessary to properly regulate them. The scope of the standard acknowledges that building codes and gas codes do not address the unique and specific requirements for these specialized types of facilities. It is not the intent of this proposal to capture buildings that are designed, constructed, and maintained to the International Building Code and International Fire Code already, such as a B or A occupancy where instruction on fire practices takes place, rather, to capture those buildings not clearly covered by the Codes that would typically require variances or modifications of code language to be compliant.

From the previous cycle, based on committee comments, the definition of “Live Fire Training Building” was modified to ensure only buildings where live fire training exercises are conducted are captured. The “associated systems, appliances and props” was also removed from the definition and the term “appurtenances” was added to the section to ensure the intent is not to capture stand-alone props that may be co-located at the same facility such as a gas-fired car prop but to capture gas-fired props used to simulate fire in or on the structure. Furthermore the requirement that the building still had to be constructed following the applicable provisions of the IBC was added.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is not intended to add any new provisions on buildings. The use of NFPA1402 to design and construct these types of buildings is already a standard of practice in the industry. This proposal is simply codifying the requirement, giving the code enforcement community a means to properly implement the provisions of NFPA 1402, and squarely placing the building into a specific use group for consistency.

F61-24

F62-24

IFC: SECTION 202 (New), SECTION 323 (New), 323.1 (New), 323.2 (New), 323.3 (New), 323.4 (New), 323.5 (New), 323.5.1 (New), 323.6 (New), 323.7 (New), 323.8 (New), 323.9 (New), 323.9.1 (New), 323.9.2 (New), 323.9.3 (New), UL Chapter 80 (New)

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Fire Code

Add new definition as follows:

MODULAR ROOM.
A prefabricated structure intended for indoor use to provide privacy that has walls, a ceiling, with or without an integrated floor, and that can include integral electrical wiring, ventilation, and furniture.

Add new text as follows:

SECTION 323
MODULAR ROOMS

323.1 General. *Modular rooms* shall comply with this section.

323.2 Permits. A construction permit shall be required for the installation of *modular rooms*.

323.3 Listing. *Modular rooms* shall be *listed* and *labeled* in accordance with UL 962.

Exception: Precast concrete construction in accordance with Chapter 17 and 19 of the *International Building Code* shall not be required to be listed.

323.4 Location. *Modular rooms* shall not obstruct the means of egress and shall be installed in approved locations.

323.5 Installation. *Modular rooms* shall be installed in accordance with the listing and manufacturer's installation instructions.

323.5.1 Stacking. Modular rooms shall not be stacked.

323.6 Floor Area. The aggregate area of *modular rooms* shall not exceed 10 percent of the fire area.

323.7 Occupant Notification system. Where modular rooms are installed in areas equipped with an occupant notification system, the audible and visual signals shall provide notification to the occupants within the *modular room* in accordance with Section 907.5.

323.8 Automatic sprinkler system. Where modular rooms exceeding 24 ft2 (2.2 m2) are installed in areas protected by an automatic sprinkler system, the automatic sprinkler system shall provide protection within the *modular room* in accordance with Section 903.3.

323.9 Modular rooms used for sleeping. *Modular rooms* used for sleeping shall also comply with Sections 323.9.1 through 323.9.3.

323.9.1 Location. *Modular rooms* shall not be permitted in Group F,H,S, or U occupancy groups.

323.9.2 Number of Modular rooms used for sleeping. The *fire code officia*l is authorized to limit the number of *modular rooms* installed in a single fire area.

323.9.3 Smoke detection. In buildings equipped with a fire alarm system, the *modular room* shall be equipped with smoke detectors. In other buildings, the *modular room* shall be equipped with a smoke alarm in accordance with Section 907.2.11.

Add new standard(s) as follows:

UL

Underwriters Laboratories LLC
333 Pfingsten Road
Northbrook, IL 60062

962-2022 Household and Commercial Furnishings

Staff Analysis: A review of the standard proposed for inclusion in the code, ***Household and Commercial Furnishings (UL 962-2022)***, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: Modular rooms are becoming increasingly popular and are showing up in a variety of different occupancies. This proposal provides a means for code officials to approve these installations and allow the use of these prefabricated furnishings. The locations where these are found include airports, convention centers, business and government buildings. These are factory-built products, rather than rooms being constructed as a part of the structure in accordance with the local building code.

Requiring the modular room to be listed to UL 962 provides the code official with verification that the modular structure met testing requirements for applicable fire and electrical shock safety for occupants.

The UL 962 listing standards covers the fabrication and safety of the modular room. UL 962 includes requirements for insulation, finish materials, internal wiring, lighting, ventilation, and other construction features. UL 962 requires that modular rooms be tested for flame spread, with minimum passing results equivalent to a UL 723 FSI of 200. UL 962 additionally contains furniture flammability requirements for upholstered seating and mattresses that may be incorporated into the modular room.

Proposed section 322.5 limits the size of a modular room to not exceed 100 ft^2 to reflect that these modular rooms are factory-built products and not conventional construction.This proposal treats modular rooms as products that can be installed in a building, and not as building construction, while not losing applicable code requirements.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: Increase

Estimated Immediate Cost Impact:

$0.00

Estimated Immediate Cost Impact Justification (methodology and variables):

Though there is cost increases with the need to comply with UL 962 and potentially adjustment to automatic sprinkers and fire alarm devices these are treated primarily as a product being placed in a building and are not associated with building construction. The cost of compliance with UL 962 will vary based upon the product being listed to this standard and how it will affect systems being used in the building.

F62-24

F63-24

IFC: SECTION 202 (New), SECTION 323 (New), 323.1 (New), 323.2 (New), 323.3 (New), 323.4 (New), 323.5 (New), 323.6 (New)

Proponents: Mark Chubb, ManitouNW LLC, ManitouNW LLC (mark.chubb@manitounw.com)

2024 International Fire Code

Add new definition as follows:

AUTOMATED PARKING SYSTEM (APS)

. A mechanical system designed to facilitate the efficient storage of motor vehicles by stacking vehicles vertically or arranging vehicles horizontally in any fashion that reduces clearances between adjacent vehicles or between vehicles and building elements; also known as automated parking facility (APF) and automated vehicle storage and retrieval system (AVSRS).

Add new text as follows:

SECTION 323
AUTOMATED PARKING SYSTEMS

323.1 General.. New *automated parking systems* in new or existing buildings shall comply with the provisions of Sections 323.2 through 323.6

323.2 Open parking garages. New *automated parking systems* shall only be installed and located on floor levels that comply with the requirements of Section 406 of the International Building Code for open parking garages.

323.3 Above grade. All portions of an *automated parking system* shall be located at or above a level of fire department vehicle access but no more than 4-stories or 30-ft (10-m) above the lowest level of fire department vehicle access.

323.4 Fire department vehicle access. All portions of an *automated parking system* shall be located within 150-ft of an approved fire department vehicle access roadway.

323.5 Fire protection. *Automated parking systems* shall be protected by automatic sprinkler systems designed and installed in accordance with the provisions of Section 903.3.1.1.

323.6 Electric vehicle charging. Electric vehicle charging in *automated parking systems* shall be prohibited.

Reason: The introduction of automated parking systems to increase the density of automobile storage has become common in urban areas with high land values. Recent fire experience with parking structures suggests changes in the combustibility of vehicle components has affected the scale and severity of fires involving high-density vehicle storage. At the same time, efforts to develop automatic sprinkler system design criteria for automated storage and retrieval systems (ASRS) have failed to produce definitive guidance that can be applied under Section 903. The convergence of these issues — high density vehicle storage and ASRS — warrants a precautionary approach until definitive guidance on the protection of these systems emerges. The proposed code text seeks to address the design and construction of new automated parking systems by limiting their installation to aboveground structures easily accessible to firefighters for manual fire suppression. Notwithstanding the hazards associated with previously approved automated parking structures, this proposed change does not seek to render these illegal, otherwise require the discontinuation of their use, or require additional protection for their continued operation. These matters are left to the discretion of the code officials in the jurisdictions that have already approved these installations.

Cost Impact: Increase

Estimated Immediate Cost Impact:

The most immediate impact involves limitations on sites where automatic parking systems can be constructed. By prohibiting the installation of these systems in enclosed parking structures and building levels below grade level, building owners wishing to employ these systems will need to dedicate space aboveground to these installations and utilize design strategies that satisfy requirements for open parking structures.

Estimated Immediate Cost Impact Justification (methodology and variables):

In the absence of definitive guidance regarding the protection of these installations, it must be assumed fire service intervention and manual firefighting will be required to suppress and extinguish fires involving automated parking systems. Fighting fires involving densely spaced automobiles containing thermoplastics, flammable or combustible liquids, and lithium-ion battery systems poses an unreasonable risk of firefighter injuries or deaths were these systems to be installed in full enclosed buildings or below-grade. As such, the safety of fire department personnel required to suppress or extinguish these fires justifies limitations on the location and construction of these systems.

Estimated Life Cycle Cost Impact:

The proposal contains no requirements likely to increase lifecycle costs beyond those associated with similar buildings based on construction type and use.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

No additional lifecycle costs are anticipated.

F63-24

F64-24

IFC: SECTION 324 (New), 324.1 (New), 324.2 (New), 324.2.1 (New), 324.3 (New), 324.4 (New), 324.5 (New), 324.6 (New), 324.7 (New), 324.8 (New), 324.9 (New), 324.10 (New), 324.11 (New), 903.2.4; IBC: [F] 903.2.4

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Fire Code

Add new text as follows:

SECTION 324 LITHIUM-ION AND LITHIUM METAL BATTERY RESEARCH, TESTING, MANUFACTURING, OR RECYCLING

324.1 General.
The research, testing, manufacturing, or recycling of lithium-ion and lithium metal batteries shall comply with this Section.

324.2 Scope. Any occupancy where one or more of the following operations involving lithium-ion or lithium metal battery components are conducted shall comply with Sections 324.3 through 324.11.

1. Where batteries or cells are tested, modified, or subjected to load testing, cycling, thermal tests, short circuit, impact, penetration, crushing, overcharge, shock, vibration, or similar conditions.
2. Where battery components are researched, tested, or developed.
3. Where batteries are manufactured.
4. Where batteries are recycled, dismantled, repaired, or refurbished.

324.2.1 Collection and collating facilities. Facilities where batteries are only collected and collated for offsite recycling processing or disposal are not regulated by this section. Such facilities shall comply with Section 320.

324.3 Permits.. An operational permit in accordance with Section 105.5.29 shall be required.

324.4 Fire Safety Plan. A fire safety plan shall be provided in accordance with Section 403.10.6.

324.5 Technical opinion and report.. A technical opinion and report complying with Section 104.2.2 shall be prepared to evaluate the fire and explosion risks associated with research, testing, manufacturing, and recycling and to make recommendations including the necessary mitigation measures for all identified risks and for the fire and explosion protection design basis. The report shall be submitted to the fire code official for approval. The technical opinion and report shall specifically evaluate the following:

1. Compliance with Section 320.
2. Hazardous materials storage, use, and handling, including Group H Occupancy requirements, where applicable.
3. Combustible dust hazards, including cathode and anode powders; notching and cutting equipment; and other processes that involve or generate combustible dusts or powders, as applicable.
4. Storage, distribution, and dispensing of flammable liquids or gases, including electrolytes as applicable.
5. Protection of areas and equipment where formation, aging, and testing of batteries or cells occurs, including fire suppression, fire or gas detection, thermal runaway prevention, ventilation, and emergency response to runaway cells.
6. Storage of batteries or cells, including high piled storage requirements where storage exceeds 6 feet (1.82 m) in height.

7. Firefighting access and water supply.
8. Hazards involving flying debris during fire incidents igniting adjacent storage areas, buildings, or other exposure hazards.
9. The basis of design for an automatic sprinkler system or other approved fire suppression system. Such design basis shall reference relevant full-scale fire testing or another approved method of demonstrating sufficiency of the recommended design.
10. An evaluation of the suitability of the equipment used.
11. Handling, storage, and monitoring of damaged, defective, recalled, and out-of-specification batteries and cells.
12. Other items as required by the fire code official.

324.6 Storage.. Lithium metal and lithium-ion batteries shall be stored in accordance with Section 320.

324.7 Equipment.
Equipment used in research, testing, recycling, and manufacturing of lithium-ion and lithium metal batteries shall be designed for the intended use and evaluated in the technical report.

324.8 Fire protection.. An approved automatic sprinkler system complying with Section 903 shall be provided in buildings where lithium ion or lithium metal batteries are researched, tested, manufactured, or recycled.

324.9 Fire detection.. An approved automatic fire detection and alarm system complying with Section 907 shall be provided in buildings where lithium ion or lithium metal batteries are researched, tested, manufactured, or recycled.

324.10 Fire resistant separation. Indoor rooms or areas where any of the following operations are conducted shall be separated from other portions of the building by 2-hour fire-resistance-rated fire barriers and horizontal assemblies. Fire barriers shall be constructed in accordance with Section 707 of the International Building Code, and horizontal assemblies shall be constructed in accordance with Section 711 of the International Building Code.

1. Research or manufacturing areas where more than 2kWh of lithium ion or lithium metal batteries are charged, tested, or undergo processes such as formation and aging.
2. Where any quantity of batteries or cells undergo destructive testing such as thermal, short circuit, impact, nail penetration, crushing, overcharge, or similar testing that can reasonably be expected to result in failure of the battery or cell.
3. Where any quantity of lithium ion or lithium metal batteries undergo recycling processes including dismantling, repair, refurbishing, incineration, or similar processes.

324.11 Hazardous materials.. Hazardous materials stored, used, handled, and generated in lithium ion and lithium metal battery manufacturing, research, testing, or recycling shall be in accordance with Chapters 50 through 67, and the *International Building Code.*

Revise as follows:

903.2.4 Group F-1.
An *automatic sprinkler system* shall be provided throughout all buildings containing a Group F-1 occupancy where one of the following conditions exists:

1. A Group F-1 *fire area* exceeds 12,000 square feet (1115 m^2).
2. A Group F-1 *fire area* is located more than three stories above *grade plane*.
3. The combined area of all Group F-1 *fire areas* on all floors, including any mezzanines, exceeds 24,000 square feet (2230 m^2).

4. A Group F-1 occupancy is used to manufacture or recycle lithium-ion or lithium metal batteries.
5. A Group F-1 occupancy is used to manufacture vehicles, energy storage systems or equipment containing lithium-ion or lithium metal batteries where the batteries are installed as part of the manufacturing process.

2024 International Building Code

Revise as follows:

[F] 903.2.4 Group F-1.
An *automatic sprinkler system* shall be provided throughout all *buildings* containing a Group F-1 occupancy where one of the following conditions exists:

1. A Group F-1 *fire area* exceeds 12,000 square feet (1115 m^2).
2. A Group F-1 *fire area* is located more than three stories above *grade plane*.
3. The combined area of all Group F-1 *fire areas* on all floors, including any *mezzanines*, exceeds 24,000 square feet (2230 m^2).
4. A Group F-1 occupancy is used to manufacture or recycle lithium-ion or lithium metal batteries.
5. A Group F-1 occupancy is used to manufacture vehicles, energy storage systems or equipment containing lithium-ion or lithium metal batteries where the batteries are installed as part of the manufacturing process.

Reason: FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

This new article is intended to provide guidance for the safe design, construction, and operation of these operations involving lithium-ion or lithium metal batteries.

Unfortunately, there is no guidance on how to comprehensively identify and apply the requirements which will have variations operation to operation. This proposal identifies the application of the requirements, that a technical report be provided that documents how the hazards will be addressed in relationship to the code requirements.

Triggers for automatic fire sprinkler systems, fire detection, and fire safety and evacuation plans and battery storage were all added to the 2024 edition of the IFC and IBC. Pointers are included here to assist in applying the code. For clarification purposes "recycle" has been added to Section 903.2.4 Group F-1, Item 4.

Addition of this section will provide clear guidance for designers, builders, and code officials when applying the code to facilities containing these hazards.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0.00

Estimated Immediate Cost Impact Justification (methodology and variables):

The core requirements are contained within the current codes. This new section provides guidance to provide for efficient and effective application of the code requirements. This will help eliminate unnecessary construction requirements developed by designers or, more importantly, demanded by local code officials. The proposal builds on requirements added to the 2024 codes for suppression, detection, emergency action plans, and assignment of group classifications.

Providing a road map to the necessary requirements for complying with the codes reduces the demand for improvements that do not provide any increase in safety. This reduces the cost of construction.

F65-24

IFC: 401.4

Proponents: William Freer, NYS OFPC, NYS OFPC (wfreer@dhses.ny.gov); Heather Roth, NYS, OFPC (heather.roth@dhses.ny.gov)

2024 International Fire Code

Revise as follows:

401.4 Required plan implementation. In the event an unwanted fire is detected in a building or a fire alarm activates, the ~~emergency plan~~ fire safety and evacuation plans shall be implemented.

Reason: The current code requires that the emergency plan be implemented but there is no definition in the code for emergency plan nor an outline of what the emergency pan should include, making enforcement difficult. Both fire safety and evacuation plan are well outlined in Section 404.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

There is no cost impact associated with this proposal as it is simply a change in terminology. See reason statement.

F65-24

F66-24

IFC: 401.4.1 (New)

Proponents: William Freer, NYS OFPC, NYS OFPC (wfreer@dhses.ny.gov); Heather Roth, NYS, OFPC (heather.roth@dhses.ny.gov)

2024 International Fire Code

Add new text as follows:

401.4.1 **Evacuation.** Unless otherwise specified in an approved fire safety and evacuation plan, all occupants shall evacuate the building.

Reason: Section 403.1 specifies what occupancies are required to have fire safety and evacuation plans. Not all occupancies are required to have a plan and therefore no code path is provided for a fire code official to enforce the evacuation of a building during an unwanted fire or fire alarm activation.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This code proposal is operational and does not impact the cost of construction.

F66-24

F67-24

IFC: 403.7.3.1, 403.7.3.2, 403.7.3.3

Proponents: Chad Sievers, NYS, NYS DOS (chad.sievers@dos.ny.gov); Jeanne Rice, NYS DOS, NYS DOS (jeanne.rice@dos.ny.gov); Kevin Duerr-Clark, NYS DOS, NYS DOS (kevin.duerr-clark@dos.ny.gov); China Clarke, New York State Dept of State, Manager Technical Support Unit (china.clarke@dos.ny.gov); John R Addario - NYS Department of State, NEW YORK STATE CODES DIVISION, New York State Department of State Division of Building Standards and Codes (john.addario@dos.ny.gov)

2024 International Fire Code

403.7.3.1 Fire safety and evacuation plans.
The fire safety and evacuation plans required by Section 404 shall include a description of special staff actions. Plans shall include all of the following in addition to the requirements of Section 404:

1. Procedures for evacuation of detainees with needs for containment or restraint and post-evacuation containment, where present.
2. Procedures for a *defend-in-place* strategy.
3. Procedures for a full-floor or building evacuation, where necessary.

Revise as follows:

403.7.3.2 Fire safety plan.
A copy of the fire safety plan shall be maintained at the facility at all times. The plan shall include both of the following in addition to the requirements of Section 404.2.2:

1. Location and number of cells.
2. Location of special locking arrangements.
3. Keys that operate doors installed in the means of egress shall be identified in the fire safety and evacuation plan.

403.7.3.3 Staff training. Staff shall be periodically instructed and kept informed of their duties and responsibilities under the plan. Records of instruction shall be maintained. Such instruction shall be reviewed by staff at intervals not exceeding 3 months. Training of new staff shall be provided promptly upon entrance to duty.

1. Staff shall be instructed in the proper use of portable fire extinguishers and other manual fire suppression equipment.
2. Staff shall be trained on the identification and use of keys that are necessary for unlocking doors that are installed in the means of egress.

Reason: Locked doors which require a key to operate are often found in the means of egress in I3 occupancies. The proposed change adds requirements for documentation of all such locked doors to be added to fire safety plans, ensuring that such information is easily accessible. The proposed change also adds requirements for staff training on identification and use of keys for locked doors in the means of egress, which will ensure that such doors can be opened by staff in the event of an emergency. Without proper training, staff may be unaware of the location of the keys and/or how to utilize the keys to unlock the doors, which could lead to means of egress being blocked in an emergency.

Cost Impact: Increase

Estimated Immediate Cost Impact:

The proposed change will increase the required staff fire safety training time. We estimate a cost of roughly $10 per employee for training on operating key-locked doors in the means of egress.

Estimated Immediate Cost Impact Justification (methodology and variables):

According to a study conducted by Training Magazine (https://pubs.royle.com/publication/?m=20617&i=678873&p=24&ver=html5), companies in 2020 spent an average of $1,111 for safety training per employee, providing an average of 55.4 hours of training per employee. This provides an average cost of $20.05/hour per employee for safety training. Adding training for key-locked doors in means of egress will likely add not more than 1/2 hour of safety training per employee.

F67-24

F68-24

IFC: 403.10.6, 403.10.6.1

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Robert J Davidson, Davidson Code Concepts LLC, Self (rjd@davidsoncodeconcepts.com)

2024 International Fire Code

Revise as follows:

403.10.6 Lithium-ion and lithium metal batteries .
An *approved* fire safety and evacuation plan in accordance with Section 404 shall be prepared and maintained for occupancies that involve activities for the research and development, testing, manufacturing, recycling, handling or storage of lithium-ion batteries or lithium metal batteries, or the repair or servicing of vehicles powered by lithium-ion batteries or lithium metal batteries.

Exceptions: A fire safety and evacuation plan is not required for the storage or merchandizing of any of the following:

1. New or refurbished batteries installed for use in the equipment or vehicles they are designed to power.
2. New or refurbished batteries packed for use with the equipment or vehicles they are designed to power for merchandizing purposes.
3. New or refurbished lithium-ion batteries rated at not more than 300 watt-hours and lithium metal batteries containing not more than 25 grams of lithium metal in their original retail packaging.
4. The storage, repair and charging activities in detached one- and two-family *dwellings* and townhouses, provided that such devices are for personal use.
5. The storage, repair and charging activities associated with personal use in *sleeping units* and *dwelling units* of Group R-1 and R-2 occupancies.

403.10.6.1 Mitigation planning .
The *approved* fire safety and evacuation plan shall include thermal runaway event mitigation measures. These measures shall include activities undertaken to prevent thermal runaway, early detection of a thermal runaway event , reporting of unplanned thermal runaway events to the fire official, and mitigation measures to be undertaken to limit the size and impact of the event on occupants and the facility.

Reason: FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

This proposal modifies Section 403.10.6 to add "recycling" as a clarification. Routine users of the code would understand that the battery recycling operation would be addressed as we do a manufacturing operation. A reverse manufacturing in concept. This clarification highlights that that recycling activities are included in the requirement for a fire safety and evacuation plan when dealing with these types of batteries.

Section 403.10.6.1 is updated to ensure reporting of unplanned thermal runaway events are reported to the fire code official. If such events occur, ensuring that mitigation measures were successful, and that proper cause analysis occurs to prevent such occasions are important activities. The reporting of unplanned events is consistent with Section 401.2.1.

Cost Impact: Increase

Estimated Immediate Cost Impact:

$0.00

Estimated Immediate Cost Impact Justification (methodology and variables):

This is an additional aspect that must be address for fire safety and evacuation planning, however this is purely operational and somewhat a clarification of intent.

F68-24

F69-24

IFC: SECTION 202 (New), 403.10.7 (New), NFPA Chapter 80 (New)

Proponents: Joe Scibetta, BuildingReports, Self (jscibetta@buildingreports.com)

2024 International Fire Code

Add new text as follows:

ANIMAL HOUSING FACILITIES. Area of a building or structure, including interior and adjacent exterior spaces, where animals, other than those in agricultural buildings, are fed, rested, worked, exercised, treated, exhibited, or used for production.

403.10.7 Animal Housing Facilities.. Animal housing facilities shall develop a disaster/emergency management plan in accordance with NFPA 150. The disaster/emergency management plans shall comply with the maintenance and availability provisions in Sections 404.3 and 404.4.

Add new standard(s) as follows:

NFPA

National Fire Protection Association
1 Batterymarch Park
Quincy, MA 02169-7471

150-22 Fire and Life Safety in Animal Housing Facilities Code

Staff Analysis: A review of the standard proposed for inclusion in the code, ***Fire and Life Safety in Animal Housing Facilities Code (NFPA 150-22)***, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: Currently, the IFC addresses animals housed in agricultural buildings only (livestock and poultry). Facilities that house animals (and, at times, human handlers) other than in agricultural buildings, are not addressed. This proposal would incorporate animal housing facilities into the IFC as separate and distinct from agricultural buildings and would ensure that a disaster/emergency plan is implemented for them.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

No cost impact with this proposal. This provides recognition and clarification that animal housing facilities exist and should be considered separate and distinct from agricultural buildings.

F69-24

F70-24

IFC: 404.2.3.1

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Fire Code

Revise as follows:

404.2.3.1 Lockdown plan contents. Lockdown plans shall include the following:

1. Identification of individuals authorized to issue a lockdown order.
2. Security measures used during normal operations, when the building is occupied, that could adversely affect egress or fire department operations.
3. A description of identified emergency and security threats addressed by the plan, including specific lockdown procedures to be implemented for each threat condition.
4. Means and methods of initiating a lockdown plan for each threat, including:
   - 4.1. Occupant notification shall be based on a mass notification risk analysis conducted in accordance with NFPA 72, and the notification signal for a lockdown event ~~The means of notifying occupants of a lockdown event, which~~ shall be distinct from the fire alarm signal.
   - 4.2. Identification of each door or other access point that will be secured.
   - 4.3. A description of the means or methods used to secure doors and other access points.
   - 4.4. A description of how locking means and methods are in compliance with the requirements of this code for egress and accessibility.
5. Procedures for reporting to the fire department any lockdown condition affecting egress or fire department operations.
6. Procedures for determining and reporting the presence or absence of occupants to emergency response agencies during a lockdown.
7. Means for providing two-way communication between a central location and each area subject to being secured during a lockdown.
8. Identification of the prearranged signal for terminating the lockdown.
9. Identification of individuals authorized to issue a lockdown termination order.
10. Procedures for unlocking doors and verifying that the *means of egress* has been returned to normal operations upon termination of the lockdown.
11. Training procedures and frequency of lockdown plan drills.

Reason: This is the second of two proposals relating to notifying occupants during a lockdown. This proposal seeks to amend the means of notifying occupants during a lockdown by requiring a mass notification risk analysis to be performed. The proposal is needed because Chapter 4 the 2021 code requires a notification method distinct from the fire alarm system notification signal but provides no guidance as to the expectation for what kind of system.

A key aspect of a lockdown plan is to identify the organizational structure in charge of making decisions during a lockdown. It is critical to understand who is authorized to initiate and lift a lockdown order. There is often a need for different lockdown plans to address differing threats. Therefore, different types of messaging are required to notify occupants of different threats. For example, the correct procedure during a chemical release incident will be different from the correct procedure during an active shooter incident.

Mass notification often utilizes one or several communication technologies and is intended to communicate information about emergencies including but not limited to fire, human caused events (accidental and intentional), other dangerous situations, accidents, and natural disasters. A lockdown situation often requires a subsequent evacuation depending on the threat, and therefore is a reasonable trigger to perform a mass notification risk analysis.

This proposal **does not automatically** mandate the installation of any mass notification systems. Rather, it only requires a risk analysis be conducted for a building that chooses to utilize lockdown plans as detailed in section 404.

Requiring a risk analysis will result in a more comprehensive emergency response plan that is customized for the specific hazards and risks associated with the building. The risk analysis and emergency response plan can be as elaborate or as basic as the fire code official and building owner determines it needs to be. This proposal only emphasizes the need to document how communicating with the occupants of the building and possibly occupants that are outside the building will be accomplished.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: Increase

Estimated Immediate Cost Impact:

$0.00

Estimated Immediate Cost Impact Justification (methodology and variables):

There is no increase in construction cost because this proposal is not associated with construction, nor is this proposal requiring any new occupant notification system.

There will be some additional costs to conduct the risk analysis, which will be based on the complexity of the facility. For the purposes of this requirement, the scope of the risk analysis is limited to the scope of the emergency response plan being considered for a lockdown event. In extreme cases, the risk analysis may cost thousands of dollars to produce an expansive report of risks, and strategies to mitigate those risks.

F70-24

F71-24

IFC: SECTION 405, 405.2

Proponents: Mark Chubb, ManitouNW LLC, ManitouNW LLC (mark.chubb@manitounw.com)

2024 International Fire Code

SECTION 405
EMERGENCY EVACUATION DRILLS

Revise as follows:

405.2 Occupant participation.
Emergency fire and evacuation drills shall involve the actual evacuation of occupants to a selected assembly point and shall provide occupants with experience in exiting through required *exits*. <u>The use of virtual reality simulators or synthetic environments for training purposes is not a suitable substitute for required participation in drills or exercises required by this section.</u>

Exceptions:

1. In ambulatory care facilities and Group I-2, the movement of care recipients to a safe area or to the exterior of the building is not required.
2. In Group I-1, Condition 2, the assembly point for residents is permitted to be within an adjacent *smoke compartment*.
3. In Group R-4, actual exiting from emergency escape and rescue openings shall not be required. Opening the emergency escape and rescue openings and signaling for help shall be an acceptable alternative.
4. In Group I-3, Conditions 2 through 5 where a *defend-in-place* response is permitted, the assembly point for detainees is permitted to be within an adjacent *smoke compartment*.
5. In Group I-3, Conditions 2 through 5, movement of detainees is not required to an assembly point where there are security concerns.

Reason: The development and use of virtual reality and augmented reality has advanced considerably in recent years. Virtual reality simulators are now routinely used for research purposes to study occupants' evacuation behaviors under varying conditions. The use of virtual or augmented reality in staff training has value but should not be considered a substitute for the physical performance of evacuation drills and exercises in buildings. Occupants performing evacuation drills in the actual physical environment provide many advantages over virtual or synthetic environments, even when these environments are constructed to resemble the actual occupancy in question. The experience of physical space under actual conditions of use often reveals features and conditions simulations cannot replicate or present to users in the same manner they are experienced in the physical world.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The added material reinforces the existing language while specifically addressing the introduction of new technologies not previously considered in the application of the code. This results in no added or changed costs for users.

F71-24

F72-24

IFC: 503.2.2, 503.2.1.1 (New), 503.2.1.2 (New), 503.2.1.2.1 (New), Table 503.2.1.2.1 (New), 503.2.1.2.2 (New), TABLE 503.2.1.2.2 (New), 503.2.1.2.3 (New), TABLE 503.2.1.2.3 (New), 503.4.1 (New), TABLE 503.4.1 (New), 503.4.2 (New), SECTION D102 (New), D102.1 (New), SECTION 202 (New), SECTION D103, D103.1, FIGURE D103.1, D103.1.1 (New), D103.2, D103.3, D103.4 (New), TABLE D103.4, D103.5, D103.6, D103.6.1, D103.6.2, D105.1, D105.2, D105.2.1 (New), D105.2.1.1 (New), D105.2.2 (New), D105.2.2.1 (New), D105.2.2.2 (New), D105.2.2.3 (New), D105.2.2.4 (New), D105.2.2.5 (New), D105.2.2.6 (New), FIGURE D105.2.2.6 (New)

Proponents: Scott Brody, Self (sbrody96@gmail.com)

2024 International Fire Code

Revise as follows:

503.2.2 Authority. The *fire code official* shall have the authority to require or permit modifications to the required access widths where they are inadequate for fire or rescue operations or where necessary to meet the public safety, health, environmental, historic preservation, or other objectives of the jurisdiction.

Add new text as follows:

503.2.1.1 Single Lane Fire Apparatus Access Roads. Single lane fire apparatus access roads shall be not less than 12 ft (3658 mm) wide, and shall comply with all of the following:

1. The road shall be one-way, a one-way lane channel of a divided two-way road, or closed to ordinary motor vehicle traffic.

   Exception: In exclusively residential areas, a single bi-directional driving lane shall be permitted where designed in accordance 503.2.1.2.

2. The route from the Fire Station to the dwelling shall require traveling no more than 600 ft (182.88 m) until the nearest turnoff to another road, and there shall be no more than 1200 ft (365.76 m) of one lane road segments for each emergency service trip, unless approved otherwise.
3. A minimum 75 foot long (22.86 m) × 21 ft (6401 mm) wide passing space shall be installed not less than every 600 ft (182.88 m).

   3.1 Where parking is naturally prohibited in the vicinity of hydrants, active driveways, intersections, or other approved locations, these spaces shall be permitted to be counted toward the passing bay requirements.

   3.2 Where there are turnoffs to other roads not less than every 400 ft (121.92 m), passing bays are allowed to be omitted.

4. The road width at curves shall be increased where necessary to accommodate the swept path of all emergency vehicles.
5. The road shall not terminate in a dead end.
6. The route from the Fire Station to all buildings shall not be overly circuitous. The fire code official is authorized to modify the location and level of interconnection between fire apparatus access roads where their design is insufficient.
7. All parallel parking spaces shall be a minimum of 7 ft (2134 mm) wide.
8. Angle parking, and reverse angle parking, shall only be permitted where designed in accordance with approved dimensions.
9. All parking spaces shall be marked for the entire extent of the space with lines indicating the border between the outer edge of the parking space, and the fire apparatus travel lane. The fire code official is authorized to require the placement of enhanced signage and road markings indicating that the central lane must be kept clear at all times.
10. The fire code official is authorized to require a sufficient number of locations be provided for deliveries, maintenance vehicles, passenger drop-off/pickup, snow storage, or any other extenuating circumstance that results in excessive blockage of the road. The width of such spaces shall be determined based on the types of vehicles which are likely to require use of the space, and shall be approved.

11. Where a narrower street could impede apparatus access, or pose a risk that arriving pumpers would need to get too close to the building in order to establish a connection to the automatic sprinkler system and standpipe system, the fire code official is authorized to require installation of approved remote or interconnected fire department connections, or a fire pump system.
12. Buildings shall be equipped throughout with an approved automatic sprinkler system installed in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3.
13. Where the travel distance on single lane roads exceeds 600 ft (182.88 m), and buildings sited along single lane road(s) have a combined occupant load of 350 persons or more, Automated External Defibrillators (AED) shall be made available and maintained within 450 ft (137.16 m) of all locations.
14. Except for one and two-family dwellings, and other *approved* low risk occupancies, construction type shall be IA, IB, IIA, IIIA, IV (A,B, or C), or V-A.
15. Buildings over 3 stores or 30 ft (9144 mm) above grade plane shall be provided with approved aerial apparatus access.

503.2.1.2 Traffic Demand-based Street Widths. Where a fire apparatus access road is assigned a functional classification of local road or minor collector, or is similarly described per another classification scheme, and the road's average daily traffic volume does not routinely exceed 2000 vehicles per day, the street widths in Section 503.2.1.2.1 and Section 503.2.1.2.2 shall be permitted. Parking ratios shall comply with Section 503.2.1.2.3.

503.2.1.2.1 Two way streets parking one-side. For two-way streets where parking is permitted on one side only, and the parking spaces are unmarked, the width of fire apparatus access roads shall comply with Table 503.2.1.2.1.

Table 503.2.1.2.1 FIRE APPARATUS ACCESS ROAD WIDTH - PARKING ON ONE SIDE

Dwelling units, Sleeping units and Mixed Use			
Per Gross Acre	**Minimum Width (ft)**	**Per Gross Hectare**	**Minimum Width (mm)**
≤ 2.0	18	≤ .8	5486
> 2 to 6	24	> .8 to 2.4	7315
> 6 to 10.0	28	>2.4 to 4.0	8534
Mixed use and > 10	32	Mixed use and > 4.0	9754

503.2.1.2.2 Two-way streets, parking both sides. For two way streets where parking is permitted on both sides, and the parking spaces are unmarked, the width of fire apparatus access roads shall comply with Table 503.2.1.2.2.

TABLE 503.2.1.2.2 FIRE APPARATUS ACCESS ROAD WIDTH - PARKING BOTH SIDES

Dwelling Units, Sleeping units and Mixed Use			
Per Gross Acre	Minimum Width (ft)	Per Gross Hectare	Minimum Width (mm)
≤2.0	20	≤.8	6096
> 2 to 6.0	26	>.8 to 2.4	7925
> 6 to 10	30	> 2.4 to 4.0	9144
Mixed use and > 10	34	Mixed use and >4.0	10360

503.2.1.2.3 Parking ratios residential. In residential districts, the parking ratios shall comply with Table 503.2.1.2.3 or the widths shall comply with high density (6.1 to 10.0 DU/ac or 2.5 to 4.0 DU/ha).

TABLE 503.2.1.2.3 PARKING RATIOS

Dwelling Unit or Sleeping Unit Charactertistics	Minimum number of off-street spaces
≤ 1 bedroom	1.75
2 bedrooms	2.0
Detached housing with ≥ 3 bedrooms	2.5

Revise as follows:

503.4.1 Traffic calming. ~~Traffic calming shall be prohibited unless approved by the fire code official.~~ Traffic calming shall comply with the requirements of Table 503.4.1. Treatments shall be approved by the fire code official based on ability to accommodate the width and turning movements of fire apparatus.

Add new text as follows:

TABLE 503.4.1 TRAFFIC CALMING

Roadway Type/Location	Design to Achieve 85 percentile space mean speed not less than		Maximum Distance[a]	
	mph	km/h	ft	m
Parking lot drive aisles	10	16.09	1000	304.8
Fire Lanes closed to civilian vehicle traffic and woonerfs[b]	10	16.09	1000	304.8
Midblock pedestrian and bicycle crossings (all roadway functional classifications)	10	16.09	Immediate vicinity of crossing only	
Turning movements near urban crosswalks and bicycle path crossings (all roadway functional classifications)	5	8.05	Immediate vicinity of turn only	
Local Roads	18.6	30.00	2000	609.6
Minor collector roads	18.6	30.00	2000	609.6
Major collector, Minor arterial roads, other principle arterial freeways and expressways	Prohibited unless approved by the fire code official			
Other roads	As approved			

a. Fire services shall be provided an approved route to access all structures which does not require traveling more than 2000 ft (609.6 m)
on traffic calmed local and minor collector streets. Streets themselves shall be permitted to contain more than 2000 ft (609.6 m) of traffic
calming, provided that emergency services do not have to travel beyond 2000 ft (609.6 m) as part of their route.

b. Woonerfs shall be permitted to follow the 10 mph (16.09 km/h) design speed even if assigned a different formal functional classification.

503.4.2 Special Hazards. Fire apparatus access roads shall be permitted to be split into segments not less than 12 ft (3658 mm) wide, where necessary to address the following hazards:

1. To prevent vehicle operators from entering opposing travel lane(s) to bypass railroad or drawbridge gates.
2. To prevent vehicle operators from swerving around others stopped for pedestrians, bicyclists, or similar hazards at a crosswalk.

Exemption: The minimum width of a roadway divided in accordance with 503.4.2 shall be 10 ft (3048 mm), where the elements that divide the roadway are traversable by fire apparatus.

SECTION D102 DEFINITIONS

D102.1 DEFINITIONS. For the purpose of this appendix, certain terms are defined as follows:

Add new definition as follows:

DRIVING LANE. The portion of a fire apparatus access road which is permanently available for driving vehicles.

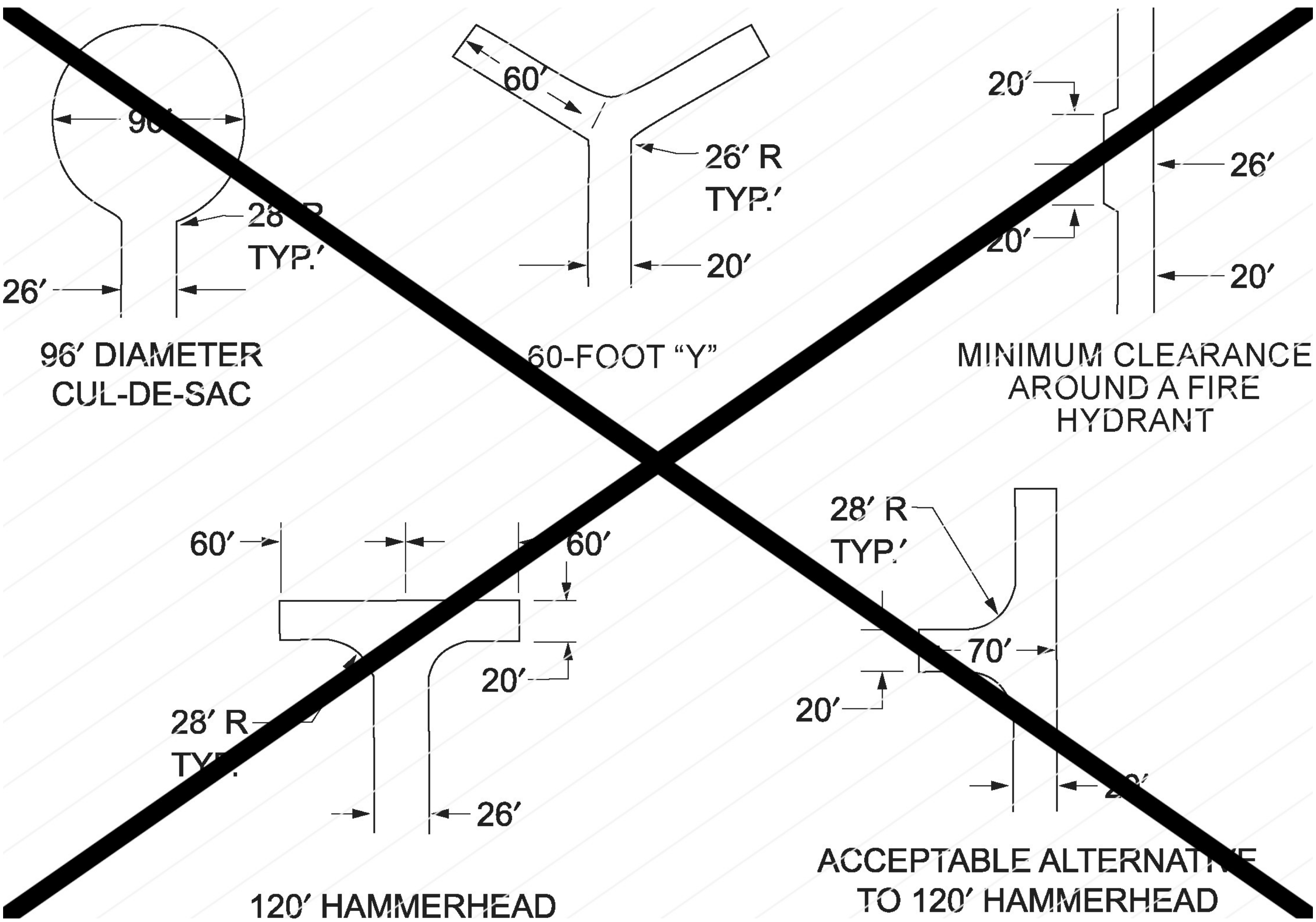
WORKING AREA. A designated area beside the fire apparatus access road, which is available for the placement of outriggers, hose lines, and other staging activates. This could be sidewalk, grass, or another surface, provided there are not excessive obstructions which would impede staging.

SECTION D103
MINIMUM SPECIFICATIONS

Revise as follows:

D103.1 Access road width with a hydrant.
Where a fire hydrant is located on a fire apparatus access road, the minimum road width shall be 26 feet (7925 mm), exclusive of shoulders ~~(see Figure D103.1)~~.

Delete without substitution:



~~For SI: 1 foot = 304.8 mm.~~

~~**FIGURE D103.1 DEAD-END FIRE APPARATUS ACCESS ROAD TURNAROUND**~~

Add new text as follows:

D103.1.1 Hydrant access width reductions. The minimum width of fire apparatus access roads in the vicinity of hydrants shall be reduced to 21 ft (6401 mm) for two-lane roads, or 12 ft (3658 mm) for divided roads, where hydrants are placed not less than 7 ft (2134 mm) back from the nearest roadway edge.

D103.2 Grade. Fire apparatus access roads shall not exceed 10 percent in grade.

Exception: Grades steeper than 10 percent as *approved* by the *fire code official*.

D103.3 Turning radius. The minimum turning radius shall be determined by the *fire code official*.

Revise as follows:

D103.4 Dead Ends. Dead end fire apparatus access roads in excess of 150 feet (45 720 mm) shall be provided with turnaround provisions in accordance with ~~Table D103.4.~~ *A Policy on Geometric Design of Highways and Streets, by the American Association of State Highway and Transportation Officials.*

Delete without substitution:

~~**TABLE D103.4 REQUIREMENTS FOR DEAD-END FIRE APPARATUS ACCESS ROADS**~~

LENGTH (feet)	WIDTH (feet)	TURNAROUNDS REQUIRED
0–150	20	None required
151–500	20	120-foot Hammerhead, 60-foot “Y” or 96-foot diameter cul-de-sac in accordance with Figure D103.1
501–750	26	120-foot Hammerhead, 60-foot “Y” or 96-foot diameter cul-de-sac in accordance with Figure D103.1
Over 750	Special approval required	

~~For SI: 1 foot = 304.8 mm.~~

D103.5 Fire apparatus access road gates.

Gates securing the fire apparatus access roads shall comply with all of the following criteria:

1. Where a single gate is provided, the gate width shall be not less than 20 feet (6096 mm). Where a fire apparatus road consists of a divided roadway, the gate width shall be not less than 12 feet (3658 mm).
2. Gates shall be of the horizontal swing, horizontal slide, vertical lift or vertical pivot type.
3. Construction of gates shall be of materials that allow manual operation by one person.
4. Gate components shall be maintained in an operative condition at all times and replaced or repaired when defective.
5. Electric gates shall be equipped with a means of opening the gate by fire department personnel for emergency access. Emergency opening devices shall be *approved* by the *fire code official*.
6. Methods of locking shall be submitted for approval by the *fire code official*.
7. Electric gate operators, where provided, shall be *listed* in accordance with UL 325.
8. Gates intended for automatic operation shall be designed, constructed and installed to comply with the requirements of ASTM F2200.

D103.6 Signs.

Where required by the *fire code official*, fire apparatus access roads shall be marked with permanent “NO PARKING—FIRE LANE” signs complying with Figure D103.6. Signs shall have a minimum dimension of 12 inches (305 mm) wide by 18 inches (457 mm) high and have red letters on a white reflective background. Signs shall be posted on one or both sides of the fire apparatus road as required by Section D103.6.1 or D103.6.2.

D103.6.1 Roads 20 to 26 feet in width.
Fire lane signs as specified in Section D103.6 shall be posted on both sides of fire apparatus access roads that are 20 to 26 feet wide (6096 to 7925 mm).

D103.6.2 Roads more than 26 feet in width.
Fire lane signs as specified in Section D103.6 shall be posted on one side of fire apparatus access roads more than 26 feet wide (7925 mm) and less than 32 feet wide (9754 mm).

Revise as follows:

D105.1 Where required.
Where the vertical distance between the *grade plane* and the highest roof surface exceeds 30 feet (9144 mm), *approved* aerial fire apparatus access roads shall be provided. For purposes of this section, the highest roof surface shall be determined by measurement to the eave of a pitched roof, the intersection of the roof to the *exterior wall*, or the top of parapet walls, whichever is greater.

Exception: Where *approved* by the *fire code official*, buildings of Type IA, Type IB or Type IIA construction equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 and having firefighter access through an enclosed *stairway* with a Class I standpipe from the lowest level of fire department vehicle access to all roof surfaces.

D105.2 Width. Aerial fire apparatus access roads shall have a minimum unobstructed width of 26 feet (7925 mm), exclusive of shoulders, in the immediate vicinity of the building or portion thereof.

Add new text as follows:

D105.2.1 Reductions in Width Permitted with Enhanced Fire Service Equipment. Aerial apparatus access roads shall be permitted to be narrowed on account of the fire service having specialized equipment, in sufficient quantity, to negate the need for wider roadways. All solutions, or combinations thereof, shall be approved by the fire code official and the fire chief. For the purposes of this code, alternative systems shall include but not be limited to:

1. Ladder trucks with specialized capabilities, including but not limited to the following:
   - 1.1 Narrower truck bodies and/or narrower or zero spread outriggers.
   - 1.2 Aerial equipment which does not require outriggers for safe deployment.
   - 1.3 Outriggers which can fit under adjacent parked vehicles, where an adjacent parking lane is provided
   - 1.4 Outriggers which are sized to fit between parallel parked vehicles, where an adjacent parking lane is provided.
   - 1.5 Outriggers with short-jacking capabilities.
2. Vehicle dolly jacks, or other parked vehicle relocation systems, carried by responding emergency service units.
   - 2.1 Manual vehicle relocation systems shall have the capability to move a typical parked passenger vehicle in 90 seconds or less when operated by a single individual, and 60 seconds or less when operated by two individuals.
   - 2.2 Vehicle relocation robots shall have the capability to move a typical parked passenger vehicle in 60 seconds or less.
   - 2.3 Vehicle relocation systems shall not be proposed along slopes or other conditions for which the system is not safely rated.
   - 2.4 Where curbing could interfere with vehicle relocation, the fire code official is authorized to require installation of alternative roadway edge delineation.
3. Push bars mounted to emergency vehicles, for relocating disabled vehicles from the path of aerial apparatus.
   - 3.1 Design strategies which would require moving lawfully parked vehicles with push bars, shall be prohibited unless approved by the fire code official.
4. Outrigger pads with enhanced strength to deploy on non-paved surfaces.
5. Taller ground ladders, or other climbing systems.

6. Light weight or telescopic ladders, where the distance between the aerial apparatus and fire is longer.
7. Fire service aircraft, including drones.
   7.1 Where aircraft are proposed, the adjacent airspace shall be sufficiently clear of obstructions to facilitate their use.

D105.2.1.1 Procedures for Furnishing Equipment. Where the fire department does not have the necessary equipment for operating on narrower streets, the *fire code official* is authorized to require payment for new equipment, and associated expenses, as a condition of approval D105.2.1.

D105.2.2 Aerial apparatus access working areas.. Aerial apparatus access routes shall be permitted to consist of a combination of driving lanes and working areas, where *approved* by the fire code official.

D105.2.2.1 Working Area Materials. Working areas shall consist of sidewalks, geo-cell reinforced grass, or any other system which has been *approved* to provide adequate support for placement of aerial apparatus stabilizers. The system shall also provide support for emergency services to walk upon and use for other staging activities.

D105.2.2.2 Total Width. The sum of the widths for the driving lane(s) and working area shall be not less than 26 ft (7925 mm).

D105.2.2.3 Driving Lane Width. Roads open to bi-directional vehicle traffic shall contain a minimum of 21 ft (6401 mm) of driving lanes. Driving lane width for one-way roads and halves of divided roads shall a minimum of 12 ft (3658 mm). Roads with less than 21 ft (6401 mm) of driving lanes shall install passing bays at the intervals specified in 503.2.1.1, or at locations deemed necessary by the fire code official.

D105.2.2.4 Working Area Placement. Working areas shall be placed directly beside driving lanes.

D105.2.2.5 Separation Between Working Area and Driving Lane. The working area and driving lane shall be permitted to be separated by a combination of any of the following, provided the design is *approved*:

1. Tactile warning surfaces for the blind.
2. Curb with a sufficiently low slope that it will not cause damage to fire apparatus traversing it.
3. Where passing is not required, full height curb.
4. Bollards, boxed plants, or other obstructions placed at sufficiently infrequent spacing so as to provide room for aerial apparatus to deploy around them.
5. Bollards with the ability to be retracted with fire department keys, or another approved retracting system.
6. Bollards that provide the ability to be run over without causing damage to the fire apparatus.

D105.2.2.6 Signage. The fire code official shall be authorized to require the posting of signage including but not limited to the maximum load capacity of the surface, the limits of the area, instructions how to operate any systems, and notices to keep the area clear of unauthorized items.

FIGURE D105.2.2.6 EXAMPLES OF SIGNS AND GROUND TILES FOR MARKING WORKING AREAS

Staff Analysis: A review of the standard proposed for inclusion in the code, ***Neighborhood Street Design Guidelines Table 3–1 (Institute of Transportation Engineers (ITE))***, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Attached Files

- **IFC Fire Access Proposal Narrative.pdf**
  https://www.cdpaccess.com/proposal/9078/30852/files/download/4858/

Reason: The US currently has a traffic crash fatality rate several times many peer nations. IFC® Section 503 and Appendix D is likely responsible for 5-10% of US traffic deaths. Every year, roughly 4,000 Americans lose their lives on non-rural neighborhood streets. That's more than the average number of people killed in all fires in a typical year. If the US adopted traffic calming and narrower streets like most of the world, data suggests over half these deaths, at least 2,000 fatalities could be prevented on local streets alone. The benefits simply outweigh the risk.

Lack of exercise causes hugely more deaths than fires. The ban on scale streets leads to neighborhoods which are less attractive for non-motorized transportation. Narrower streets could also reduce road noise and air pollution, both of which kill more persons than fires. The US has an impervious surface the size of Ohio. Wider streets have been shown to cause more ecosystem depletion, drainage problems, and vehicle-wildlife collisions.

My cost analysis analyzed 41.5 miles (66.8 km) of streets fronting nearly 5,000 dwelling units. Calculations show wider streets typically raise the cost of new housing by several thousand dollars. Wider streets further cost the economy through maintenance expenditures and diminished land productivity.IFC® Section 503 and Appendix D were made with the intention of saving lives from fire and other emergencies. However, in the years since, countless places have leapfrogged the United States in fire safety and emergency medical response, despite not having as wide roads. Wide and non-traffic calmed streets are two of the most ineffective investments for improving response time. Other measures like interconnected streets and sprinklers are more effective and proposed as an alternative pathway for compliance. There are also many tactics which can be used, and my proposed language would help fire departments deploy them. Certain fire access passages appear to have been preempted by US Federal Regulations, international treaties, UN Resolutions, and the ICC's own requirements to write standards in a fashion as internationally applicable as possible. This proposal aims to resolve conflicts between the IFC® Fire Access sections, and other laws in a fair and balanced manner.This proposal specifically allows narrower streets if they are more interconnected. For one lane roads, homes are to be sprinklered. For commercial, must provide 1-hr fire resistant construction and AEDs for large developments. This should ensure fire safety is achieved without compromising road safety.

IFC Fire Access Proposal Narrative.pdf

https://www.cdpaccess.com/proposal/9078/30852/files/download/4858/

See PowerPoint slides I prepared for your organization: https://www.cdpaccess.com/proposal/9078/30852/files/download/4433/See full video I prepared for your organization:

Statement to the IFC FCAC 12 06 2023 https://www.youtube.com/watch?v=nTHcZ1v3DP0

Bibliography: The values found in tables referenced in Section 503.2.1.2 were adapted and used with permission from Institute of Transportation Engineers (ITE), based on Neighborhood Street Design Guidelines Table 3 – 1. ISBN: 10: 1-933452-49-8. ISBN 13: 978-1-933452-48-71627. Institute of Transportation Engineers, I Street, NW, Suite 550, Washington, DC, 20006, USA.See reason statement PDF and PowerPoint for additional in-text citations.

Cost impact (key sources):

US Department of Transportation. Highway Investment Analysis Methodology 2015 Status of the Nation's Highways, Bridges, and Transit: Conditions & Performance. [Online] 2015. https://www.fhwa.dot.gov/policy/2015cpr/appendixa.cfm.

DiClerico, Dan. True Cost Guide: Install Asphalt Paving. HomeAdvisor - Powered by Angi. [Online] August 14, 2021. Used price data collected in 2020 and kept on website through late 2021. https://web.archive.org/web/20210814132509/https://www.homeadvisor.com/cost/outdoor25 living/install-asphalt-paving/.

National Fire Protection Association & Newport Partners. Home Fire Sprinkler Cost Assessment. [Online] 2013. https://www.nfpa.org/-/media/Files/News-and-Research/Fire-statistics34 and-reports/Suppression/HomeFireSprinklerCostAssessment2013.ashx.

Note many other sources were considered in my cost model, which can be shared with the committee of requested. I am not including it publicly because planning to publish in a journal and exact values could be adjusted.

Cost Impact: Decrease

- **Study Locations.pdf**
  https://www.cdpaccess.com/proposal/9078/30852/documentation/148268/attachments/download/4813/
- **Cost study sample calc.pdf**
  https://www.cdpaccess.com/proposal/9078/30852/documentation/148268/attachments/download/4812/
- **Statistical Calculations.pdf**
  https://www.cdpaccess.com/proposal/9078/30852/documentation/148268/attachments/download/4811/
- **Results by neighborhood class.PNG**
  https://www.cdpaccess.com/proposal/9078/30852/documentation/148268/attachments/download/4810/

Estimated Immediate Cost Impact:

Context sensitive, traffic-demand based, standards yielded savings in 20 of 25 neighborhoods sampled. Compared with the as-built scenario, reflexive of what is typically built in the US including some exemptions from fire code officials and legacy codes, AASHTO/ITE standards which I am proposing reduced average road surface by 18.9 m2 (204 SF) per dwelling. (IQR: 17.1 –23.3 m2). This is estimated to reduce new home cost by $5,731. Compared with a strict adherence scenario, savings is $6,839 per new home.

For single lane roads, it is estimated cost savings would be 103k$/100 meters, typical of the length of an apartment building.

Cost of sprinklers estimated at 3,501$/home for an NFPA 13R system, per NFPA data. I assume the cost of building construction upgrade to 1 hour fire resistant would be rather low, and could be to a degree offset if it is also better at providing insulation over the life cycle. Exact costs for this vary by building type.

Estimated Immediate Cost Impact Justification (methodology and variables):

To understand resource consumption differs, 66.8 km (41.5 mi) of road spread over 210 local 13 streets in 25 neighborhoods were analyzed. Sample streets fronted 4,985 dwelling units. By recording characteristics of each neighborhood, it was possible to ascertain current roadway characteristics, and how much surface would be required if the same community were built using different standards.

I used average cost per lane mile of construction per US Department of Transportation Highway Economics Requirements System, and the rate private sector pays to build roads per Home Advisor. Also counted land and utility costs. The average of these resulted in a unit price of 261.96 $/m2 (24.34$/ft2) for building a new paved surface, and 3.14 $/m2/year ($0.2918$/ft2/year) in repair costs. This is $1.12 M/lane-km or $1.80 M/lane-mile.

Considering average rates of utility service subscription (ie, what percentage subscribe to gas, electric, cable TV/fiber, public water, and sewer), each ft of road was associated with 955.49 $/m (291.23$/ft) in total utility new build costs and 14.58 $/m/yr (4.44$/ft/yr) in average repair costs.

For roads built to AASHTO/ITE context sensitive widths vs existing codes, costs per dwelling unit are shown below by density. Note immediate cost impact is shown as New Construction Sav. (paving + utilities) whereas lifecycle costs are show as annual repair.

Estimated Life Cycle Cost Impact:

Life cycle cost savings from less road repair is $72.26 per DU per year vs typical scenario, and $85.01 per DU per year comparing context sensitive streets scenario vs strict compliance with existing codes.

I am planning to publish my research on a peer reviewed journal. I can share further mythology/research with the committee outside the public meeting.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

Same as above except did not use average of public and private costs, assumed roads generally turned over to government, so only used USDOT HERS repair cost rates for the repaving.

F72-24

F73-24

IFC: 507.1

Proponents: Kevin Scott, KH Scott & Associates LLC, self (khscottassoc@gmail.com)

2024 International Fire Code

Revise as follows:

507.1 Required water supply. An *approved* water supply capable of supplying the required fire flow for fire protection shall be provided to premises on which facilities, buildings or portions of buildings are hereafter constructed or moved into or within the jurisdiction. <u>Reclaimed water or recycled water shall be analyzed to evaluate any health hazard and to determine whether any materials, chemicals or contaminants in the water will be detrimental to the components of the fire water supply or fire-extinguishing systems and a report shall be submitted to the fire code official for approval prior to acceptance as fulfilling the requirement for water supply.</u>

Reason: In recent years there has been a increased desire to utilize recycled or reclaimed water for fire fighting purposes. The long-term goal of water conservation is important to improve sustainability, but the quality of recycled or reclaimed water used for fire fighting must meet considered.

There are two aspects of concern: 1) does the water contain any contaminants that will be detrimental to the fire protection equipment and appliances used in fighting the fire, and 2) does the water present any health hazard as fire fighters are doused with water during the firefighting operations.

NFPA 13, the standard for fire sprinkler system design allows the use of recycled or reclaimed water, provided the water quality is tested and evaluated. 2022 NFPA 13 reads:
5.2.1 Water supplies for sprinkler systems shall be one of the following or any combination:

1. A connection to an approved public or private waterworks system in accordance with 5.2.2
2. A connection including a fire pump in accordance with 5.2.3
3. A connection to a water storage tank at grade or below grade installed in accordance with NFPA 22 and filled from an approved source
4. A connection to a pressure tank in accordance with 5.2.4 and filled from an approved source
5. A connection to a gravity tank in accordance with 5.2.5 and filled from an approved source
6. A penstock, flume, river, lake, pond, or reservoir in accordance with 5.2.6
7. ***** A source of recycled or reclaimed water where the building owner (or their agent) has analyzed the source of the water and the treatment process (if any) that the water undergoes before being made available to the sprinkler system and determined that any materials, chemicals, or contaminants in the water will not be detrimental to the components of the sprinkler system it comes in contact with

Annex A in NFPA 13 contains some additional guidance to Item 7 above, and states "…Recycled or reclaimed water should never be used in a sprinkler system until an analysis of what contaminants might be in the water has determined that nothing will be detrimental to sprinkler system performance or the expected reasonable life of the sprinkler system."

Fire fighters routinely splashed or drenched with water from fire sprinklers, fire hoses, and other fire fighting appliances. The firefighters should be wearing their structural fire-fighting personal protective equipment, but that equipment is not designed to keep water off their body, and to limit skin contact with fire fighting water.

The quality of the water must be evaluated for health reasons and for the efficacy of the fire fighting equipment. It would be foolish to install expensive automatic fire fighting systems and then run water through it that will corrode it internally, or plug the orifices of sprinklers. This proposal allows recycled water or reclaimed water to be utilized, but the quality of the water must be analyzed for provide adequate protection from health risks to fire fighters and for the longevity and reliability of the fire fighting appliances.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The requirement to analyze the water already exists, but as the desire increases to use recycled water this proposal places the requirement in the code so it is not missed.

F74-24

IFC: 507.2, B103.3

Proponents: Chad Sievers, NYS, NYS DOS (chad.sievers@dos.ny.gov); Jeanne Rice, NYSDOS (jeanne.rice@dos.ny.gov); Kevin Duerr-Clark, NYS DOS, NYS DOS (kevin.duerr-clark@dos.ny.gov); China Clarke, New York State Dept of State, Manager Technical Support Unit (china.clarke@dos.ny.gov); John R Addario - NYS Department of State, NEW YORK STATE CODES DIVISION, New York State Department of State Division of Building Standards and Codes (john.addario@dos.ny.gov)

2024 International Fire Code

Revise as follows:

507.2 Type of water supply. A water supply shall consist of reservoirs, pressure tanks, elevated tanks, water mains or other fixed systems capable of providing the required fire flow.

Exception: In rural and suburban areas in which adequate and reliable water supply systems do not exist, the *fire code official* is authorized to approve the use of NFPA 1142 or the *International Wildland-Urban Interface Code* where it is adopted.

B103.3 Areas without water supply systems.
For information regarding water supplies for firefighting purposes in rural and suburban areas in which adequate and reliable water supply systems do not exist, the *fire code official* is authorized to utilize NFPA 1142 or the *International Wildland-Urban Interface Code*.

Reason: Because of the rural character of many regions of the majority of states, strict compliance with 507.2 is not always feasible. NFPA 1142 and IWUIC accommodate some alternatives. NFPA 1142 and IWUIC are allowed in the IFC code under Appendix B, but adding the exception allows NFPA 1142 or IWUIC to be used without adopting all of Appendix B.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

Total cost savings: **$14,272** for a single-family home with an attached garage, as the building would not need to include on-site water storage.

This code change would be cost savings because it gives the code users another option to provide water to extinguish a fire. This option allows water to be supplied by the fire department instead of being kept on-site. This is common in rural areas where there's not a municipal water distribution network. Many factors will come into play in developing a water supply for fire flow. To simplify this estimate we looked at a single-family home with an attached garage and using plastic water tanks to store the water.

This cost estimate does not include any necessary maintenance of fire department equipment, nor the cost of acquiring the water (via pumping or other acquisition method).

Estimated Immediate Cost Impact Justification (methodology and variables):

NFPA 1142 states (as an acceptable method to calculate fire flow)

Eq 4.3.1
WS_{min}=VStot/OHC * CC * 1.5

WS_{min}= min Water Supply

VS_{tot}= Total volume of structure (ft^3)

OHC=Occupancy hazard Classification number

CC= Construction Classification number

For example a single-family home 2 stories with an attached garage

V_{garage} = 24’ x 24’ x 10’=5760

V_{house} = 2 stories x 8’H stories x 40’x 30’19200

V_{tot} = 19200+5760 = 24,960 ft^3

OHC = 7 (per NFPA 1142 5.2.5.2 dwellings)

CC = 1.5 (per NFPA 1142 Table 6.2.1 Type V)

WS_{min}= VS_{tot}/OHC * CC * 1.5=24,960 ft^3 / 7 x1.5 x1.5 = 8023 gallons

Use two 5,000 gallon tanks @ $5,136 each https://www.ntotank.com/5000gallon-norwesco-black-vertical-water-tank-x1750809

Shipping cost estimate $1,000

plumbing cost estimated $1,000

Site work estimate

$2,000

Total cost savings $14,272

F74-24

F75-24

IFC: 509.1.1

Proponents: William Johnson, Town of Mount Pleasant, EDS (wjohnson@tompsc.com)

2024 International Fire Code

Revise as follows:

509.1.1 Utility identification. Where required by the *fire code official*, gas shutoff valves, electric meters, service switches, <u>including stand by generator transfer switches </u>and other utility equipment shall be clearly and legibly marked to identify the unit or space that it serves. Identification shall be made in an *approved* manner, readily visible and shall be maintained.

Reason: Where standby generators are installed on services without service disconnects, the ATS (automatic transfer switch) may not be located at the meter base. During a fire event, simply pulling the meter may not disable the service potentially putting first responders at risk of injury or death. When considering the cost/ benefit analysis, requiring a decal at the service meter would minimally impact the cost of the overall project. Currently, we require decals on solar arrays for rapid shut down, this does not seem too unreasonable to implement without an increased burden to home and business owners.

Cost Impact: Increase

Estimated Immediate Cost Impact:

Approximately $20.00.

Estimated Immediate Cost Impact Justification (methodology and variables):

This would minimally increase the overall cost of the installation of the standby generator system, essentially the only increase would be the price of the decal. A brief review of similar labels online.

F75-24

F76-24

IFC: SECTION 510

Proponents: Alan Perdue, Safer Buildings Coalition, Safer Buildings Coalition (alan.perdue@saferbuildings.org); Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Fire Code

Revise as follows:

SECTION 510 EMERGENCY RESPONDER COMMUNICATIONS COVERAGE ~~ENHANCEMENT SYSTEMS~~

510.1 Emergency responder communications ~~enhancement systems~~ coverage in new buildings.
Approved in-building emergency responder communications coverage ~~enhancement system (ERCES)~~ for emergency responders shall be provided in all new buildings. ~~In-building~~ ERCES within the building shall be based on the existing coverage levels of the public safety communications systems utilized by the jurisdiction, measured at the exterior of the building. The ERCES, where required, shall be of a type determined by the *fire code official* and the *frequency license holder(s)*. This section shall not require improvement of the existing public safety communications systems.

Exceptions:

1. Where *approved* by the building official and the *fire code official*, a wired communications system in accordance with Section 907.2.13.2 shall be permitted to be installed or maintained instead of an *approved* communications coverage system.
2. Where it is determined by the *fire code official* and the frequency license holder that the communications coverage system is not needed based on existing in-building signal strength, quality and coverage from the public safety communications system(s)
3. In facilities where emergency responder communications coverage is required and such systems, components or equipment required could have a negative impact on the normal operations of that facility, the *fire code official* shall have the authority to accept an automatically activated emergency responder communications coverage system.
4. One-story buildings not exceeding 12,000 square feet (1115 m^2) with no below-ground area(s).

510.2 Emergency responder communications ~~enhancement system~~ coverage in existing buildings.
Existing buildings shall be provided with *approved* in-building emergency responder communications ~~enhancement system~~ coverage for emergency responders as required in Chapter 11.

510.3 Permits.
Permits for in-building emergency responder communications enhancement systems shall be in accordance with Sections 510.3.1 and 510.3.2.

510.3.1 Permit required.
A construction permit for the installation of or modification to in-building emergency responder communications enhancement systems and related equipment is required as specified in Section 105.6.5. Maintenance performed in accordance with this code is not considered a modification and does not require a permit.

510.3.2 Operational permit.
Where required by the fire code official, an operational permit shall be issued for the operation of an in-building emergency responder communications enhancement system.

510.4 Technical and design requirements.

The in-building emergency responder communications enhancement system shall be designed in accordance with this code and NFPA 1225.~~Equipment required to provide in-building emergency responder communications enhancement shall be *listed* in accordance with UL 2524. Systems, components and equipment required to provide the in-building emergency responder communications enhancement system shall comply with Sections 510.4.1 through 510.4.2.8.~~

510.4.1 ~~Emergency responder communications enhancement system signal strength~~ Listing.
~~The building shall be considered to have an acceptable in-building emergency responder communications enhancementsystem where signal strength measurements in 95 percent of all areas and 99 percent of areas designated as *critical areas* by the *fire code official* on each floor of the building meet the signal strength requirements in Sections 510.4.1.1 through 510.4.1.3.~~Equipment required to provide in-building emergency responder communications enhancement shall be listed in accordance with UL 2524.

~~510.4.1.1~~ 510.4.2.1 Minimum signal strength into the building.
The minimum *downlink* signal strength shall be sufficient to provide usable voice communications throughout the coverage area as specified by the *fire code official*. The *downlink* signal level shall be sufficient to provide not less than a Delivered Audio Quality (DAQ) of 3.0 throughout the coverage area using either narrowband analog, digital or wideband LTE signals or an equivalent bit error rate (BER), or signal-to-interference-plus-noise ratio (SINR) applicable to the technology for either analog or digital signals.

~~510.4.1.2~~ 510.4.2.2 Minimum signal strength out of the building. The minimum *uplink* signal strength shall be sufficient to provide usable voice communications throughout the coverage area as specified by the *fire code official*. The *uplink* signal level shall be sufficient to provide not less than a delivered audio quality (DAQ) of 3.0 using either narrowband analog, digital or wideband LTE digital signals or an equivalent bit error rate (BER), or an equivalent SINR applicable to the technology for either analog or digital signals.

Delete without substitution:

~~510.4.2 System design~~.
~~The in-building emergency responder communications enhancement system shall be designed in accordance with Sections 510.4.2.1 through 510.4.2.8 and NFPA 1225.~~

Revise as follows:

~~510.4.1.3~~ 510.4.2 ~~System performance~~ Signal Strength & Quality.
Signal strength shall be sufficient to meet the requirements of the frequencies, applications and other modulation technologies being utilized by public safety for emergency operations through the coverage area as specified by the *fire code official* in Section 510.4.2.2.

Delete without substitution:

~~510.4.2.1 Amplification systems and components~~.
~~Buildings and structures that cannot support the required level of in-building emergency responder communications enhancement system shall be equipped with systems and components to enhance the radio signals and achieve the required level of in-building emergency responder communications enhancement system specified in Sections 510.4.1 through 510.4.1.3. In-building emergency responder communications enhancement systems utilizing radio-frequency-emitting devices and cabling shall be *approved* by the *fire code official*. Prior to installation, all RF-emitting devices shall have the certification of the radio licensing authority and be suitable for public safety use.~~

~~510.4.2.2 Technical criteria~~.
~~The *fire code official* shall maintain a document providing the specific technical information and requirements for the in-building emergency responder communications enhancement system. This document shall contain, but not be limited to, the various frequencies required, the location of radio sites, the effective radiated power of radio sites, the maximum propagation delay in microseconds, the applications being used and other supporting technical information necessary for system design.~~

~~**510.4.2.3 Standby power.**~~

~~In-building emergency responder communications enhancement systems shall be provided with dedicated standby batteries or provided with 2-hour standby batteries and connected to the facility generator power system in accordance with Section 1203. The standby power supply shall be capable of operating the in-building emergency responder communications enhancement system at 100-percent system capacity for a duration of not less than 12 hours.~~

~~**510.4.2.4 Signal booster requirements.**~~

~~If used, signal boosters shall meet the following requirements:~~

1. ~~All signal booster components shall be contained in a NEMA Type 4 cabinet.~~
2. ~~Battery systems used for the emergency power source shall be contained in a NEMA 3R or higher-rated cabinet.~~
3. ~~Equipment shall have FCC or other radio licensing authority certification and be suitable for public safety use prior to installation.~~
4. ~~Where a donor antenna exists, isolation shall be maintained between the donor antenna and all inside antennas to not less than 20dB greater than the system gain under all operating conditions.~~
5. ~~Active RF-emitting devices used for in-building emergency responder communications enhancement systems shall have built-in oscillation detection and control circuitry to reduce gain and maintain operation. When a signal booster detects oscillation, a supervisory signal shall be transmitted. In the event of uncorrectable oscillation, the system shall be permitted to shut down.~~
6. ~~The installation of amplification systems or systems that operate on or provide the means to cause interference on any in-building emergency responder communications enhancement network shall be coordinated and *approved* by the *fire code official* and the *frequency license holder(s)* .~~

~~**510.4.2.5 System monitoring.**~~

~~The in-building emergency responder communications enhancement system shall be monitored by a *listed fire alarm control unit*, or where *approved* by the *fire code official*, shall sound an audible signal at a constantly attended on-site location. Automatic supervisory signals shall include the following:~~

1. ~~Loss of normal AC power supply.~~
2. ~~System battery charger(s) failure.~~
3. ~~Signal source malfunction.~~
4. ~~Failure of active RF-emitting device(s).~~
5. ~~Low-battery capacity at 70 percent of the 12-hour operating capacity has been depleted.~~
6. ~~Failure of critical system components.~~
7. ~~The communications link between the *fire alarm system* and the in-building emergency responder communications enhancement system.~~
8. ~~Oscillation of active RF-emitting device(s).~~

Revise as follows:

~~510.4.2.5.1~~ 510.4.3 Single supervisory input.

Where *approved*, a single supervisory input to the *fire alarm system* to monitor all system supervisory signals shall be permitted.

~~510.4.2.6~~ 510.4.4 Additional frequencies and change of frequencies.

The in-building emergency responder communications enhancement system shall be capable of modification or expansion in the event *frequency* changes are required by the FCC or other frequencylicensing authorities, or additional frequencies are made available by the FCC or other frequency licensing authorities.

~~**510.4.2.7**~~ **510.4.5 Design documents.**
The *fire code official* shall have the authority to require "as-built" design documents and specifications for in-building emergency responder communications enhancement systems. The documents shall be in a format acceptable to the *fire code official*.

Delete without substitution:

~~**510.4.2.8 Near-far effect.**~~
~~Where a signal booster is required by the RF system designer, the dynamic range of the in-building emergency responder communications enhancement system shall be designed to minimize the effects of strong signal automatic gain control on weak signal *uplink* performance.~~

Revise as follows:

~~**510.4.2.9**~~ **510.4.6 Noise interference.**
Where a signal booster is used, signal booster type(s) and the *uplink* signal and noise levels shall be coordinated with and *approved* by all *frequency license holder(s)* that may be adversely impacted by any transmitted noise resulting from the in-building emergency responder communications enhancement system. Systems shall be in compliance with all *frequency licensing authority* requirements.

510.5 Installation requirements.
The installation of the in-building emergency responder communications enhancement system shall be in accordance with NFPA 1225 and Sections 510.5.2 through 510.5.5.

~~**510.5.1 Mounting of the donor antenna(s).**~~
~~To maintain proper alignment with the system designed donor site, donor antennas shall be permanently affixed on the building or where *approved*, mounted on a movable sled with a clearly visible sign stating "MOVEMENT OR REPOSITIONING OF THIS ANTENNA IS PROHIBITED WITHOUT APPROVAL FROM THE FIRE CODE OFFICIAL." The antenna installation shall be in accordance with the applicable requirements in the *International Building Code* for weather protection of the building envelope.~~

510.5.2 Approval prior to installation.
Communications enhancement systems capable of operating on frequencies licensed to any public safety *agency* by the FCC or other *frequency licensing authority* shall not be installed without prior coordination and approval of the *fire code official* and *frequency license holder* .

Delete without substitution:

~~**510.5.2.1 Active RF-emitting devices.**~~
~~Active RF-emitting devices shall meet the following requirements in addition to any other requirements determined by the *fire code official* or the *frequency license holder(s)*:~~

1. ~~Active RF-emitting devices that have a transmitted power output sufficient to require certification of the *frequency licensing authority* shall have the certification of the radio *frequency licensing authority* prior to installation.~~
2. ~~All active RF-emitting devices shall be simultaneously compatible for their intended use, as required by the *frequency licensing authority*, the *frequency license holder(s)* and the *fire code official* , at the time of installation.~~
3. ~~Written authorization shall be obtained from the *frequency license holder(s)* prior to the initial activation of any RF-emitting devices required to be certified by the *frequency licensing authority*.~~

Revise as follows:

510.5.3 Minimum qualifications of personnel. The minimum qualifications for technical competency of the system designer, ~~and~~ lead installation, maintenance and testing personnel shall include ~~both of~~ the following:

~~1.~~ ~~A valid FCC-issued general radio operators license.~~

~~2~~1. Certification or licensing of in-building system training issued by an *approved* organization ~~or *approved* school, or a~~

2. A certificate issued by the manufacturer of the equipment being installed.

~~These qualifications shall not be required where demonstration of adequate skills and experience satisfactory to the *fire code official* is provided.~~

Delete without substitution:

~~**510.5.4 Acceptance test procedure.**~~
~~Where an in-building emergency responder communications~~ enhancement ~~system is required, and upon completion of installation, the building *owner* shall have the radio system tested to verify that two-way coverage on each floor of the building is not less than 95 percent. The test procedure shall be conducted as follows~~ or by a method ~~*approved* by the *fire code official*~~ :

1. ~~Each floor of the building shall be divided into a grid of 20 approximately equal test areas.~~
2. ~~The test shall be conducted using a calibrated portable radio of the latest brand and model used by the *agency* talking through the *agency*'s radio communications system or equipment *approved* by the *fire code official*.~~
3. ~~Failure of more than one test area shall result in failure of the test.~~
4. ~~In the event that two of the test areas fail the test, in order to be more statistically accurate, the floor shall be permitted to be divided into 40 equal test areas. Failure of not more than two nonadjacent test areas shall not result in failure of the test. If the system fails the 40-area test, the system shall be altered to meet the 95-percent coverage requirement.~~
5. ~~A test location approximately in the center of each test area shall be selected for the test, with the radio enabled to verify two-way communications to and from the outside of the building through the public *agency*'s radio communications system. Once the test location has been selected, that location shall represent the entire test area. Failure in the selected test location shall be considered to be a failure of that test area. Additional test locations shall not be permitted.~~
6. ~~The gain values of all amplifiers shall be measured and the test measurement results shall be kept on file with the building *owner* so that the measurements can be verified during annual tests. In the event that the measurement results become lost, the building *owner* shall be required to rerun the acceptance test to reestablish the gain values.~~
7. ~~As part of the installation, a spectrum analyzer or other suitable test equipment shall be utilized to ensure spurious oscillations are not being generated by the subject signal booster. This test shall be conducted at the time of installation and at subsequent annual inspections.~~
8. ~~Systems shall be tested using two portable radios simultaneously conducting subjective voice quality checks. One portable radio shall be positioned not greater than 10 feet (3048 mm) from the indoor antenna. The second portable radio shall be positioned at a distance that represents the farthest distance from any indoor antenna. With both portable radios simultaneously keyed up on different frequencies within the same band, subjective audio testing shall be conducted and comply with DAQ levels as specified in Sections 510.4.1.1 and 510.4.1.2.~~

~~**510.5.5 FCC compliance**~~**.**
~~The in-building emergency responder communications~~ enhancement ~~system installation and components shall comply with all applicable federal regulations including, but not limited to, FCC 47 CFR Part 90.219.~~

Revise as follows:

510.6 Testing and Maintenance.
The in-building emergency responder communications enhancement system shall be maintained operational at all times in accordance with this code and~~Sections 510.6.1 through 510.6.4~~NFPA 1225.

510.6.1 System Testing ~~and proof of compliance~~.

The testing of the in-building, emergency responder communication enhancement system shall be in accordance with NFPA 1225.~~*owner* of the building or *owner's* authorized agent shall have the in-building emergency responder communications~~ enhancement ~~system inspected and tested annually or where structural changes occur, including additions or remodels that could materially change the original field performance tests. Testing shall consist of the following:~~

1. ~~In-building coverage test as described in Section 510.5.4.~~
2. ~~Signal boosters shall be tested to verify that the gain is the same as it was upon initial installation and acceptance or set to optimize the performance of the system.~~
3. ~~Backup batteries and power supplies shall be tested under load of a period of 1 hour to verify that they will properly operate during an actual power outage. If within the 1-hour test period the battery exhibits symptoms of failure, the test shall be extended for additional 1-hour periods until the integrity of the battery can be determined.~~
4. ~~All active components shall be checked to verify operation within the manufacturer's specifications.~~

~~At the conclusion of the testing, a report, which shall verify compliance with Section 510.5.4, shall be submitted to the *fire code official* .~~

510.6.2 Additional frequencies.

The building *owner* shall modify or expand the in-building emergency responder communications enhancement system at their expense in the event *frequency* changes are required by the FCC or other radio licensing authority, or additional frequencies are made available by the FCC or other radio licensing authority. Prior approval of an in-building emergency responder communications enhancement system on previous frequencies does not exempt this section.

Delete without substitution:

~~510.6.3 Nonpublic safety system~~.

~~Where other nonpublic safety amplification systems installed in buildings reduce the performance or cause interference with the in-building emergency responder communications~~ enhancement ~~system, the nonpublic safety amplification system shall be corrected or removed.~~

Revise as follows:

~~510.6.4~~ 510.6.3 Field testing. *Agency* personnel shall have the right to enter onto the property at any reasonable time to conduct field testing to verify the required level of radio coverage.

Reason: This proposal is editorial. NFPA 1225, Standard for Emergency Services Communications (Chapter 18 In-Building Emergency Responder Communications Enhancement Systems and Chapter 20 Testing) has been revised and updated to include the appropriate design, installation, inspection, testing and maintenance requirements pertaining to ERCES. With the reference to NFPA 1225, the duplicative technical requirements are no longer needed in the IFC. By referencing NFPA 1225, ERCES will be designed and installed in accordance with the most up to date technical requirements of NFPA 1225. This simple reference to comply with NFPA 1225 eliminates future correlation issues between the IFC and NFPA 1225.

Note: NFPA 1225 (previously NFPA 1221) is a consolidation of several standards. The technical requirements for ERCES are now in Chapter 18 of NFPA 1225.

The requirements that are retained in this Section of the IFC pertain to administrative issues or areas not addressed in NFPA 1225.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The 2022 edition of NFPA 1225 is already referenced for system design and installation. The only new application will be for maintenance. The provisions of NFPA 1225 and Section 510 are very similar so this will only simplify enforcement.

F76-24

F77-24

IFC: 510.1

Proponents: Scott Plumer, Arvada Fire Protection District, Arvada Fire Protection District

2024 International Fire Code

Revise as follows:

510.1 Emergency responder communications enhancement systems in new buildings.
Approved in-building emergency responder communications enhancement system (ERCES) for emergency responders shall be provided in all new buildings. In-building ERCES within the building shall be based on the existing coverage levels of the public safety communications systems utilized by the jurisdiction, measured at the exterior of the building. The ERCES, where required, shall be of a type determined by the *fire code official* and the *frequency license holder(s).* This section shall not require improvement of the existing public safety communications systems.

Exceptions:

1. Where *approved* by the building official and the *fire code official*, a wired communications system in accordance with Section 907.2.13.2 shall be permitted to be installed or maintained instead of an *approved* communications coverage system.
2. Where it is determined by the *fire code official* that the communications coverage system is not needed.
3. In facilities where emergency responder communications coverage is required and such systems, components or equipment required could have a negative impact on the normal operations of that facility, the *fire code official* shall have the authority to accept an automatically activated emergency responder communications coverage system.
4. ~~One-story buildings not exceeding 12,000 square feet (1115 m^2) with no below-ground area(s).~~

Reason: This proposal is to remove exception 4 for one story buildings less than 12,000 square feet with no below ground areas from this section. Buildings less than 12,000 square feet can arguably be more dangerous to emergency responders than larger buildings due to the lack of automatic sprinkler systems. The 12,000 square foot size typically triggers the requirement for an automatic sprinkler system in multiple occupancy types (A-1, A-3, A-4, E, F-1, M, S-1, and S-2). However, the existing code language excepts these smaller, potentially non-sprinklered, buildings from requiring a two-way emergency responder communication system. Depending upon the building construction type/method, building location within the jurisdiction, special occupancy hazards present, and emergency responder staffing/resources, there may be a very legitimate need to have one of these systems in a building that is less than 12,000 square feet. If the fire code official determines that the previously mentioned factors or any unmentioned factors do not apply or will not have an adverse affect on emergency operations, then they are well within their authority to not require a system based on exception 2.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is to remove an exception to a section and does not inherently increase or decrease the cost of construction.

F77-24

F78-24

IFC: SECTION 510, 510.1, 510.1.1 (New), SECTION 202 (New)

Proponents: Alan Perdue, Safer Buildings Coalition, Safer Buildings Coalition (alan.perdue@saferbuildings.org)

2024 International Fire Code

Revise as follows:

SECTION 510 EMERGENCY RESPONDER COMMUNICATIONS COVERAGE~~ENHANCEMENT SYSTEMS~~

510.1 Emergency responder communications ~~enhancement systems~~ coverage in new buildings.
Approved in-building emergency responder communications ~~enhancement system (ERCES)~~ coverage for emergency responders shall be provided in all new buildings. In-building emergency responder coverage ~~ERCES~~ within the building shall be based on the existing coverage levels of the public safety communications systems utilized by the jurisdiction, measured at the exterior of the building. The ERCES, where required, shall be of a type determined by the *fire code official* and the *frequency license holder(s)*. This section shall not require improvement of the existing public safety communications systems.

Exceptions:

1. Where *approved* by the building official and the *fire code official*, a wired communications system in accordance with Section 907.2.13.2 shall be permitted to be installed or maintained instead of an *approved* communications coverage system.
2. Where it is determined by the *fire code official* and the frequency license holder that the communications coverage system is not needed based on existing in-building signal strength, quality, and coverage from the public safety communications system(s) as determined by an approved radio frequency (RF) evaluation..
3. In facilities where emergency responder communications coverage is required and such systems, components or equipment required could have a negative impact on the normal operations of that facility, the *fire code official* shall have the authority to accept an automatically activated emergency responder communications coverage system.
4. One-story buildings not exceeding 12,000 square feet (1115 m^2) with no below-ground area(s).

Add new text as follows:

510.1.1 Radio frequency (RF) evaluation. A radio frequency (RF) evaluation shall be performed to determine if existing (RF) coverage by the *public safety communications system(s)* utilized by the jurisdiction exists within the building to meet the signal coverage, strength and quality requirements of NFPA 1225 prior to requiring the installation and operation of an emergency responder communications enhancement system.

Add new definition as follows:

PUBLIC SAFETY COMMUNICATIONS SYSTEM.
A system that provides communications coverage for use by emergency responders within the jurisdictional area.

Reason: During the 2024 code development cycle the term two-way radio communications coverage system was changed to align with standard industry terminology identify systems that enhance radio frequency (RF) coverage inside buildings as Emergency Responder Communications Enhancement Systems in F32-21. As a result of this global change taking place within Section 510 it inadvertently modified the scope of the section's title and section 510.1 by eliminating the word "coverage" in certain locations. This proposed language for the section title and section 510.1 reinserts the word "coverage" where it is needed to clarify the intent of the issue of when and if an enhancement system is required. It is important to identify and understand that there is RF coverage naturally from the public safety communications system in many buildings as well as buildings where the RF signal is blocked. It is imperative that in-building RF solutions only be installed where they are actually needed. This is a requirement from many frequency licensing authorities due to potential noise and interference to the public safety communications system.

The proposed language within exception #2 is intended to clarify the baseline requirements to be utilized to determine if an emergency responder enhancement system is actually needed or not.

The proposed language within 510.1.1 is intended to address a significant need that has been overlooked during previous code development cycles. As currently written, both the IFC and NFPA ERCES related codes and standards only address the installation of an Emergency Responder Communications Enhancement System (ERCES) and do not provide the necessary direction and requirements to determine if a system is actually needed through a radio frequency (RF) evaluation.

An essential part of determining the need for an emergency responder communications enhancement system (ERCES) is the initial in-building coverage evaluation often referred to as a (RF) survey. The purpose of conducting an initial evaluation is to determine if (RF) from the public safety communication system(s)s utilized by the jurisdiction(s) can penetrate the building to provide sufficient signal strength and quality in addition to the coverage requirements for both general and critical areas without the need for an emergency responder communications enhancement system.

Earlier editions of the standard for ERCES focused on the testing of signal strength only using a measurement of -95DBm. Based on experience, lessons learned and the need for signal quality in addition to signal strength, the testing requirements have evolved. During the evaluation process, it is imperative that signal coverage, strength and signal quality be evaluated for both uplink and downlink communications capabilities. This will include but is not limited to measurements such as delivered audio quality (DAQ), bit error rate (BER) and signal to interference noise ratio (SINR) which provide the quality measurement of the signal.

In many areas, the frequency licensing authority (the Federal Communications Commission in the United States) requires that signal boosters be used in weak signal areas only. In other words, you shall not install and operate an ERCES where it is not actually needed. Therefore, the initial evaluation should be utilized to determine if a building has sufficient signal naturally may need complete or partial enhancement where (RF) is not sufficient to meet the required levels.

It is vital to understand that if there is an insufficient signal level from the public safety communications system outside the building, there is no requirement to install an ERCES within the building. Additionally, there may be multiple public safety communications systems in use by the jurisdiction. To ensure coverage for all emergency responders such as fire, law enforcement, EMS and others, all systems in use by emergency responders should be properly evaluated to ensure adequate signal coverage, strength and quality exist.

Requiring unnecessary ERCES installations will contribute to noise and interference that can impact the health of the entire public safety communications system to the point where it can completely fail leaving emergency responders with no communications within their jurisdiction not just inside the building.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Although the IFC and referenced NFPA 1225 2022 edition are silent on how to conduct an RF evaluation they are already being conducted. This proposal simply clarifies the benchmarks that need to be accomplished to properly determine if an ERCES is actually needed. Performing the evaluation correctly will eliminate the need for some of the ERCES that are currently being required throughout the industry.

F78-24

F79-24

IFC: 502.1, SECTION 202 (New), 105.5.28 (New), 105.6.16 (New), SECTION 511 (New), 511.1 (New), 511.2 (New), 511.3 (New), 511.4 (New), 511.5 (New), 511.6 (New), 511.7 (New)

Proponents: Joseph Kelsey, SAFE HAVEN BABY BOXES INC, self (joe@safehavenbabyboxes.com)

2024 International Fire Code

Revise as follows:

502.1 Definitions. The following terms are defined in Chapter 2:
AGENCY.

FIRE APPARATUS ACCESS ROAD.

FIRE COMMAND CENTER.

FIRE DEPARTMENT MASTER KEY.

FIRE LANE.

INFANT DROP-OFF BOX.

KEY BOX.

TRAFFIC CALMING DEVICES.

Add new definition as follows:

INFANT DROP-OFF BOX. A newborn safety device provided under a jurisdiction's Safe Haven Law allowing a mother in crisis, that is unable to provide infant care may safely, securely, and anonymously surrender their child at an approved location designated as an infant drop-off site.

Add new text as follows:

105.5.28 Infant drop-off box. An operational permit is required for an infant drop-off box regulated by Section 511.

105.6.16 Infant drop-off box. A construction permit is required for the installation of an infant drop-off box. Maintenance performed in accordance with this code is not considered to be a modification and does not require a construction permit

SECTION 511
INFANT DROP-OFF BOXES

511.1 General.. Where installed in new or existing buildings, the *infant drop-off box* shall comply with Sections 511.2 through 511.4

511.2 Permits.. Permits shall be required as set forth in Sections 105.5 and 105.6.

511.3 Installation. Installation shall be approved and in accordance with the manufacturers instructions.

511.4 Location.. The installation location shall be *approved* by the *fire code official*.

511.5 Monitoring. The infant drop-off box shall be continuously monitored. Signals shall be transmitted to an *approved* supervising station or, where *approved* by the *fire code official*, shall sound an audible signal at a monitored device. Fire and EMS Stations shall be able to respond within 5 minutes after being notified by dispatch that a signal has been received.
Monitoring signals shall include the following:

1. Two seconds after the outside door is opened.
2. Sixty seconds after baby is placed inside the infant drop-off box
3. Where power is lost to the infant drop-off box.

511.6 Inspection, testing and maintenance.. The *infant drop-off box* shall be inspected, tested and maintained in accordance with the manufacturer's instructions.

511.7 Climate control. The infant drop-off box shall be climate controlled.

Reason: Many states have enacted "Safe Haven laws" where parents can anonymously and safely leave an infant, they are unable or unwilling to care for, at locations such as fire stations, police stations or hospitals. Infant drop-off boxes (commonly known as baby boxes) are designed to provide a secure and anonymous option for parents in need, ensuring the well-being of infants and adhering to proper procedures. This proposal provides reasonable safety and performance requirements where an infant drop-off box is being installed in new or existing construction. There is no requirement mandating buildings be outfitted with these boxes. That decision remains with the building owner.

As of 2023, there are illegally abandoned infants found in the United States approximately every 3-5 days. These numbers are decreasing in states that have baby boxes. Indiana for example, installed the country's first baby box in 2016. Since then, Indiana has had 0 deadly abandonments with a prior record of 1-3 per year. Out of all 50 states that have their own versions of the Safe Haven Law, 20 have added baby boxes and several more currently have legislation pending.

Cost Impact: Increase

Estimated Immediate Cost Impact:

Immediate/initial cost impact: Installation is not required, but where installed, the cost for the equipment, related building modifications and connection to the electric service and monitoring is estimated to cost between $15,000-$20,000.

Estimated Immediate Cost Impact Justification (methodology and variables):

Immediate/initial cost impact: Depending on the location, the construction & installation along with the potential need for an additional alarm monitoring service the cost can vary. However, due to the public service nature of infant drop-off boxes, there is a possibility that many of these costs can be donated by individuals or local community organizations.

Estimated Life Cycle Cost Impact:

Annual maintenance cost is estimated to not exceed $500/yr.

F79-24

F80-24

IFC: SECTION 603, 603.1, 603.1.1, 603.1.2

Proponents: Jeff O'Neil, Chair, Committee on Healthcare (ahc@iccsafe.org)

2024 International Fire Code

Revise as follows:

SECTION 603
ELECTRICAL EQUIPMENT, WIRING AND HAZARDS

603.1 General.
Electrical equipment, wiring and systems required by this code or the International Building Code shall be installed, used and maintained in accordance with NFPA 70 and Sections 603.2 through 603.9.

603.1.1 Equipment and wiring.
All electrical equipment, wiring, devices and appliances shall be tested; *listed* and *labeled;* and installed, used and maintained in accordance with NFPA 70 and all instructions included as part of such listing.

Revise as follows:

603.1.2 Healthcare facilities.
In Group I-2 facilities, ambulatory care facilities and outpatient clinics, the electrical systems and equipment shall be installed, maintained and tested in accordance with NFPA 99.

Reason: In order to meet federal conditions of participation health care facilities must comply with system and equipment according to the requirements listed in NFPA 99, Health Care Facilities Code (K912). NFPA 99 is a risk-based approach to system design and maintenance of key building systems. It is based upon risk to patients, visitors, or staff in the healthcare facility regardless of occupancy classification. It does cover items such as routine testing of both normal and emergency power, installation directions of circuits in areas as critical areas, testing of electrical systems, defining surgery operating rooms as wet locations unless approved risk assessment determines otherwise. Cover plates on life safety and critical branch receptacles are a distinct color. Requiring tamperproof receptacles in designated pediatric locations. These practices improve safety and reliability of electrical systems in locations at risk.

This proposal is submitted by the ICC Committee on Healthcare (CHC). The CHC was established by the ICC Board to evaluate and assess contemporary code issues relating to healthcare facilities. This is a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation.

This change is a part of a series of changes that assure the IFC, IBC and IEBC align with the requirements of CMS facilities regulations.

Adding reference to NFPA 99 reinforces to local design teams and code officials the need for healthcare facilities electrical systems to conform with both NFPA 99 and NFPA 70. The patients and staff are depending upon a reliable electric system to support delivery of care and their lives may depend upon this. Without having designers, code officials and owners aligned on this expectation, facilities may face compliance challenges from Center for Medicare and Medicaid during inspection.

This proposal is submitted by the ICC Committee for Healthcare (CHC).
The Committee on Healthcare (CHC) was established by the ICC Board of Directors in 2011 to pursue opportunities to study and develop effective and efficient provisions for Hospital, Nursing Homes, Assisted Living and Ambulatory Care Facilities. This committee was formed in cooperation with the American Society for Healthcare Engineering (ASHE). In July of 2017, the ICC Board made CHC a standing committee. In 2023 the CHC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the CHC website at CHC webpage.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is already a requirement for healthcare facilities in the United States, so end result will be no change to construction costs.

F80-24

F81-24

IFC: 603.5.1.1, UL Chapter 80 (New)

Proponents: Jonathan Roberts, UL Solutions, UL Solutions (jonathan.roberts@ul.com)

2024 International Fire Code

Revise as follows:

603.5.1.1 Listing in Group I-2 occupancies and ambulatory care facilities.
In Group I-2 occupancies and ambulatory care facilities, relocatable power taps shall be *listed* and *labeled* in accordance with UL 1363 except under the following conditions:

1. In Group I-2, Condition 2 occupancies, relocatable power taps providing power to patient care-related electrical equipment in the patient care vicinity, as defined by NFPA 99, shall be *listed* and *labeled* in accordance with ~~UL 1363A~~ UL 2930 or be integral to equipment listed and labeled to ~~or~~ UL 60601-1.
2. In Group I-2, Condition 1 facilities, in care recipient rooms using line-operated patient care-related electrical equipment, relocatable power taps in the patient care vicinity, as defined by NFPA 99, shall be *listed* and *labeled* in accordance with ~~UL 1363A~~ UL 2930 or be integral to equipment listed and labeled to ~~or~~ UL 60601-1.
3. In ambulatory care facilities, relocatable power taps providing power to patient care-related electrical equipment in the patient care vicinity, as defined by NFPA 99, shall be *listed* and *labeled* in accordance with~~UL 1363A~~ UL 2930 or be integral to equipment listed and labeled to ~~or~~ UL 60601-1.

Add new standard(s) as follows:

UL

Underwriters Laboratories LLC
333 Pfingsten Road
Northbrook, IL 60062

2930-2023 Cord-and-Plug-Connected Health Care Facility Outlet Assemblies

Staff Analysis: A review of the standard proposed for inclusion in the code, ***Cord-and-Plug-Connected Health Care Facility Outlet Assemblies (UL 2930-2023)***, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: UL 2930 was published in August 2023 and is the appropriate listing standard for Relocatable Power Taps (RPT)s for use in I-2 and ambulatory care facilities. UL 60601-1 does not apply to stand-alone RPTs, but rather complete medical electrical equipment which may incorporate integral power taps. The existing code references UL 1363A which is a component standard for use within listed complete medical electrical equipment. However, UL1363A is not used for listing, and there are not listed and labeled products on the market in accordance with this standard. The product requirements in UL 2930 align with those in these existing reference standards, but are appropriate for listing of stand-alone RPTs for these uses. At least four manufacturers have listing to these requirements.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Clarification to point to correct listing standard. Substantive requirements have not changed from existing references.

F81-24

F82-24

IFC: 604.3.4

Proponents: Kevin Brinkman, NEI, NEII (klbrinkman@neii.org)

2024 International Fire Code

Revise as follows:

604.3.4 Temperature Control. Where standby power is connected to elevators and a temperature control means is provided in accordance with Section 3005.2 of the *International Building Code*, the temperature control means ~~the machine room ventilation or air conditioning~~ shall be connected to the standby power source.

Reason: To correlate the title and requirements with IBC Section 3005.2. The current titles and language are misleading because the real purpose is to provide standby power for the means to control the temperature for proper operation of the elevator equipment. This public comment to modify the proposal correlates with the public comment and proposal for 3003.1.4.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

There is no change in the requirement for standby power, only a clarification to better align with another section in the IBC.

F82-24

F83-24

IFC: 607.6 (New), 607.6, 607.7, 607.6.2 (New), UL Chapter 80 (New)

Proponents: Jonathan Roberts, UL Solutions, UL Solutions (jonathan.roberts@ul.com)

2024 International Fire Code

Add new text as follows:

607.6 Electrically operated cooking oil equipment. Electrically operated equipment for heating, storing, and filtering cooking oil shall be installed in accordance with NFPA 70, the manufacturer's installation instructions, and 607.6.1 and 607.6.2.

Revise as follows:

607.6.1 Electrical cooking oil heating equipment ~~Heating of cooking oil~~.
Electrical equipment used for heating cooking oil in cooking oil storage systems shall be *listed* ~~to~~ and *labeled* in accordance with UL 499 ~~and shall comply with NFPA 70~~. Use of electrical immersion heaters shall be prohibited in nonmetallic tanks.

Delete without substitution:

~~607.7 Electrical equipment~~.
~~Electrical equipment used for the operation of cooking oil storage systems shall comply with NFPA 70.~~

Add new text as follows:

607.6.2 Electrically operated filter systems for cooking oil. Electrically operated filter systems for cooking oil which are not integral to a cooking appliance shall be *listed* and *labeled* in accordance with UL 1889.

Add new standard(s) as follows:

UL

Underwriters Laboratories LLC
333 Pfingsten Road
Northbrook, IL 60062

1889-1996 Commercial Filters for Cooking Oil - with revisions through September 4, 2018

Staff Analysis: A review of the standard proposed for inclusion in the code, ***Commercial Filters for Cooking Oil - with revisions through September 4, 2018 (UL 1889-1996)***, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: Editorial changes to group related requirements for electrically operated cooking oil equipment. This proposal identifies UL 1889 as the correct standard for listing the electrically operated filter systems for this application and also clarifies requirements for non-integral filter systems as is done for integral filter systems which are part of listed cooking appliances. More than 15 manufacturers have active listings to this standard.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The cost for obtaining listed electrically operated equipment for heating, storing, and filtering cooking oil may or may not represent increased product costs over obtaining non-listed equipment that have not been independently investigated to applicable standards for determining product safety and performance.

Obtaining and maintaining a listing for electrically operated equipment for heating, storing, and filtering cooking oil involves both product investigation costs and costs for periodic inspection of production, as required by the definition of "listed". However, the impact of any potential cost increase can be weighed by the code development committee against the user and code official safety benefits derived from requiring listed equipment, as well as the additional benefit of less effort needed to demonstrate or determine compliance.

F84-24

IFC: 608.18.4 (New), 2311.5 (New), 2311.5, UL Chapter 80 (New)

Proponents: Jonathan Roberts, UL Solutions, UL Solutions (jonathan.roberts@ul.com)

2024 International Fire Code

Add new text as follows:

608.18.4 Refrigerant recovery and recycling equipment. Electrically operated equipment used for recovery or recycling of refrigerant of Groups A2, A2L, and A3 shall be *listed* and *labeled* in accordance with UL 1963 and be marked as suitable for use with the refrigerant being recovered or recycled.

2311.5 Refrigerant recovery and recycling equipment. Electrically operated equipment used for recovery or recycling of refrigerant of Groups A2, A2L, and A3 shall be *listed* and *labeled* in accordance with UL 1963 and be marked as suitable for use with the refrigerant being recovered or recycled.

Revise as follows:

~~2311.5~~ 2311.6 **Vehicles powered by liquefied petroleum gas (LP-gas).**
Vehicles powered by LP-gas and the servicing of vehicles powered by LP-gas shall be in compliance with this chapter, Chapter 61 and NFPA 58.

Add new standard(s) as follows:

UL

Underwriters Laboratories LLC
333 Pfingsten Road
Northbrook, IL 60062

1963-2011 Refrigerant Recovery/Recycling Equipment - with revisions through March 25, 2021.

Staff Analysis: A review of the standard proposed for inclusion in the code, ***Refrigerant Recovery/Recycling Equipment - with revisions through March 25, 2021 (UL 1963-2011)***, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: EPA Significant New Alternative Policy Program (SNAP) rules regarding low-GWP refrigerants will essentially require the use of refrigerants with higher flammability safety classifications per ASHRAE 34. The referenced product standard for recovery/recycling equipment has additional requirements to mitigate fire and explosion hazards associated with these refrigerants.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The cost for obtaining listed electrically operated equipment used for recovery or recycling of refrigerant may or may not represent increased product costs over obtaining non-listed products that have not been independently investigated to applicable standards for determining product safety and performance.

Obtaining and maintaining a listing for electrically operated equipment used for recovery or recycling of refrigerant involves both product investigation costs and costs for periodic inspection of production, as required by the definition of “listed”. However, the impact of any potential cost increase can be weighed by the code development committee against the user and code official safety benefits derived from requiring listed equipment, as well as the additional benefit of less effort needed to demonstrate or determine compliance.

F84-24

F85-24

IFC: 609.1

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Fire Code

Revise as follows:

609.1 General.
~~Hyperbaric~~ In all facilities and occupancies, hyperbaric chambers and associated devices shall be installed, inspected, tested and maintained in accordance with NFPA 99.

Reason: This proposal is necessary because there has been an increase in the number of hyperbaric chambers that are being used in occupancies other than Health Care Facilities. This proposal also closes a loophole in the code for those that are using hyperbaric chambers for non-medical uses. With this code change, now the fire code will ensure that all hyperbaric chambers, no matter their location or use, are in compliance with NFPA 99.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: Increase

Estimated Immediate Cost Impact:

$0.00

Estimated Immediate Cost Impact Justification (methodology and variables):

There is no actual cost impact because all hyperbaric chambers were intended to meet the requirements of NFPA 99 though the code was not clear with use of the term facilities and not referring to the hyberbaric chambers themselves. This code change closes a loophole.

F85-24

F86-24

IFC: SECTION 611 (New), 611.1 (New), 611.1.1 (New), 611.2 (New), 611.3 (New)

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Fire Code

Add new text as follows:

SECTION 611
ELECTRIC VEHICLE CHARGING STATIONS

611.1 Disconnects. Locations containing electric vehicle charging stations shall be provided with a clearly identified and readily accessible emergency disconnect installed in an approved location.

611.1.1 Alternative Disconnects. Where approved, a disconnect provided to comply with NFPA 70 can be utilized to meet the disconnect requirement when it is clearly identified, and the location is accessible to the fire department.

611.2 Height. Where provided, the height of the emergency disconnect shall be not less than 42 inches (1067 mm) and not more than 48 inches (1372 mm) measured vertically, from the floor level to the activating device. The disconnect shall be distinctly labeled EMERGENCY ELECTRIC VEHICLE CHARGER DISCONNECT.

611.3 Fire Extinguishers. Approved portable fire extinguishers complying with Section 906 with a minimum rating of 2-A:20-B:C shall be provided and located such that an extinguisher is not more than 75 feet (23 860 mm) from electric vehicle charging stations.

Reason: Electric vehicle charging stations are becoming more prominent as electric vehicles gain popularity. The fire service needs a safe means to disconnect these charging stations from their power supply to be able to safely extinguish a fire involving the charging stations and/or the vehicle being charged. This new code sections provides accessible emergency disconnects to safely shut power off to the charging stations. The new code section allows for alternative disconnect that is in compliance with NFPA 70 plus code language for the height of the disconnect, signage and fire extinguishers.

Cost Impact: Increase

Estimated Immediate Cost Impact:

Research was conducted and the typical immediate cost increase for each installation would be less than $50.

Estimated Immediate Cost Impact Justification (methodology and variables):

The cost impact is very small as most installation already have a means to disconnect the power from the EV Charger. A small increase may be necessary in terms on additional conduit and wire if the disconnect needs to be installed in a location the is accessible for the fire service and away from the charger. Research was conducted and the cost increase for each installation would be less than $50.

F86-24

F87-24

IFC: 701.2

Proponents: Mark S. Graham, National Roofing Contractors Association (NRCA) (mgraham@nrca.net)

2024 International Fire Code

Revise as follows:

701.2 Fire-resistance-rated construction.
The *fire-resistance rating* of the following *fire-resistance-rated* construction shall be maintained:

1. Structural members.
2. *Exterior walls*.
3. Roof coverings
4. ~~3.~~4. *Fire walls , fire barriers , fire partitions*.
5. ~~4.~~5. *Horizontal assemblies*.
6. ~~5.~~6. Shaft enclosures.

Reason: This code change proposal is intended to clarify the code's intent by specifically identifying roof coverings as rated construction who's rating needs be maintained, inventoried and annually visually inspected per Section 701.

It can be interpreted roof coverings are already included in Item 4. *Horizontal assembles,* as this term includes "...roof assembly of materials..." in it's definition. Adding roof covering in Section 701.2 makes it plainly clearly roof coverings, whether low-slope (horizontal) or steep-slope, are required to be maintained in Section 701 as constructed according to IBC Section 1505-Fire Classification and IRC Section-R902-Fire Classification.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This code change proposal adds clarity to the code and does not increase or decrease the code's stringency. See reason statement.

F87-24

F88-24

IFC: 705.2.4

Proponents: Kevin Scott, KH Scott & Associates LLC, self (khscottassoc@gmail.com)

2024 International Fire Code

Revise as follows:

705.2.4 Door operation. Swinging *fire doors* shall close from ~~the full-open~~a door-open position of 90 degrees (1.57 rad) and latch automatically.

Reason: There is a conflict in the requirements for swinging fire doors specific to the functionality of the door closing hardware.

- The IBC §716.1 and IFC §705.2 require opening protectives to comply with NFPA 80. This includes fire doors and door-closing devices on fire doors.
- IFC §405.2 requires inspection and testing of fire doors.
- IFC §705.2.4 requires fire doors to close and latch from the **full open** position.
- NFPA 80 §5.3.5.2 states that swinging doors with fire door hardware must close from the **full open** position.
- NFPA 80 §5.3.6.2 states that swinging doors with fire door hardware must close from the **any open** position.
- NFPA 80 Chapter 7, which is specific to swinging doors with fire door hardware requires fire doors to close from **any open** position.

This proposal intends to clarify the actual requirement for initial acceptance and periodic inspection and testing. There are contradictory requirements, and as a result a multitude of interpretations and applications of the requirement.

Even if a door swings to 180 degrees, when an occupant uses that door to exit, they will not routinely open it the full 180-degree swing—more likely a 90-degree swing is what will happen. Chapter 10 requires measurement of the clear width of egress opening at 90 degrees.

Where NFPA 80 states the door must close from any open position, does that mean full open, 90 degrees open, or 1 degree open? I would be surprised to see door closers close and latch from a 1 degree position, but I would expect from 90 degrees or more.

So, if we consider “full open” to be 90 degrees or more, we can the test at 90 degrees as the worst case for that range. Testing fire doors in an existing building from a 90-degree position seems to be the logical solution.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This will not change the cost of construction. This proposal clarifies the method of inspection to ensure proper operation of the door through its life span.

F88-24

F89-24

IFC: SECTION 708, 708.1

Proponents: Bill McHugh, CM Services, National Fireproofing Contractors Association (bill@mc-hugh.us)

2024 International Fire Code

Revise as follows:

SECTION 708
SPRAY FIRE-RESISTIVE ~~FIRE-RESISTANT~~ MATERIALS
AND INTUMESCENT FIRE-RESISTIVE ~~FIRE-RESISTANT~~ MATERIALS

708.1 Maintaining protection.
Where required when the building was originally permitted and constructed, spray ~~fire-resistant~~ fire-resistive materials and intumescent ~~fire-resistant~~ fire-resistive materials shall be visually inspected to verify that the materials do not exhibit exposure to the substrate.

Reason: From the 2021 to the 2024 version of the IBC, the terms were changed to Spray Fire-Resistive Materials and Intumescent Fire-Resistive Materials. To be consistent with the 2024 International Building Code, the terms need to change in the 2027 International Fire Code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Changing titles and terms in this case does not increase or decrease the cost of construction.

F89-24

F90-24

IFC: 708.1, 708.2 (New)

Proponents: Bill McHugh, CM Services, National Fireproofing Contractors Association (bill@mc-hugh.us)

2024 International Fire Code

708.1 Maintaining protection.
Where required when the building was originally permitted and constructed, spray fire-resistant materials and intumescent fire-resistant materials shall be visually inspected to verify that the materials do not exhibit exposure to the substrate.

Add new text as follows:

<u>708.2</u> <u>Repair of Spray Fire-Resistant Materials and Intumescent FIre-Resistant Materials</u>. <u>Where damaged, materials used to protect columns, beams and horizontal assemblies shall be repaired, replaced or restored in accordance with the listing, the manufacturer's repair instructions and with the same materials and thicknesses used in the *listing*. Where the *listing* is not known, repairs shall be made with the same material type and thickness that exists.</u>

Reason: In the 2024 IFC it is that SFRM and IFRM Fireproofing need to be visually inspected. This proposal completes the action by adding a repair section. Because fireproofing is installed in accordance with a fire-resistance listing and manufacturers instructions, it needs to be repaired with a listed repair system. When the listing is not known, guidance is provided to repair with the same type of material an the same thickness. Too many times we see thick fireproofing repaired with skim coats over fireproofing void and not the same thickness as exists on the rest of the beam, column or assembly. It is critical the repair method have the appropriate material, material type and where possible, match new construction listing to provide continues fire-resistance protection.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The reason this proposal has no impact is that this proposal reflects what actually should happen. Anything less is a fire and life safety risk.

F90-24

F91-24

IFC: SECTION 708, 708.1

Proponents: Bill McHugh, CM Services, National Fireproofing Contractors Association (bill@mc-hugh.us)

2024 International Fire Code

Revise as follows:

SECTION 708
SPRAY FIRE-RESISTANT MATERIALS~~, AND~~ INTUMESCENT FIRE-RESISTANT MATERIALS <u>AND OTHER MATERIALS</u>

708.1 Maintaining protection.
Where required when the building was originally permitted and constructed, spray fire-resistant materials<u>,</u>~~, and~~ intumescent fire-resistant materials<u>and other materials used to provide fire-resistance protection,</u> shall be visually inspected to verify that the materials do not exhibit exposure to the substrate.

Reason: The reason for this proposal is to update 708.1 to be consistent with the types of materials used to provide fire-resistance protection to structural building elements and assemblies. In addition to spray fire-resistive materials and intumescent fire-resistive materials, boards and wraps are used as well. Boards could be mineral wool boards, ceramic fiber boards, gypsum panels, calcium silicate board, metal composite boards, lath and plaster. Wraps are insulation type materials, endothermic wraps, etc.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The International Fire Code requires annual visual inspection of fire-resistance in buildings. This code proposal is to clarify that all types of materials used to provide fire-resistance-rated protection to structural building elements need to have protection maintained during the life cycle of the building.

F91-24

F92-24

IFC: 803.3

Proponents: Marcelo Hirschler, GBH International, GBH International (mmh@gbhint.com)

2024 International Fire Code

Revise as follows:

803.3 Interior finish requirements based on occupancy.
Interior wall and ceiling finish shall have a flame spread index not greater than that specified in Table 803.3 for the group and location designated. Interior wall and ceiling finish materials tested in accordance with NFPA 286, and meeting the acceptance criteria of Section 803.1.1.1, shall be permitted to be used where a Class A, Class B, or Class C classification in accordance with ASTM E84 or UL 723 is required.

Reason: Since a Class A requirement is more severe than a Class B or a Class C requirement, based on testing to ASTM E84, it should be evident that if a material is acceptable as a Class A, it would also automatically be acceptable as a Class B or Class C. However, sometimes aspects that are evident are not accepted if they are not explicitly stated. In this case, the code commentary also states what this proposal recommends, but explicit mention in the code would be useful.

The other change (from "shall be used" to "shall be permitted to be used") is a clarification and makes it consistent with the intent and with the IBC. Clearly the IFC is not mandating that only materials tested to NFPA 286 shall be used but that materials that comply with the criteria based on NFPA 286 are acceptable.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is simply clarification. It is clear that a material that meets a Class A can also meet a Class B or a Class C.

F92-24

F93-24

IFC: 807.4, 807.4.1, 807.4.1.1 (New)

Proponents: Marcelo Hirschler, GBH International, GBH International (mmh@gbhint.com)

2024 International Fire Code

807.4 Artificial decorative vegetation.
Artificial decorative vegetation shall comply with this section and the requirements of Sections 806.2 and 806.3. Natural decorative vegetation shall comply with Section 806.

Exception: Testing of artificial vegetation is not required in Group I-1; Group I-2, Condition 1; Group R-2; Group R-3; or Group R-4 occupancies equipped throughout with an *approved automatic sprinkler system* installed in accordance with Section 903.3.1, where such artificial vegetation complies with the following:

1. Wreaths and other decorative items on doors shall not obstruct the door operation and shall not exceed 50 percent of the surface area of the door.
2. Decorative artificial vegetation shall be limited to not more than 30 percent of the wall area to which it is attached.
3. Decorative artificial vegetation not on doors or walls shall not exceed 3 feet (914 mm) in any dimension.

Revise as follows:

807.4.1 Flammability.
~~Artificial~~ The flammability of artificial decorative vegetation shall be assessed in accordance with one of the following:
~~meet the flame propagation performance criteria of~~

1. Where tested in accordance with NFPA 701 using Test Method 1 or Test Method 2, as appropriate~~, of NFPA 701~~ the artificial decorative vegetation shall meet the flame propagation performance criteria. ~~Meeting such criteria shall be documented and certified by the manufacturer in an approved manner~~
2. ~~Alternatively, the artificial decorative vegetation shall be~~ Where tested in accordance with NFPA 289~~,~~ using the 20 kW ignition source, ~~and~~ the artificial decorative vegetation shall have a maximum heat release rate of 100 kW.

Add new text as follows:

807.4.1.1 Documentation. The test report and compliance with acceptance thresholds shall be documented and certified by the manufacturer in an approved manner.

Reason: Editorial rewrite for clarification. No change in requirements.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

No change in requirements.

F93-24

F94-24

IFC: 807.4, 807.4.1

Proponents: Kevin Scott, KH Scott & Associates LLC, self (khscottassoc@gmail.com)

2024 International Fire Code

Revise as follows:

807.4 Artificial decorative vegetation.
Artificial decorative vegetation in other than Group U occupancies shall comply with this section and the requirements of Sections 806.2 and 806.3. Natural decorative vegetation shall comply with Section 806.

~~**Exception:** Testing of artificial vegetation is not required in Group I-1; Group I-2, Condition 1; Group R-2; Group R-3; or Group R-4 occupancies equipped throughout with an *approved automatic sprinkler system* installed in accordance with Section 903.3.1, where such artificial vegetation complies with the following:~~

1. ~~Wreaths and other decorative items on doors shall not obstruct the door operation and shall not exceed 50 percent of the surface area of the door.~~
2. ~~Decorative artificial vegetation shall be limited to not more than 30 percent of the wall area to which it is attached.~~
3. ~~Decorative artificial vegetation not on doors or walls shall not exceed 3 feet (914 mm) in any dimension.~~

807.4.1 Flammability.
~~Artificial~~The flammability of artificial decorative vegetation shall be tested and meet one of with the following:

1. ~~the flame propagation performance criteria of~~Where tested in accordance with NFPA 701 using Test Method 1 or Test Method 2, as appropriate, ~~of NFPA 701~~the artificial decorative vegetation shall meet the flame propagation performance criteria. ~~Meeting such criteria shall be documented and certified by the manufacturer in an *approved* manner.~~
2. ~~Alternatively, the artificial decorative vegetation shall be~~Where tested in accordance with NFPA 289~~,~~ using the 20 kW ignition source, ~~and~~the artificial decorative vegetation shall have a maximum heat release rate of 100 kW.

The test report showing compliance with acceptance thresholds shall be documented and certified by the manufacturer.

Exception: In Group I-1; I-2, Condition 1; R-2; R-3; and R-4 occupancies flammability testing is not required in buildings equipped throughout with an approved automatic sprinkler system installed in accordance with Section 903.3.1, where the artificial decorative vegetation complies with the following:

1. Wreaths and other artificial decorative vegetation on doors shall not obstruct the door operation and shall not exceed 50 percent of the surface area of the door.
2. Artificial decorative vegetation shall be limited to not more than 30 percent of the wall area to which it is attached.
3. Artificial decorative vegetation not on doors or walls shall not exceed 3 feet (914 mm) in any dimension.

Reason: Section 807.4 states all decorative vegetation must comply with the requirements. Section 807.4.1 requires flammability testing, but the exception to flammability testing is in Section 807.4. This proposal intends to relocate the exception to flammability testing to the appropriate section and reformat the flammability testing requirements.

This proposal accomplishes the following:

1. Section 807.4 is revised by indicating the provisions do not apply to Group U occupancies, and deleting the exception. The exception is relocated to Section 807.4.1, which is where the flammability testing is required.
2. Section 807.4.1 is reformatted to clarify that either the NFPA 701 test or the NFPA 289 test in providing evidence of acceptability.
3. The allowance for the manufacturer to certify compliance is relocated so that it applies to both testing procedures rather than only NFPA 701.

This proposal reformats the sections and clarifies the application of the exception.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal editorially relocates requirements to a clearer format. The only possible change in construction costs would be for Group U occupancies which would not need to comply.

F94-24

F95-24

IFC: 901.6 (New), 901.6.1, 901.6, 901.6.3 (New), 901.6.2, 901.6.2.1, 901.6.2.2, 901.6.3, 901.6.3.1

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Fire Code

Add new text as follows:

901.6 Inspection, testing and maintenance. Fire protection and life-safety systems shall be inspected, tested and maintained in accordance with Sections 901.6.1 through 901.6.5

901.6.1 Standards.
Fire protection systems shall be inspected, tested and maintained in accordance with the referenced standards *listed* in Table 901.6.1.

Revise as follows:

~~901.6~~ 901.6.2 Operative Condition Required ~~Inspection, Testing and Maintenance~~.
Fire protection and *life safety systems* shall be maintained in an operative condition at all times, and shall be replaced or repaired where defective. ~~Nonrequired *fire protection* and *life safety systems* and equipment shall be inspected, tested and maintained or removed in accordance with Section 901.8.~~

Add new text as follows:

901.6.3 Non-required systems.
Nonrequired *fire protection* and *life safety systems* and equipment shall be inspected, tested and maintained or removed in accordance with Section 901.8.

Revise as follows:

~~901.6.2~~ 901.6.4 Integrated testing.
Where two or more *fire protection* or *life safety systems* are interconnected, the intended response of subordinate *fire protection* and *life safety systems* shall be verified when required testing of the initiating system is conducted. In addition, integrated testing shall be performed in accordance with Sections 901.6.4.1 ~~901.6.2.1~~ and 901.6.4.2 ~~901.6.2.2~~.

~~901.6.2.1~~ 901.6.4.1 High-rise buildings.
For high-rise buildings, integrated testing shall comply with NFPA 4, with an integrated test performed prior to issuance of the certificate of occupancy and at intervals not exceeding 10 years, unless otherwise specified by an integrated system test plan prepared in accordance with NFPA 4. If an equipment failure is detected during integrated testing, a repeat of the integrated test shall not be required, except as necessary to verify operation of fire protection or life safety functions that are initiated by equipment that was repaired or replaced.

~~901.6.2.2~~ 901.6.4.2 Smoke control systems.
Where a *fire alarm system* is integrated with a smoke control system as outlined in Section 909, integrated testing shall comply with NFPA 4, with an integrated test performed prior to issuance of the certificate of occupancy and at intervals not exceeding 10 years, unless otherwise specified by an integrated system test plan prepared in accordance with NFPA 4. If an equipment failure is detected during integrated testing, a repeat of the integrated test shall not be required, except as necessary to verify operation of fire protection or life safety functions that are initiated by equipment that was repaired or replaced.

~~901.6.3~~ 901.6.5 Records. Records of all system inspections, tests and maintenance shall be maintained in accordance with Section 110.3.

~~901.6.3.1~~ 901.6.5.1 **Records information.** Initial records shall include the name of the installation contractor, type of components installed, manufacturer of the components, location and number of components installed per floor. Records shall include the manufacturers' operation and maintenance instruction manuals. Such records shall be maintained for the life of the installation.

Reason: Section 901.6 currently lacks a scoping statement, which makes it appear that provisions following the current 901.6.1 only apply to existing systems. The added scoping statement clarifies that each subsection of 901.6 stands on its own vs. the appearance of being constrained to existing systems. The provisions for non-required systems have been split into a separate subsection to increase visibility of this important provision.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

Editorial clarification.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Only adding a scoping section for existing provisions.

F95-24

F96-24

IFC: 901.6.1.1 (New)

Proponents: Jeffrey M Hugo, CBO, NFSA, National Fire Sprinkler Association (hugo@nfsa.org)

2024 International Fire Code

Add new text as follows:

901.6.1.1 Fire sprinklers. Where fire sprinklers have been installed for 80 or more years, the fire sprinklers shall be replaced with new *listed* fire sprinklers appropriate for the occupancy classification. In Group S occupancies, fire sprinklers installed for 80 or more years protecting *high-piled storage areas* shall be replaced with new *listed* fire sprinklers of the same orientation and orifice size. New fire sprinkler installation and modifications shall be in accordance with the standards in Section 903.3.1.

Exceptions:

1. Fire sprinklers in concealed and inaccessible spaces are permitted to remain in service when inspected, tested, and maintained in accordance with 901.6.
2. The fire code official is permitted to extend the schedule of replacement sprinklers in accordance with Section 104.2.4.1.

Reason: This change would remove many fire sprinklers 80 years or older and replace with new sprinklers appropriate for the hazard occupancy or commodity classification.

Modern sprinklers have evolved significantly in the past 80 years. Today, sprinklers have more operating temperature categories, more deflector styles, larger and smaller orifices or K-factors, better water distribution, and different operating elements, such as, fast (quick and residential) response sprinklers. Sprinklers today have evolved and are designed to meet today's fire loading and represent significant improvement to sprinklers installed 80 years ago. Furthermore, today's sprinklers have the manufacturers installation bulletin (cut sheets) available for installation and special rules, whereas this is missing for many older sprinklers. These rules are easily found when the SIN (sprinkler identification number, required on all new sprinklers since Dec. 31, 2000) is entered into a search engine.

The referenced edition (2023) of NFPA 25 (per IFC Section 901.6), *the Standard for Inspection, Testing, and Maintenance of Water-based Fire Protection Systems* (Section 5.3.1.1.1.4) requires sprinklers manufactured after 1920 and in-service for 75 or more years, the option to either replace all sprinklers or send a representative sample (1 % or a minimum of four of each type) and then retest every five years. This proposal would allow sprinklers being installed for 75 years when tested and passed, an additional 5-years. This change would establish 80 years as the maximum age of many installed sprinklers and supersede the NFPA 25 1920 criteria by only allowing one 5-year extension past the 75-year test with an exception to concealed and inaccessible sprinklers. Currently, NFPA 25 does have 1920 as the maximum age before replacement, allowing 104-year-old sprinklers (in 2024) in buildings, however this may change in the current development of the 2026 edition of NFPA 25.

This first sentence provides the existing building the opportunity to update with sprinklers protection to the current occupancy classification. For example, standard response sprinklers have not been allowed in light hazard occupancies since the 1996 edition of NFPA 13. Since 1996 (or earlier, the legacy codes, UBC and SBCCI, first required in 1991 editions), dwelling units and sleeping units (considered light hazard per NFPA 13) are protected with quick response or residential sprinklers with lower or faster activation times that correlate to a measurement called Response Thermal Index or RTI (Section 3.3.215.2 and A.3.3.215.2 in the 2022 edition of NFPA 13) than standard response sprinklers. The RTI of quick response and residential sprinklers have a RTI from 0 – 50 whereas standard response sprinklers have a longer operating time in the RTI range of 80 to 350. The higher the RTI, the longer it takes the thermal element in the sprinkler to operate. Standard response sprinklers manufactured from 1926 to 1948 have a RTI retesting failure rate of 6.3%.

The thermal operating elements in quick response and residential sprinklers operate faster and provide better life safety to the occupants, while protecting the property. The National Fire Sprinkler Association (NFSA) tested several older standard response sprinklers (with bulb and links) removed from existing I and R occupancies that resulted in a RTI range of 186 -276. This RTI range has an average of 223, which passes the test for the current standard response sprinklers, however, they are well above the maximum of 50 for fast response sprinklers installed today in dwelling and sleeping units. To put it differently, the NFPA 13, NFPA 13R, and NFPA 13D standards requires sprinklers in dwelling units to have fast response (quick or residential) sprinklers with an RTI from 0 – 50. When sprinklers in these buildings are at 80 years, then new sprinklers would correlate to the occupancy hazard, meaning, quick response sprinklers for light hazard or residential sprinklers protecting dwelling or sleeping units.

The second sentence addresses Group S (Storage). Sprinkler technology for storage has evolved significantly in the past 30 years. Today, NFPA 13 has high-piled storage protection criteria for Control Mode Density Area (CMDA), Control Mode Specific Application (CMSA) and Early Suppression Fast Response (ESFR) sprinklers. NFPA 13 does not allow k-5.6 or k-8.0 sprinklers for new storage protection and requires a minimum of K-11.2 or larger sprinklers in the design. It is not the intent of this proposal to address changes or evaluate commodity classifications, that is required either by the 2023 NFPA 25 Sections 4.1.6, 4.1.7 or the 2024 IFC Section 3205.1. This proposal would allow the existing aged sprinklers to be replaced with new sprinklers with the same orientation (pendent or sidewall) and equivalent orifice sizes permitting either K-5.6 or k-8.0 to remain.

The first exception permits sprinklers installed in inaccessible and concealed spaces to remain in service. This exception would prevent the removal of walls or ceilings in existing buildings to access sprinklers. NFPA 25 does not require these sprinklers to be inspected or tested either, however, their inaccessibility should be noted in the inspection reports required by IFC 901.6 and NFPA 25.

The second exception would allow the fire code official to permit, on a case-by-case basis, an extension to the 80-year timeframe per IFC Section 104.2.4. This section permits modifications to the fire code for individual cases:

> 104.2.4.1 Individual cases. The fire code official shall have the authority to grant modifications for individual cases, provided that the fire code official shall first find that special individual reason makes the strict letter of this code impractical and the modification is in compliance with the intent and purpose of this code and that such modification does not lessen health, life and fire safety requirements. The details of action granting modifications shall be recorded and entered in the files of the code compliance agency.

Cost Impact: Increase

Estimated Immediate Cost Impact:

Replacement of fire sprinklers at 80 years:

- One hour, union labor, at a residential rate average of $35/hr.
- Total range of cost of $79 - $106 per replaced sprinkler.
- Estimate range for typical 500 sprinkler replacement of a 112,500 sq ft project: $39,500.00 - $53,000

Testing 75 yr old sprinklers and retesting every five years (per NFPA 25 remove 1% or at least 4 per type of sprinkler, send to test lab)

- Test fees: $55 per sprinkler x at least 4: $220
- Four replacement sprinklers: $48 - $80+
- Labor to remove, replace, send for testing, return to in-service: $1,120.
- Estimate range for four sprinklers removed, tested, and return to service: $1,388-$1,988+

Estimated Immediate Cost Impact Justification (methodology and variables):

Analogous methodology using actual current cost estimates and data from RS Means to create a range of cost. This proposal does increase the cost of an existing building with sprinklers but in the long run it saves on testing and maintenance.

F96-24

F97-24

IFC: 903.2.1.6; IBC: [F] 406.5.8 (New), [F] 903.2.1.6, 3104.5.2

Proponents: Jeffrey M Hugo, CBO, NFSA, National Fire Sprinkler Association (hugo@nfsa.org)

2024 International Fire Code

Revise as follows:

903.2.1.6 Assembly occupancies on roofs.
Where an occupied roof has an assembly occupancy with an *occupant load* exceeding 100 for Group A-2 and 300 for other Group A occupancies, all floors between the occupied roof and the *level of exit discharge* shall be equipped with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2.

Exception: Open parking garages of Type I or Type II construction unless required by Section 903.2.10.

2024 International Building Code

Add new text as follows:

[F] 406.5.8 Automatic sprinkler system. An *open parking garage* shall be equipped with an *automatic sprinkler* system as required by Section 903.2.10.

Revise as follows:

[F] 903.2.1.6 Assembly occupancies on roofs.
Where an occupied roof has an assembly occupancy with an *occupant load* exceeding 100 for Group A-2 and 300 for other Group A occupancies, all floors between the occupied roof and the *level of exit discharge* shall be equipped with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2.

Exception: *Open parking garages* of Type I or Type II construction, unless required by Section 903.2.10.

3104.5.2 Alternative separation.
The wall separating the *pedestrian walkway* and the *building* shall comply with Section 3104.5.2.1 or 3104.5.2.2 where:

1. The distance between the connected *buildings* is more than 10 feet (3048 mm).
2. The *pedestrian walkway* and connected *buildings* are equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1, and the roof of the walkway is not more than 55 feet (16 764 mm) above grade connecting to the fifth, or lower, *story above grade plane*, of each *building*.

Exception: *Open parking garages* need not be equipped with an *automatic sprinkler system*, unless required by Section 903.2.10.

Reason: This proposal applies the current requirements for automatic sprinkler systems for open parking garages in several sections. The 2021 IBC, Section 903.2.10 requires open parking garages over 48,000 sf fire area or over 55 feet (903.2.11.3) in height to have an automatic sprinkler system.

[F] 406.5.8: This subchapter already points to Section 905 for standpipes. This adds a new section to point to the sprinkler requirements in 903.2.10.

[F]903.2.1.6: As currently written, it appears to exempt sprinklers from open parking of Type I or II construction. This change points to the sprinkler threshold in 903.2.10.

3104.5.2: This updates the IBC on pedestrian walkways when connected to open parking, sprinklered or not. It points to 903.2.10 for sprinkler requirements when over the thresholds.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The 2021 IBC, Section 903.2.10 requires open parking garages over 48,000 sf fire area or over 55 feet (903.2.11.3) in height to have an automatic sprinkler system. This change correlates the automatic sprinkler system, when required, to other open parking structures in the IBC and IFC.

F97-24

F98-24

IFC: 903.2.3; IBC: [F] 903.2.3

Proponents: Kevin Scott, KH Scott & Associates LLC, self (khscottassoc@gmail.com)

2024 International Fire Code

Revise as follows:

903.2.3 Group E.
An *automatic sprinkler system* shall be provided ~~for~~throughout the fire area containing a Group E ~~occupancies as follows~~occupancy where any of the following conditions exist:

1. ~~Throughout all~~The Group E *fire area~~s~~* is greater than 12,000 square feet (1115 m^2) in area.
2. The Group E *fire area* is located on a floor other than a *level of exit discharge* serving such occupancies.

   Exception: In buildings where every classroom has not fewer than one exterior exit door at ground level, an *automatic sprinkler system* is not required in any area below the lowest *level of exit discharge* serving that area.

3. The Group E *fire area* has an *occupant load* of 300 or more.

2024 International Building Code

Revise as follows:

[F] 903.2.3 Group E.
An *automatic sprinkler system* shall be provided ~~for~~throughout the fire area containing a Group E ~~occupancies as follows~~occupancy where any of the following conditions exist:

1. ~~Throughout all~~The Group E *fire ~~areas~~area* is greater than 12,000 square feet (1115 m^2) in area.
2. The Group E *fire area* is located on a floor other than a *level of exit discharge* serving such occupancies.

   Exception: In *buildings* where every classroom has not fewer than one exterior *exit* door at ground level, an *automatic sprinkler system* is not required in any area below the lowest *level of exit discharge* serving that area.

3. The Group E *fire area* has an *occupant load* of 300 or more.

Reason: This proposal is entirely editorial. Section 903.2.3 is written in a different format than the 10 other sections in 903.2 which all require an automatic sprinkler system. This proposal simply formats this section to match the other sections in the code. Without this reformat it leads the code user to look for an underlying reason why it is written differently—and there is no reason.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is editorial and for clarification. See reason statement.

F98-24

F99-24

IFC: 903.2.4, 903.2.4.4 (New), 907.2, 907.2.24 (New); IBC: [F] 903.2.4, [F] 903.2.4.4 (New), [F] 907.2, [F] 907.2.24 (New)

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Robert J Davidson, Davidson Code Concepts LLC, Self (rjd@davidsoncodeconcepts.com)

2024 International Fire Code

903.2.4 Group F-1.
An *automatic sprinkler system* shall be provided throughout all buildings containing a Group F-1 occupancy where one of the following conditions exists:

1. A Group F-1 *fire area* exceeds 12,000 square feet (1115 m^2).
2. A Group F-1 *fire area* is located more than three stories above *grade plane*.
3. The combined area of all Group F-1 *fire areas* on all floors, including any mezzanines, exceeds 24,000 square feet (2230 m^2).
4. A Group F-1 occupancy is used to manufacture lithium-ion or lithium metal batteries.
5. A Group F-1 occupancy is used to manufacture vehicles, energy storage systems or equipment containing lithium-ion or lithium metal batteries where the batteries are installed as part of the manufacturing process.

Add new text as follows:

903.2.4.4 Combustible waste sorting and transfer. An automatic sprinkler system shall be provided throughout F-1 occupancy fire areas that contain combustible waste sorting and transfer operations in excess of 5,000 square feet (464.5 m^2) in area.

907.2 Where required—new buildings and structures.
An *approved fire alarm system* installed in accordance with the provisions of this code and NFPA 72 shall be provided in new buildings and structures in accordance with Sections 907.2.1 through 907.2.23 and provide occupant notification in accordance with Section 907.5, unless other requirements are provided by another section of this code.
Not fewer than one manual fire alarm box shall be provided in an *approved* location to initiate a fire alarm signal for fire alarm systems employing automatic fire detectors or waterflow detection devices. Where other sections of this code allow elimination of fire alarm boxes due to sprinklers, a single fire alarm box shall be installed.

Exceptions:

1. The manual fire alarm box is not required for fire alarm systems dedicated to elevator recall control and supervisory service.
2. The manual fire alarm box is not required for Group R-2 occupancies unless required by the *fire code official* to provide a means for fire watch personnel to initiate an alarm during a sprinkler system impairment event. Where provided, the manual fire alarm box shall not be located in an area that is open to the public.

Add new text as follows:

907.2.24 Combustible waste sorting and transfer. . A radiant-energy fire detection system or a thermal imaging fire detection system shall be provided throughout F-1 occupancy fire areas that contain combustible waste sorting and transfer operations in excess of 5,000 square feet (464.5 m2) in area.

2024 International Building Code

[F] 903.2.4 Group F-1.
An *automatic sprinkler system* shall be provided throughout all *buildings* containing a Group F-1 occupancy where one of the following conditions exists:

1. A Group F-1 *fire area* exceeds 12,000 square feet (1115 m^2).

2. A Group F-1 *fire area* is located more than three stories above *grade plane*.
3. The combined area of all Group F-1 *fire areas* on all floors, including any *mezzanines*, exceeds 24,000 square feet (2230 m^2).
4. A Group F-1 occupancy is used to manufacture lithium-ion or lithium metal batteries.
5. A Group F-1 occupancy is used to manufacture vehicles, energy storage systems or equipment containing lithium-ion or lithium metal batteries where the batteries are installed as part of the manufacturing process.

Add new text as follows:

[F] 903.2.4.4 Combustible waste sorting and transfer.. An automatic sprinkler system shall be provided throughout F-1 occupancy fire areas that contain combustible waste sorting and transfer operations in excess of 5,000 square feet (464.5 m^2) in area.

[F] 907.2 Where required—new buildings and structures.
An *approved fire alarm system* installed in accordance with the provisions of this code and NFPA 72 shall be provided in new *buildings* and *structures* in accordance with Sections 907.2.1 through 907.2.23 and provide occupant notification in accordance with Section 907.5, unless other requirements are provided by another section of this code.
Not fewer than one *manual fire alarm box* shall be provided in an *approved* location to initiate a fire *alarm signal* for *fire alarm systems* employing *automatic fire detectors* or waterflow detection devices. Where other sections of this code allow elimination of fire alarm boxes due to sprinklers, a single fire alarm box shall be installed.

Exceptions:

1. The *manual fire alarm box* is not required for *fire alarm systems* dedicated to elevator recall control and *supervisory service*.
2. The *manual fire alarm box* is not required for Group R-2 occupancies unless required by the *fire code official* to provide a means for fire watch personnel to initiate an alarm during a sprinkler system impairment event. Where provided, the *manual fire alarm box* shall not be located in an area that is open to the public.

Add new text as follows:

[F] 907.2.24 Combustible waste sorting and transfer.. A radiant-energy fire detection system or a thermal imaging fire detection system shall be provided throughout F-1 occupancy fire areas that contain combustible waste sorting and transfer operations in excess of 5,000 square feet (464.5 m2) in area.

Reason: FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

A problem Combustible waste sorting and transfer operations have is items in the waste stream that can cause serious fires. Lithium-ion batteries are one of the items that are causing fire events that need to be identified and responded to quickly to protect occupants and the facility. Many facilities are government investments or private investments with government partnerships, these facilities and other private facilities are important to managing the waste stream and effective early detection and mitigation fire protection systems are necessary.

The new requirements can be addressed with an NFPA 13 fire suppression system and an NFPA 72 fire detection system, but there are also some specialty suppression options available that combine early detection with automatic targeted suppression methods.

In determining the square foot threshold, we looked at other suppression thresholds such as woodworking operations and upholstered furniture which are 50% lower, but the hazard and the fuel load is much greater. Theoretically, since this is new construction or occupancy related the threshold could be 0 square feet, new facilities are typically much larger than the 5,000 sq.ft.

Cost Impact: Increase

Estimated Immediate Cost Impact:

This will increase the cost of construction for a small waste transfer and sorting facility, however, because of volume of trash needing sorting the typical facility already crosses the base F-1 12,000 square foot threshold. As a result, that cost impact is minimal if at all in today's waste handling operations world. The real additional cost impact would be the fire detection system, however, this cost is negated by the lifetime savings to the facility by providing for detection early enough to prevent the need for fire suppression system activation.

Estimated Immediate Cost Impact Justification (methodology and variables):

The actual cost of the protection varies from market to market for materials and for labor, there is no way to give a number with any accuracy that applies everywhere the IFC and IBC are adopted. In theory the difference between a 5,000 square foot facility compared to a 12,001 square foot facility would be 60%, however, the smaller facilities would be the rarity, though located in areas that a loss would have a greater impact.

F99-24

F100-24

IFC: 903.2.8, 903.2.8.1, 903.2.8.2, 903.2.8.3, 903.3.1.3; IBC: [F] 903.2.8, [F] 903.2.8.1, [F] 903.2.8.2, [F] 903.2.8.3, [F] 903.3.1.3

Proponents: Jeffrey Shapiro, International Code Consultants, Lake Travis Fire Rescue (jshapiro@LTFR.org)

2024 International Fire Code

Revise as follows:

903.2.8 Group R.
An *automatic sprinkler system* installed in accordance with Section 903.3.1 shall be provided throughout all buildings with a Group R *fire area*.

Delete without substitution:

~~**903.2.8.1 Group R-3.**~~
~~An *automatic sprinkler system* installed in accordance with Section 903.3.1.3 shall be permitted in Group R-3 occupancies.~~

~~**903.2.8.2 Group R-4, Condition 1.**~~
~~An *automatic sprinkler system* installed in accordance with Section 903.3.1.3 shall be permitted in Group R-4, Condition 1 occupancies.~~

~~**903.2.8.3 Care facilities.**~~
~~An *automatic sprinkler system* installed in accordance with Section 903.3.1.3 shall be permitted in care facilities with five or fewer individuals in a single-family *dwelling*.~~

Revise as follows:

903.3.1.3 NFPA 13D sprinkler systems.
Automatic sprinkler systems installed in one- and two-family *dwellings* and *townhouses*; Group R-3; and Group R-4, Condition 1~~; and *townhouses*~~ shall be permitted to be installed throughout in accordance with NFPA 13D.

2024 International Building Code

Revise as follows:

[F] 903.2.8 Group R.
An *automatic sprinkler system* installed in accordance with Section 903.3.1 shall be provided throughout all *buildings* with a Group R *fire area*.

Delete without substitution:

~~**[F] 903.2.8.1 Group R-3.**~~
~~An *automatic sprinkler system* installed in accordance with Section 903.3.1.3 shall be permitted in Group R-3 occupancies.~~

~~**[F] 903.2.8.2 Group R-4, Condition 1.**~~
~~An *automatic sprinkler system* installed in accordance with Section 903.3.1.3 shall be permitted in Group R-4, Condition 1 occupancies.~~

~~**[F] 903.2.8.3 Care facilities.**~~
~~An *automatic sprinkler system* installed in accordance with Section 903.3.1.3 shall be permitted in care *facilities* with five or fewer individuals in a single-family *dwelling*.~~

Revise as follows:

[F] 903.3.1.3 NFPA 13D sprinkler systems.
Automatic sprinkler systems installed in one- and two-family *dwellings* and *townhouses*; Group R-3; and Group R-4, Condition 1~~; and *townhouses*~~ shall be permitted to be installed throughout in accordance with NFPA 13D.

Reason: Code requirements in Section 903.2.8 and 903.3.1 currently conflict with respect to the types of sprinkler systems permitted for some residential occupancies. Subsections to 903.2.8 specify which sprinkler standards are permissible for some Group R uses, but Section 903.3.1 has different allowances for NFPA 13D to be used, particularly for townhouses which are covered in the scope of NFPA 13D but aren't always classified as Group R3. NFPA 13D as an appropriate standard for townhouse protection is currently recognized in Section 903.3.1.3 but not in Section 903.2.8. Rather than correlating these sections, it makes more sense to have the applicable requirements reside in one location in the code, and Sections 903.3.1 (including 903.3.1.1, 903.3.1.2 and 903.3.1.3) are currently sufficient to entirely support Section 903.2.8. For ease of following what this proposal accomplishes and how the sections will work together if the proposal is approved, relevant extracts from Section 903.3.1 in the 2024 IBC are reproduced below:

[F] 903.3.1 Standards. Automatic sprinkler systems shall be designed and installed in accordance with Section 903.3.1.1 unless otherwise permitted by Sections 903.3.1.2 and 903.3.1.3 and other chapters of this code, as applicable.

[F] 903.3.1.1 NFPA 13 sprinkler systems. Where the provisions of this code require that a building or portion thereof be equipped throughout with an automatic sprinkler system in accordance with this section, sprinklers shall be installed throughout in accordance with NFPA 13 except as provided in Sections 903.3.1.1.1 through 903.3.1.1.3.

[F] 903.3.1.2 NFPA 13R sprinkler systems. Automatic sprinkler systems in Group R occupancies shall be permitted to be installed throughout in accordance with NFPA 13R where the Group R occupancy meets all of the following conditions:

1. Four stories or fewer above grade plane.

2. For other than Group R-2 occupancies, the floor level of the highest story is 30 feet (9144 mm) or less above the lowest level of fire department vehicle access. For Group R-2 occupancies, the roof assembly is less than 45 feet (13 716 mm) above the lowest level of fire department vehicle access. The height of the roof assembly shall be determined by measuring the distance from the lowest required fire vehicle access road surface adjacent to the building to the eave of the highest pitched roof, the intersection of the highest roof to the exterior wall, or the top of the highest parapet, whichever yields the greatest distance.

3. The floor level of the lowest story is 30 feet (9144 mm) or less below the lowest level of fire department vehicle access. The number of stories of Group R occupancies constructed in accordance with Sections 510.2 and 510.4 shall be measured from grade plane.

[F] 903.3.1.3 NFPA 13D sprinkler systems. Automatic sprinkler systems installed in one- and two-family dwellings; Group R-3; Group R-4, Condition 1; and townhouses shall be permitted to be installed throughout in accordance with NFPA 13D.

Although I serve as a consultant to the National Fire Sprinkler Association, this proposal has not been reviewed or endorsed by NFSA, and I am not representing NFSA on this issue.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposal eliminates a conflict between code sections and duplication. Technical requirements remain unchanged.

F100-24

F101-24

IFC: 903.2.8.3 (New); IBC: [F] 903.2.8.3 (New)

Proponents: Jeff O'Neil, Chair, Committee on Healthcare (ahc@iccsafe.org)

2024 International Fire Code

Add new text as follows:

903.2.8.3 Group R-4, Condition 2. An automatic sprinkler system installed in accordance with Section 903.3.1.2 shall be permitted in Group R-4, Condition 2 occupancies.

2024 International Building Code

Add new text as follows:

[F] 903.2.8.3 Group R-4, Condition 2. An automatic sprinkler system installed in accordance with Section 903.3.1.2 shall be permitted in Group R-4, Condition 2 occupancies.

Reason: F76-21 gave as it's reason for deletion of Section 903.2.8.3 from the 2021 edition as "Group R4, Division 2 occupancies would default to NFPA 13R systems under Section 903.3.1.2, so there's no need to say that NFPA 13R systems are "permitted" in Section 903.2.8.3.". This is not accurate. The general reference for Group R is to NFPA13, 13R and 13D. There is no 'default' in Section 903.3.1.2 for Group R-4, Condition 2. There is a specific exception for attics in Group R-4, Condition 2 in Section 903.3.1.2.3 Item 4, but that is not an obvious requirement when 903.3.1.2 is generic to Group R. This text should be reinstated for clarity.

This proposal is submitted by the ICC Committee for Healthcare (CHC).
The Committee on Healthcare (CHC) was established by the ICC Board of Directors in 2011 to pursue opportunities to study and develop effective and efficient provisions for Hospital, Nursing Homes, Assisted Living and Ambulatory Care Facilities. This committee was formed in cooperation with the American Society for Healthcare Engineering (ASHE). In July of 2017, the ICC Board made CHC a standing committee. In 2023 the CHC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the CHC website at CHC webpage.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Reinstating the text will clarify what the requirements are sprinklers in Group R-4 Condition 2. This should not be a change to what is required.

F101-24

F102-24

IFC: 903.2.8.4 (New); IBC: [F] 903.2.8.4 (New)

Proponents: Ken Brouillette, Seattle Fire Department, Seattle Fire Department (ken.brouillette@seattle.gov)

2024 International Fire Code

Add new text as follows:

903.2.8.4 Group R-3 occupancies less than 60 feet in height. Group R-3 occupancies referenced in Table 504.4 of the *International Building Code* shall be permitted to install an *automatic sprinkler system in accordance with Section 903.3.1.3 when the building height does not exceed 60 feet above grade plane.*

2024 International Building Code

Add new text as follows:

[F] 903.2.8.4 Group R-3 occupancies less than 60 feet in height. Group R-3 occupancies referenced in Table 504.4 shall be permitted to install an *automatic sprinkler system in accordance with Section 903.3.1.3 when the building height does not exceed 60 feet above grade plane.*

Reason: One- and two-family dwellings, manufactured homes, and townhouses are all within the scoping of NFPA 13D. This standard does not restrict the height of these structures. These types of occupancies should not be treated as equivalent to other types of residential type occupancies such as apartments or hotels and therefore should not be required to install an equivalent designed automatic sprinkler system.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0 or less. The design and installation of a NFPA 13D automatic sprinkler system is less than a NFPA 13R or NFPA 13 system.

Estimated Immediate Cost Impact Justification (methodology and variables):

The size and amounts of underground and overhead piping and other materials including labor cost would be less with a NFPA13D system.

F102-24

F103-24

IFC: 903.2.8.5 (New); IBC: [F] 903.2.8.5 (New)

Proponents: Ken Brouillette, Seattle Fire Department, Seattle Fire Department (ken.brouillette@seattle.gov)

2024 International Fire Code

Add new text as follows:

903.2.8.5 Group R-3 occupancies 4 stories or less above grade plane.. Group R-3 occupancies referenced in Table 504.4 of the *International Building Code* shall be permitted to install an *automatic sprinkler system* in accordance with Section 903.3.1.3 when the number of stories above grade plane does not exceed 4.

2024 International Building Code

Add new text as follows:

[F] 903.2.8.5 Group R-3 occupancies 4 stories or less above grade plane.. Group R-3 occupancies referenced in Table 504.4 shall be permitted to install an *automatic sprinkler system* in accordance with Section 903.3.1.3 when the number of stories above grade plane does not exceed 4.

Reason: One- and two-family dwellings, manufactured homes, and townhouses are all within the scoping of NFPA 13D. This standard does not restrict the number of stories of these structures. These types of occupancies should not be treated as equivalent to other types of residential type occupancies such as apartments or hotels and therefore should not be required to install an equivalent designed automatic sprinkler system.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0 or less. The installation of a NFPA 13D system is less expensive than the installation of a NFPA 13 or 13R system.

Estimated Immediate Cost Impact Justification (methodology and variables):

The cost of materials and labor are less for these types of systems.

F103-24

F104-24

IFC: 903.2.9.2; IBC: [F] 903.2.9.2

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Fire Code

Revise as follows:

903.2.9.2 Bulk storage of tires. An automatic sprinkler system shall be equipped throughout buildings ~~Buildings and structures~~ where ~~the area for~~ the aggregate volume of stored ~~storage of~~ tires exceeds 20,000 cubic feet (566 m^3) ~~shall be equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1.~~

2024 International Building Code

Revise as follows:

[F] 903.2.9.2 Bulk storage of tires.
An automatic sprinkler system shall be equipped throughout buildings ~~*Buildings* and *structures*~~ where ~~the area for~~ the aggregate volume of stored ~~storage of~~ tires exceeds 20,000 cubic feet (566 m^3) ~~shall be equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1~~.

Reason: While the language implies the area of the tires is measured in volume, there are some jurisdictions that interpret this to mean the floor area of the tires, not the volume. This is to clarify that the intent is the volume of the tires, not the floor area.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Simply a clarification as to what is being measured when triggering the need for an automatic sprinkler system.

F104-24

F105-24

IFC: 903.2.9.2; IBC: [F] 903.2.9.2

Proponents: Eirene Knott, BRR Architecture, Metropolitan Kansas City Chapter of the ICC (eirene.knott@brrarch.com)

2024 International Fire Code

Revise as follows:

903.2.9.2 Bulk storage of tires. Buildings and structures where the area for the storage of tires exceeds 20,000 cubic feet (566 m^3) <u>in volume</u> shall be equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1.

2024 International Building Code

Revise as follows:

[F] 903.2.9.2 Bulk storage of tires.
Buildings and *structures* where the area for the storage of tires exceeds 20,000 cubic feet (566 m^3) <u>in volume</u> shall be equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1.

Reason: The commentary is very clear that the intention with the 20,000 cubic feet is in terms of volume, which would include three dimensions - length, depth and height, in terms of storage area. If the intention here is not volume, then there is an error in the code language as area would not include a height and would not be measured in volume.

Since the intention appears to be related to volume, then inserting the words "in volume" indicates how the area (volume) of tire storage is to be determined, which would also include the height of the storage area, not just the storage area. There have been interpretations that believe this to be an area calculation rather than a volume calculation, thus the attempt to insert "in volume" for clarification purposes. If it was really about area and not volume, then an area of tire storage in excess of 20,000 square feet would already require sprinkler protection since an S-1 occupancy requires protection in excess of 12,000 square feet.

For example, if there is an area of tire storage that measures 45 feet in both length and depth, that would yield an area of 2,025 square feet (45 feet by 45 feet). Since the area is less than 12,000 square feet, it would not trigger sprinkler protection under the S-1 occupancy provisions unless the volume exceeds 20,000 cubic feet. If the tires were stacked 10 feet in height, then the volume of the tire storage would be 20,250 cubic feet (45 feet by 45 feet by 10 feet). At this point this code section would apply.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This could actually reduce construction cost if the calculation is truly in volume, not area. If the volume is less than 20,000 cubic feet and less than 12,000 square feet in area, this code requirement may not apply.

F105-24

F106-24

IFC: 903.2.9.4; IBC: [F] 903.2.9.4

Proponents: Andrew Klein, A S Klein Engineering, PLLC, Self Storage Association (andrew@asklein.com)

2024 International Fire Code

Revise as follows:

903.2.9.4 Group S-1 upholstered furniture and mattresses.
An *automatic sprinkler system* shall be provided throughout a Group S-1 *fire area* where the area used for the storage of upholstered furniture or mattresses exceeds 2,500 square feet (232 m^2).

> **Exception:** Self-service storage facilities~~ not greater than one story above *grade plane* where all storage spaces can be accessed directly from the exterior~~.

2024 International Building Code

Revise as follows:

[F] 903.2.9.4 Group S-1 upholstered furniture and mattresses.
An *automatic sprinkler system* shall be provided throughout a Group S-1 *fire area* where the area used for the storage of upholstered furniture or mattresses exceeds 2,500 square feet (232 m^2).

> **Exception:** Self-service storage *facilities*~~ not greater than one *story above grade plane* where all storage spaces can be accessed directly from the exterior~~.

Reason: In the 2012 ICC Code development cycle, an additional trigger (#5) was added to IBC Section 903.2.9 to specify when an automatic sprinkler system shall be required in Group S-1 occupancies: “A Group S-1 occupancy that is used for the storage of upholstered furniture or mattresses exceeds 2,500 square feet.” The provision was added in response to the tragic Charleston Sofa Super Store fire in 2007, however its effects on the self-storage industry were not anticipated. The application of this requirement to self storage facilities was the result of an ICC staff official interpretation. FCAC submitted a proposal in the 2021 Code development cycle to add the exception for only one-story facilities where spaces are accessed directly from the exterior. For such small, low-occupancy buildings, the presence of an interior corridor does not increase the risk to an occupant or first responder in the event of a fire. This code change proposal returns the sprinkler threshold for all self-storage facilities to a 12,000 sf fire area, consistent with the Fire Code prior to 2012.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0 or less. This proposal could decrease the construction costs of self-service storage facilities.

Estimated Immediate Cost Impact Justification (methodology and variables):

This code change proposal returns the sprinkler threshold for all self-storage facilities to a 12,000 sf *fire area*, consistent with the Fire Code prior to 2012, as opposed to the reduced threshold of 2,500 sf *of area used for storage*.

Estimated Life Cycle Cost Impact:

n/a

Estimated Life Cycle Cost Impact Justification (methodology and variables):

n/a

F106-24

F107-24

IFC: 903.2.10; IBC: [F] 903.2.10

Proponents: Steve Skalko, Stephen V. Skalko, P.E. & Associates LLC, Precast/Prestressed Concrete Institute (svskalko@svskalko-pe.com)

2024 International Fire Code

Revise as follows:

903.2.10 Group S-2 parking garages.
An *automatic sprinkler system* shall be provided throughout buildings classified as parking garages where any of the following conditions exist:

1. Where the *fire area* of the enclosed parking garage, in accordance with Section 406.6 of the *International Building Code*, exceeds 12,000 square feet (1115 m^2).
2. Where the enclosed parking garage, in accordance with Section 406.6 of the *International Building Code*, is located beneath other groups.

   Exception: Enclosed parking garages located beneath Group R-3 occupancies.
3. Where the *fire area* of the open parking garage, in accordance with Section 406.5 of the *International Building Code*, exceeds 48,000 square feet (4460 m^2).

   <u>**Exception:** Open parking garages of Type I construction</u>

2024 International Building Code

Revise as follows:

[F] 903.2.10 Group S-2 parking garages.
An *automatic sprinkler system* shall be provided throughout *buildings* classified as parking garages where any of the following conditions exists:

1. Where the fire area of the enclosed parking garage in accordance with Section 406.6 exceeds 12,000 square feet (1115 m^2).
2. Where the enclosed parking garage in accordance with Section 406.6 is located beneath other groups.

   Exception: Enclosed parking garages located beneath Group R-3 occupancies.
3. Where the *fire area* of the *open parking garage* in accordance with Section 406.5 exceeds 48,000 square feet (4460 m^2).

   <u>**Exception:** Open parking garages of Type I construction</u>

Reason: Code change F110-18 that modified Section 903.2.10 of the International Fire Code (and International Building Code) to require sprinkler protection in open parking garages was based on a single fire incident that occurred in the UK in January 2018. From a review of the final report by the Merseyside Fire and Rescue Service (MFRS) [Merseyside Fire Rescue Service, *Kings Dock Car Park Fire Protection Report,* April 2018, Merseyside, UK], the parking garage in question, referred to as a car park in the UK, had a reduced fire-resistant design feature that likely contributed to the extensive structural damage to the open car park structure.

The building code requirements in the UK permitted 15-minutes of structural fire resistance of the precast concrete floors for the Kings Dock car park. The fire exposure from the initial vehicle (and subsequent vehicles) damaged the underside of the floor panels above sufficiently enough to damage the floor system and permit the fire to extend upward to vehicles on the next parking level.

Further, data on fire incidences in the United States show that fires in open parking garages are very low. The US Fire Administration statistics show an average of over 1.7 million fires [FA-311, *Fire in the United States 1994-2004,* 14th edition, August 2007] for the period from 1999 to 2002. When compared to the average total parking garage fires (1760 incidents) described in an NFPA study of parking garage fires [M. Ahrens, *Structure and Vehicle Fires in General Vehicle Parking Garages,* NFPA, January 2006] represent less than 0.1% of the fire incidences.

In the US the typical concrete floor systems in open parking garages meet at least a minimum of a 1-hour fire resistance, which increases significantly the ability to maintain structural stability and prevent fire spread between floors from vehicle fires. Based on the low fire incidence record of open parking garages this proposal recognizes the benefit of higher fire resistance in open parking structures of Type I construction by allowing the sprinkler protection to be omitted. In Type I construction the floor systems are required to have at least a 2-hour fire resistance [IBC Table 601]. Using structural fire resistance as an alternative to sprinkler protection is similar to provisions in the IBC where sprinkler protection is permitted to reduce the fire resistance of fire rated assemblies by 1-hour.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

Construction costs will decrease because of the savings by using built-in structural fire resistance in lieu of a sprinkler protection system.

Estimated Immediate Cost Impact Justification (methodology and variables):

Actual costs for providing sprinkler protection in open parking garages will vary depending on location. In colder climates subject to freezing temperatures the cost will need to include appropriate measures, such as dry pipe systems with mechanical rooms for air compressors. This may include multiple rooms and air compressors for multi-story open parking garages because of system size on each riser. Estimated cost for automatic sprinkler systems in open parking garage projects in colder climates have ranged from $3.50 to $3.75 per square foot. Meeting fire resistance requirements results in a direct savings.

F107-24

F108-24

IFC: SECTION 903, 903.2, 903.2.10.3 (New); IBC: SECTION 903, [F] 903.2, 903.2.10.3 (New)

Proponents: Robert J Davidson, Davidson Code Concepts LLC, Self (rjd@davidsoncodeconcepts.com)

2024 International Fire Code

SECTION 903
AUTOMATIC SPRINKLER SYSTEMS

903.2 Where required.
Approved automatic sprinkler systems in new buildings and structures shall be provided in the locations described in Sections 903.2.1 through 903.2.12.

Exception: Spaces or areas in telecommunications buildings used exclusively for telecommunications equipment, associated electrical power distribution equipment, batteries not required to have an *automatic sprinkler system* by Section 1207 for energy storage systems and standby engines, provided that those spaces or areas are equipped throughout with an *automatic smoke detection system* in accordance with Section 907.2 and are separated from the remainder of the building by not less than 1-hour *fire barriers* constructed in accordance with Section 707 of the International Building Code or not less than 2-hour *horizontal assemblies* constructed in accordance with Section 711 of the International Building Code, or both.

Add new text as follows:

903.2.10.3 Lithium-ion or lithium metal powered vehicles.. An *approved automatic sprinkler system* shall be provided throughout fire areas used for the parking or storage of lithium-ion or lithium metal powered vehicles where the fire area exceeds 500 square feet (46.4 m2).

2024 International Building Code

SECTION 903
AUTOMATIC SPRINKLER SYSTEMS

[F] 903.2 Where required.
Approved automatic sprinkler systems in new *buildings* and *structures* shall be provided in the locations described in Sections 903.2.1 through 903.2.12.

Exception: Spaces or areas in telecommunications *buildings* used exclusively for telecommunications equipment, associated electrical power distribution equipment, batteries not required to have an *automatic sprinkler system* by Section 1207 of the *International Fire Code* for energy storage systems and standby engines, provided that those spaces or areas are equipped throughout with an *automatic smoke detection system* in accordance with Section 907.2 and are separated from the remainder of the *building* by not less than 1-hour *fire barriers* constructed in accordance with Section 707 or not less than 2-hour *horizontal assemblies* constructed in accordance with Section 711, or both.

Add new text as follows:

903.2.10.3 Lithium-ion or lithium metal powered vehicles . An *approved automatic sprinkler system* shall be provided throughout fire areas used for the parking or storage of lithium-ion or lithium metal powered vehicles where the fire area exceeds 500 square feet (46.4 m2).

Reason: Last cycle the hazards presented by lithium-ion or lithium metal battery powered vehicle s was addressed by adding the following two sections to the IFC and IBC.

903.2.9 Group S-1.

5. A Group S-1 fire area used for the storage of lithium-ion or lithium metal powered vehicles where the fire area exceeds 500 square feet (46.4 m2).

902.2.9.1 Repair garages.

5. A Group S-1 fire area used for the storage of lithium-ion or lithium metal powered vehicles where the fire area exceeds 500 square feet (46.4 m2).

The hazard addressed is the same when located in a Group S-2 parking garage. This proposal uses the previously approved language to add the protection to S-2 parking garages for consistency.

It should be noted that NFPA 88A: Standard for Parking Structures, 2023, requires all parking garages to be protected by an automatic fire sprinkler system installed in accordance with NFPA 13.

Cost Impact: Increase

Estimated Immediate Cost Impact:

This proposal would require the same protection for S-2 parking garages that is required for S-1 occupancies currently. It will increase new construction costs of S-2 parking garages. The exact cost cannot be estimated.

Estimated Immediate Cost Impact Justification (methodology and variables):

To provide an exact cost a set of detailed plans for the installation of the automatic sprinkler system in a given parking structure is necessary, then the unit costs for all of the parts required including manhours would need to be calculated for a given cost region, then a cost multiplier would need to be added or subtracted for every other cost region where the I-Codes are applied.

F108-24

F109-24

IFC: 903.2.11.4; IBC: [F] 903.2.11.4

Proponents: John Swanson, NFSA, National Fire Sprinkler Association (swanson@nfsa.org); Jeffrey M Hugo, CBO, NFSA, National Fire Sprinkler Association (hugo@nfsa.org)

2024 International Fire Code

Revise as follows:

903.2.11.4 Ducts conveying hazardous exhausts.
Where required by the *International Mechanical Code*, automatic sprinklers shall be provided in ducts conveying hazardous exhaust or flammable or combustible materials.

Exception: Ducts where the largest cross-sectional ~~diameter~~ dimension of the duct is less than 10 inches (254 mm).

2024 International Building Code

Revise as follows:

[F] 903.2.11.4 Ducts conveying hazardous exhausts.
Where required by the *International Mechanical Code* , automatic sprinklers shall be provided in ducts conveying hazardous exhaust or flammable or combustible materials.

Exception: Ducts where the largest cross-sectional ~~diameter~~ dimension of the duct is less than 10 inches (254 mm).

Reason: The term, "diameter" refers to a circular and round ducts. However, ducts used in hazardous exhaust also come in square and rectangular shapes. This change will address the hazard in ducts of all sizes and shapes, not just a circular. Without this change, a literal application of the code would exempt sprinklers all square and rectangular ducts with hazardous exhaust.

Cost Impact: Increase

Estimated Immediate Cost Impact:

Source: Actual estimates

A round duct with a 10 inch diameter is $23/ linear foot and a square duct (8 in. x 8 in.) is $15/linear foot. Estimates do not include cleats, fittings, and labor.

Estimated Immediate Cost Impact Justification (methodology and variables):

Analogous methodology using actual current cost estimates and data from RS Means to create a range of cost. This proposal addresses other shapes that ducts come in. The increase in construction will capture all ducts. However, it can be less expensive to install square or rectangular round ducts.

F109-24

F110-24

IFC: 903.3.1.1.2; IBC: [F] 903.3.1.1.2

Proponents: Jeffrey M Hugo, CBO, NFSA, National Fire Sprinkler Association (hugo@nfsa.org)

2024 International Fire Code

Revise as follows:

903.3.1.1.2 Bathrooms. In Group R occupancies, sprinklers shall not be required in bathrooms that do not exceed 55 square feet (5 m^2) in area and are located within individual *dwelling units* or *sleeping units*, provided that wall~~s~~ and ceiling~~s~~ coverings, including the walls and ceilings behind a shower enclosure or tub, are of noncombustible ~~or limited-combustible~~ materialsin accordance with Section 703.3.1 of the I*nternational Building Code* and providing ~~with~~ a 15-minute thermal barrier rating.

2024 International Building Code

Revise as follows:

[F] 903.3.1.1.2 Bathrooms.
In Group R occupancies sprinklers shall not be required in bathrooms that do not exceed 55 square feet (5 m^2) in area and are located within individual *dwelling units* or *sleeping units*, provided that walls and ceilings, including the wall~~s~~ and ceiling~~s~~ coverings behind a shower enclosure or tub, are of noncombustible ~~or limited-combustible~~ materials in accordance with Section 703.3.1 and providing ~~with~~ a 15-minute thermal barrier rating.

Reason: The current IBC/IFC text is nearly identical to the requirement in found in NFPA 13. This proposal adjusts the intent of the text from NFPA 13 in the IBC/IFC and removes the term limited combustible, as it is not defined in the IBC/IFC (or the family of ICC codes) but is incorporated into IBC Section 703.3.1.

This change is important because the construction type in NFPA 13 is different than the type of construction in the IBC/IFC. NFPA 13 construction type addresses the protected space as the type of construction, for example, as combustible, noncombustible or limited-combustible, whereas the IBC type of construction addresses the structural components of the building as combustible or noncombustible (per 703.3.1). Currently, without this change, a literal read of this section would require the wall and ceiling construction to be entirely noncombustible, i.e., steel studs steel bar joists, concrete plank, etc.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

Source: Actual estimates and RS Means.

Noncombustible wall, 3 5/8 in steel stud, 16 in oc, 5/8 in. Type X each side: $4.33 - $4.40 sf

Combustible wall, 3 ½ in. wood stud, 16 in oc, 5/8 in. Type X, each side: $5.34 - $6.25 sf

Estimated Immediate Cost Impact Justification (methodology and variables):

Analogous methodology using actual current cost estimates and data from RS Means to create a range of cost for combustible and noncombustible walls. This proposal does lower the cost of construction as it clarifies the bathroom walls enclosing of the tub/shower unit can match the type of construction, such as Type V, with drywall versus constructing a totally noncombustible wall behind the tub/shower unit.

F110-24

F111-24

IFC: 903.3.1.1.3; IBC: [F] 903.3.1.1.3

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Robert J Davidson, Davidson Code Concepts LLC, Self (rjd@davidsoncodeconcepts.com)

2024 International Fire Code

Revise as follows:

903.3.1.1.3 Lithium-Ion or lithium metal batteries.
Where *automatic sprinkler systems* are required by this code for areas containing lithium-ion or lithium metal batteries, the design of the system shall be based on a series of fire tests. Such tests shall be conducted or witnessed and reported by an approved testing laboratory ~~involving test scenarios~~. A report prepared by a registered design professional with expertise in fire protection engineering shall be provided to the fire code official for review and approval in accordance with Section 104.2.2 and shall that address the range of variables associated with the intended arrangement of the hazards to be protected.

2024 International Building Code

Revise as follows:

[F] 903.3.1.1.3 Lithium-ion or lithium metal batteries.
Where *automatic sprinkler systems* are required by this code for areas containing lithium-ion or lithium metal batteries, the design of the system shall be based on a series of fire tests. Such tests shall be conducted or witnessed and reported by an *approved* testing laboratory ~~involving test scenarios that~~ . A report prepared by a registered design professional with expertise in fire protection engineering shall be provided to the fire code official for review and approval in accordance with Section 104.2.2 and shall address the range of variables associated with the intended arrangement of the hazards to be protected.

Reason: FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

There currently is a lack of full-size testing of battery arrangements in buildings. This leads to difficulties for the designer, builder and code official. There is design guidance from an approved laboratory based upon some large-scale burn testing, Factory Mutual, on sprinkler design and there are lab reports for many cells and/or modules that a designer could utilize in determining the correct level of sprinkler protection. This modification would provide for use of the information available provided a report prepared by a registered design professional with expertise in fire protection engineering is submitted for review and approval.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0.00

Estimated Immediate Cost Impact Justification (methodology and variables):

This proposal may reduce the cost of construction as it allows other ways of justifying performance where no testing data exists.

F111-24

F112-24

IFC: 903.3.1.1.3, TABLE 903.3.1.1.3(1) (New); IBC: [F] 903.3.1.1.3, TABLE 903.3.1.1.3(1) (New)

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Fire Code

Revise as follows:

903.3.1.1.3 Lithium-Ion or lithium metal batteries.
Where *automatic sprinkler systems* are required by the sections listed in Table 903.3.1.1.3 (1),~~this code~~ for areas containing lithium-ion or lithium metal batteries, the design of the system shall be based on a series of fire tests. Such tests shall be conducted or witnessed and reported by an approved testing laboratory involving test scenarios that address the range of variables associated with the intended arrangement of the hazards to be protected.

Add new text as follows:

TABLE 903.3.1.1.3(1) AUTOMATIC SPRINKLER SYSTEMS FOR LITHIUM-ION AND LITHIUM-ION BATTERY AREAS

SECTION	AREA REQUIRED
Table 3206.2	High Hazard Commodity
Section 320	Battery Storage
Section 903.2.3	Research and Development Laboratory
Section 903.2.4	Manufacturing
Section 903.2.7.3	Group M Occupancy
Section 1207.6	Energy Storage Systems

2024 International Building Code

Revise as follows:

[F] 903.3.1.1.3 Lithium-ion or lithium metal batteries.
Where *automatic sprinkler systems* are required by the sections listed in Table 903.3.1.1.3 (1), ~~this code~~ for areas containing lithium-ion or lithium metal batteries, the design of the system shall be based on a series of fire tests. Such tests shall be conducted or witnessed and reported by an *approved* testing laboratory involving test scenarios that address the range of variables associated with the intended arrangement of the hazards to be protected.

Add new text as follows:

TABLE 903.3.1.1.3(1) AUTOMATIC SPRINKLER SYSTEMS FOR LITHIUM-ION AND LITHIUM-ION BATTERY AREAS

SECTION	AREA REQUIRED
IFC Table 3206.2	High Hazard Commodity
IFC Section 320	Battery Storage
Section 903.2.3	Research and Development Laboratory
Section 903.2.4	Manufacturing
Section 903.2.7.3	Group M Occupancy
IFC Section 1207.6	Energy Storage System

Reason: The purpose of this code change is to identify the specific code sections within the IFC that already require automatic suppression systems where lithium-ion or lithium-ion batteries may be found in the building or specific occupancies. The problem with the existing language that was adopted last cycle gives the impression that this section would apply to any building and occupancy where a lithium-ion battery may exist must be protected by an automatic suppression system (for example bringing a laptop into a coffee shop would not trigger the required protection).

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the FCAC Website

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is a clarification as to the specific locations where sprinkler protection is required for Lithium-ion and Lithium-ion metal batteries.

F112-24

F113-24

IFC: 903.4.1, 903.3.9, 903.4.3, 913.4; IBC: [F] 903.4.1, [F] 903.3.9, [F] 903.4.3, [F] 913.4

Proponents: Jeffrey M Hugo, CBO, NFSA, National Fire Sprinkler Association (hugo@nfsa.org); Jason Webb, Potter Electric Signal, Automatic Fire Alarm Association Codes & Standards Committee (jasonw@pottersignal.com); John Swanson, NFSA, National Fire Sprinkler Association (swanson@nfsa.org); Shane Clary, Bay Alarm Company, Automatic Fire Alarm Association (smclary@bayalarm.com)

2024 International Fire Code

Revise as follows:

903.4.1 ~~Electronic~~ Electrical supervision.
Valves controlling the water supply for *automatic sprinkler systems*, pumps, tanks, water levels and temperatures, critical air pressures and waterflow switches on all automatic sprinkler systems shall be electrically supervised by a *listed* fire alarm control unit.

Exceptions:

1. *Automatic sprinkler systems* protecting one- and two-family *dwellings*.
2. Limited area sprinkler systems in accordance with Section 903.3.8, provided that backflow prevention device test valves located in limited area sprinkler system supply piping shall be locked in the open position unless supplying an occupancy required to be equipped with a *fire alarm system*, in which case the backflow preventer valves shall be electrically supervised by a valve supervisory ~~tamper~~ switch installed in accordance with NFPA 72 and separately annunciated.
3. *Automatic sprinkler systems* installed in accordance with NFPA 13R where a common supply main is used to supply both domestic water and the *automatic sprinkler system*, and a separate shutoff valve for the *automatic sprinkler system* is not provided.
4. Jockey pump control valves that are sealed or locked in the open position.
5. Control valves to commercial kitchen hoods, paint spray booths or dip tanks that are sealed or locked in the open position.
6. Valves controlling the fuel supply to fire pump engines that are sealed or locked in the open position.
7. Trim valves to pressure switches in dry, preaction and *deluge sprinkler systems* that are sealed or locked in the open position.
8. Underground key or hub gate valves in roadway boxes.

~~903.3.9~~ 903.4.1.1 High-rise building floor control valves. *Approved* supervised indicating control valves shall be provided at the point of connection to the riser on each floor in high-rise buildings.

903.4.3 Alarms.
An *approved* audible and visual sprinkler waterflow alarm device, located on the exterior of the building in an *approved* location, shall be connected to each *automatic sprinkler system*. Such sprinkler waterflow alarm devices shall be activated by water flow equivalent to the flow of a single sprinkler of the smallest orifice size installed in the system. Where a waterflow switch is required by Section 903.4.1 to be electrically supervised, such sprinkler waterflow alarm devices shall be monitored ~~powered~~ by a fire alarm control unit or, where provided, a *fire alarm system*. Where a *fire alarm system* is provided, actuation of the *automatic sprinkler system* shall actuate the building *fire alarm system*.

Exception: *Automatic sprinkler systems* protecting one- and two-family *dwellings*.

913.4 Valve supervision.
Fire pump valves located in the water supply for an *automatic sprinkler system* shall be supervised in accordance with Section 903.4.1. ~~Where provided, the~~ Other fire pump suction, discharge and bypass valves, and isolation valves on the backflow prevention device or assembly shall be supervised open by one of the following methods:

1. Central-station, proprietary or remote-station signaling service.
2. Local signaling service that will cause the sounding of an audible signal at a *constantly attended location*.

3. Locking valves open.
4. Sealing of valves and *approved* weekly recorded inspection where valves are located within fenced enclosures under the control of the *owner*.

2024 International Building Code

Revise as follows:

[F] 903.4.1 ~~Electronic~~ Electrical supervision.
Valves controlling the water supply for *automatic sprinkler systems*, pumps, tanks, water levels and temperatures, critical air pressures and waterflow switches on all automatic sprinkler systems shall be electrically supervised by a *listed fire alarm control unit*.

Exceptions:

1. *Automatic sprinkler systems* protecting one- and two-family *dwellings*.
2. Limited area sprinkler systems in accordance with Section 903.3.8 , provided that backflow prevention device test valves located in limited area sprinkler system supply piping shall be locked in the open position unless supplying an occupancy required to be equipped with a *fire alarm system*, in which case the backflow preventer valves shall be electrically supervised by a valve supervisory ~~tamper~~ switch installed in accordance with NFPA 72 and separately annunciated.
3. *Automatic sprinkler systems* installed in accordance with NFPA 13R where a common supply main is used to supply both domestic water and the *automatic sprinkler system*, and a separate shutoff valve for the *automatic sprinkler system* is not provided.
4. Jockey pump control valves that are sealed or locked in the open position.
5. Control valves to commercial kitchen hoods, paint spray booths or dip tanks that are sealed or locked in the open position.
6. Valves controlling the fuel supply to fire pump engines that are sealed or locked in the open position.
7. Trim valves to pressure switches in dry, preaction and deluge sprinkler systems that are sealed or locked in the open position.
8. Underground key or hub gate valves in roadway boxes.

[F] ~~903.3.9~~ 903.4.1.1 High-rise building floorcontrol valves.
Approved supervised indicating control valves shall be provided at the point of connection to the riser on each floor in *high-rise buildings*.

[F] 903.4.3 Alarms.
An *approved* audible and visual sprinkler waterflow alarm device, located on the exterior of the *building* in an *approved* location, shall be connected to each *automatic sprinkler system*. Such sprinkler waterflow alarm devices shall be activated by water flow equivalent to the flow of a single sprinkler of the smallest orifice size installed in the system. Where a waterflow switch is required by Section 903.4.1 to be electrically supervised, such sprinkler waterflow alarm devices shall be monitored ~~powered~~ by a *fire alarm control unit* or, where provided, a *fire alarm system*. Where a *fire alarm system* is provided, actuation of the *automatic sprinkler system* shall actuate the *building fire alarm system*.

Exception: *Automatic sprinkler systems* protecting one- and two-family *dwellings*.

[F] 913.4 Valve supervision.
~~Where provided,~~Fire pump valves located in the water supply for an automatic sprinkler system shall be supervised in accordance with Section 903.4.1. Other ~~the~~ fire pump suction, discharge and bypass valves, and isolation valves on the backflow prevention device or assembly shall be supervised open by one of the following methods:

1. Central-station, proprietary or remote-station signaling service.
2. Local signaling service that will cause the sounding of an audible signal at a *constantly attended location*.
3. Locking valves open.

4. Sealing of valves and *approved* weekly recorded inspection where valves are located within fenced enclosures under the control of the *owner*.

Reason: 903.4.1: The term "electrical" is more appropriate than "electronic" and correlates better with the referenced standards, i.e., NFPA 13 and NFPA 72. While these terms are often used interchangeably, these devices are listed as electrical versus electronic. Having the code match the standards helps the code official enforce the codes efficiently.

903.4.1.1: The high rise valve supervision is a current requirement and is more appropriate in the supervision section than left alone in another section.

913.4: This change reinforces the water supply valve supervision required by Section 903.4.1 and serves as a pointer from 913 to 903.4 for application consistency.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposal updates the text to be consistent throughout the IBC/IFC and the referenced standards.

F113-24

F114-24

IFC: 904.2.1; IBC: [F] 904.2.1

Proponents: Jean-Pierre de Tourtoulon, Marioff, Marioff (jean-pierre.detourtoulon@carrier.com)

2024 International Fire Code

Revise as follows:

904.2.1 Restriction on using automatic sprinkler system exceptions or reductions. *Automatic fire-extinguishing systems* shall not be considered alternatives for the purposes of exceptions or reductions allowed for *automatic sprinkler systems* or by other requirements of this code.

<u>**Exception:** *Automatic water mist systems* installed in accordance with Section 904.11.</u>

2024 International Building Code

Revise as follows:

[F] 904.2.1 Restriction on using automatic sprinkler system exceptions or reductions.
Automatic fire-extinguishing systems shall not be considered alternatives for the purposes of exceptions or reductions allowed for *automatic sprinkler systems* or by other requirements of this code.

<u>**Exception:** *Automatic water mist systems* installed in accordance with Section 904.11.</u>

Reason: FM, UL, NFPA, CEN, VDS, and IMO all recognize watermist as being equivalent to sprinkler systems when designed, installed, operated, and maintained according to the

relevant standards and in accordance with their relevant listings.

Proposal is to recognize this equivalence to sprinklers to allow the same exemptions and reductions.

Currently businesses see the benefit of using systems designed based on their performance to aid in resilience, business continuity, space and cost

savings but 9.4.2.1 negates the cost savings and makes the system too expensive to use.

Bibliography: NFPA 13
NFPA 750
UL2167
FM5560
FM Data sheet 4-2
FM Data Sheet 5-32
FM Data Sheet 3-26
CEN14976
VDS3188
IMO

Cost Impact: Decrease

Estimated Immediate Cost Impact:

Current reductions assigned to automatic sprinkler systems not allowed, change in code will have significant impact and make watermist both competitive and a better choice for clients looking for a performance based system

Estimated Immediate Cost Impact Justification (methodology and variables):

Current comparison to sprinklers makes watermist over 100% more expensive due to wording of 9.4.2.1
Changing this will reduce this to 20% but over lifetime of building system will be significantly less expensive.

Small bore stainless pipework helps with coordination, installation and longevity of system. No need to replace every 25 years.

Estimated Life Cycle Cost Impact:

High pressure water mist systems by their design perform equal or better to traditional sprinkler systems, this is the premise of the design and pass fail criteria.

If the system proves it performs better then the damage caused, cleanup cost, impact on business continuity is clearly reduced.

Environmentally speaking 72.5% less water is used to suppress a lithium ion fire so there is 72.5% less water to clean, decontaminate and dispose of to reinstate the business.

High pressure watermist systems with stainless steel pipework outlast all sprinkler systems and with maintenance have no problems with system degradation

Estimated Life Cycle Cost Impact Justification (methodology and variables):

Replacement of sprinkler currently at 20-25 years, not needed with high pressure watermist system

F114-24

F115-24

IFC: 904.2.2, 904.14; IBC: [F] 904.2.2, [F] 904.14

Proponents: Kevin Scott, KH Scott & Associates LLC, KH Scott & Associates LLC (khscottassoc@gmail.com)

2024 International Fire Code

Revise as follows:

904.2.2 Commercial hood and duct systems.
~~Each required~~ An approved automatic fire-extinguishing system shall be installed to protect Type I commercial kitchen exhaust hoods ~~and duct system~~ required by Section 606 ~~to have a Type I hood~~ , cooking appliances equipped with integral down-draft exhaust systems, smoker ovens with integral exhaust systems, and wood-fired ovens *listed* in accordance with UL 2162.~~shall be protected with an *approved*~~The *automatic fire-extinguishing system* shall be installed in accordance with ~~this code~~Sections 904.14 through 904.14.4.1.

Exceptions:

1. Factory-built commercial cooking recirculating systems listed and labeled in accordance with UL 710B, and installed in accordance with Section 304.1 of the *International Mechanical Code.*
2. Electric cooking appliances where an approved testing agency provides documentation that the appliance effluent contains 5 mg/m^3 or less of grease when tested at an exhaust flow rate of 500 cfm (0.236 m^3/s) in accordance with UL 710B.

904.14 Commercial cooking systems.
The *automatic fire-extinguishing system* for commercial cooking systems shall be of a type recognized for protection of commercial cooking equipment and exhaust systems of the type and arrangement protected. Preengineered automatic dry- and wet-chemical extinguishing systems shall be tested in accordance with UL 300 and *listed* and *labeled* for the intended application. Other types of *automatic fire-extinguishing systems* shall be *listed* and *labeled* for specific use as protection for commercial cooking operations. The system shall be installed in accordance with this code, NFPA 96, its listing and the manufacturer's installation instructions. *Automatic fire-extinguishing systems* of the following types shall be installed in accordance with the referenced standard indicated, as follows:

1. Carbon dioxide extinguishing systems, NFPA 12.
2. *Automatic sprinkler systems*, NFPA 13.
3. Automatic water mist systems, NFPA 750.
4. Foam-water sprinkler system or foam-water spray systems, NFPA 11.
5. Dry-chemical extinguishing systems, NFPA 17.
6. Wet-chemical extinguishing systems, NFPA 17A.

~~**Exception:** Factory-built commercial cooking recirculating systems that are tested in accordance with UL 710B and *listed*, *labeled* and installed in accordance with Section 304.1 of the International Mechanical Code.~~

2024 International Building Code

Revise as follows:

[F] 904.2.2 Commercial hood and duct systems.
~~Each required~~ An approved automatic fire-extinguishing system shall be installed to protect Type I commercial kitchen exhaust hoods ~~and duct system~~ required by Section 606 of the International Fire Code or Chapter 5 of the International Mechanical Code, cooking appliances equipped with integral down-draft exhaust systems, smoker ovens with integral exhaust systems, and wood-fired ovens listed in accordance with UL 2162. ~~to have a Type I hood shall be protected with an *approved*~~ The *automatic fire-extinguishing system* shall be installed in accordance with ~~this code~~ Sections 904.14 through 904.14.4.1.

Exceptions:

1. Factory-built commercial cooking recirculating systems listed and labeled in accordance with UL 710B, and installed in accordance with Section 304.1 of the *International Mechanical Code*.
2. Electric cooking appliances where an approved testing agency provides documentation that the appliance effluent contains 5 mg/m^3 or less of grease when tested at an exhaust flow rate of 500 cfm (0.236 m^3/s) in accordance with UL 710B.

[F] 904.14 Commercial cooking systems.
The *automatic fire-extinguishing system* for commercial cooking systems shall be of a type recognized for protection of commercial cooking equipment and exhaust systems of the type and arrangement protected. Preengineered automatic dry- and *wet-chemical extinguishing systems* shall be tested in accordance with UL 300 and *listed* and *labeled* for the intended application. Other types of *automatic fire-extinguishing systems* shall be *listed* and *labeled* for specific use as protection for commercial cooking operations. The system shall be installed in accordance with this code, NFPA 96, its listing and the manufacturer's installation instructions. *Automatic fire-extinguishing systems* of the following types shall be installed in accordance with the referenced standard indicated, as follows:

1. *Carbon dioxide extinguishing systems*, NFPA 12.
2. *Automatic sprinkler systems*, NFPA 13.
3. Automatic water mist systems, NFPA 750.
4. Foam-water sprinkler system or foam-water spray systems, NFPA 11.
5. Dry-chemical extinguishing systems, NFPA 17.
6. *Wet-chemical extinguishing systems*, NFPA 17A.

~~**Exception:** Factory-built commercial cooking recirculating systems that are tested in accordance with UL 710B and *listed*, *labeled* and installed in accordance with Section 304.1 of the *International Mechanical Code*.~~

Reason: The intent of this proposal is to clarify which cooking appliances require fire protection. The IFC states that only those cooking appliances required to have a Type I hood must be protected with a fire-extinguishing system. When Section 606.2 is evaluated, there are 4 exceptions to the Type I hood requirement. Technically, the code does not require all of the appliances covered in the exceptions to be protected by an fire-extinguishing system, even though all but 2 of the exceptions address cooking operations which produce grease and grease-laden vapors.

Exception 2 is for factory-built commercial cooking recirculating systems. These cooking appliances contain an automatic fire-extinguishing system as part of the listing under UL 710B. The fire-extinguishing system has been tested, and provides suitable protection.

Exception 4 addresses electric cooking appliances that have reduced grease emissions and do not produce enough grease to warrant the need for an automatic fire-extinguishing system.

Exception 3 addresses down-draft exhaust systems. NFPA 96 includes criteria on the protection of down-draft exhaust systems.

Exception 1 only eliminates compliance with certain requirements in the IMC if the exhaust hood is listed and labeled.

The phrasing in Section 904.2.2 unintentionally removes the items covered in Exceptions 1 and 3 from the fire-extinguishing system requirement even though these appliances produce grease-laden vapors.

The revisions in this proposal clarify the type of appliances where a fire-extinguishing system is required. The reference to a "required Type I hood" is retained and correlates with the requirement in the IMC.

The exception in Section 904.14 is deleted because it is misleading and an exception is added to Section 904.2.2. Equipment listed under UL 710B is already required to install a fire-extinguishing system.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal does not add new requirements, although the current requirements can be easily missed. This proposal clarifies which commercial cooking operations need to be provided with an automatic fire-extinguishing system.

F116-24

IFC: 904.3.5; IBC: [F] 904.3.5

Proponents: James Carver, Self, Southern California Fire Prevention Officer's Association

2024 International Fire Code

Revise as follows:

904.3.5 Monitoring.
Where a building *fire alarm system* or a dedicated function fire alarm system is installed, *automatic fire-extinguishing systems* shall be monitored by the building *fire alarm system* or dedicated function fire alarm system in accordance with NFPA 72.

2024 International Building Code

Revise as follows:

[F] 904.3.5 Monitoring.
Where a building *fire alarm system* or a dedicated function fire alarm system is installed, *automatic fire-extinguishing systems* shall be monitored by the building *fire alarm system* or dedicated function fire alarm system in accordance with NFPA 72.

Reason: A proposal to require pre-engineered fire extinguishing systems and other alternative automatic fire-extinguishing systems to be connected to a Dedicated Function fire alarm system when the building does not have a fire alarm system installed. Currently, the IFC only requires automatic fire-extinguishing systems to be monitored by a building fire alarm system.

Some agencies have interpreted that a dedicated function fire alarm system meets the requirement for a building fire alarm system. IFC Section 202 has the following definition for a fire alarm system:

FIRE ALARM SYSTEM.

A system or portion of a combination system consisting of components and circuits arranged to monitor and annunciate the status of fire alarm or supervisory signal-initiating devices and to initiate the appropriate response to those signals.

NFPA 72, 2022 edition has the following definition for a fire alarm system and a building fire alarm system:

3.3.118 Fire Alarm System.

A system or portion of a combination system that consists of components and circuits arranged to monitor and annunciate the status of fire alarm or supervisory signal-initiating devices and to initiate the appropriate response to those signals. (SIG-FUN)

3.3.118.4.1 Building Fire Alarm System.

A protected premises fire alarm system that includes any of the features identified in **23.3.3.1** and that serves the general fire alarm needs of a building or buildings and provides notification. (SIG-PRO)

With NFPA 72 providing a definition for a building fire alarm system, I believe it is the current intent of the IFC to not require a Dedicated Function fire alarm system to monitor a pre-engineered fire extinguishing system, or other alternative automatic fire-extinguishing system. This proposal would clarify the requirement for monitoring of automatic fire extinguishing systems. In most cases, automatic fire extinguishing systems activate prior to activation for the sprinkler system. A pre-engineered fire extinguishing system protecting a commercial kitchen hood activates when the hood system senses fire, prior to, and often without activation of the sprinkler system. When the automatic fire extinguishing system is monitored, there would be earlier notification to the fire department.

Cost Impact: Increase

Estimated Immediate Cost Impact:

The proposal could have an increase in construction cost for installation of a dedicated function fire alarm system. If the automatic fire extinguishing system is located near the fire alarm control unit or the fire alarm system initiating circuit wiring, there would be no significant cost impact. An example of increased cost would be a strip mall, where the automatic fire extinguishing system is located at one end of the strip mall and the fire alarm control unit is located at the other end. In this case, a 5% increase in system cost could be expected.

Estimated Immediate Cost Impact Justification (methodology and variables):

The proposal could have an increased system cost of approximately 5% for the installation of additional fire alarm initiating device circuit wiring to the automatic fire extinguishing system.

Estimated Life Cycle Cost Impact:

There is not estimated additional life cycle cost for this proposal.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

There is not estimated additional life cycle cost for this proposal.

F116-24

F117-24

IFC: 904.7, 904.7.1 (New), 904.7.1, 904.7.3 (New); IBC: [F] 904.7, [F] 904.7.1 (New)

Proponents: Kevin Scott, KH Scott & Associates LLC, self (khscottassoc@gmail.com)

2024 International Fire Code

904.7 Foam systems.
Foam-extinguishing systems shall be installed, maintained, periodically inspected and tested in accordance with NFPA 11 and their listing. Records of inspections and testing shall be maintained.

Add new text as follows:

904.7.1 Foam concentrate type. The foam concentrate type utilized in foam-extinguishing systems shall be in accordance with NFPA 11 and shall not contain intentionally-added polyfluoroalkyl substances or perfluoroalkyl substances (PFAS).

Revise as follows:

~~904.7.1~~ 904.7.2 System test.
Foam-extinguishing systems shall be inspected and tested at intervals in accordance with NFPA 25.

Add new text as follows:

904.7.3 Existing foam systems. Existing supplies of firefighting foam containing PFAS shall be replaced with a foam concentrate type complying with Section 904.7.1 based on the following schedule, whichever occurs first:

1. The tank containing AFFF is due for a hydrostatic test in accordance with Section 11.3.5 of NFPA 25.
2. The foam concentrate fails the annual quality condition test required in Section 11.3.1.1 of NFPA 25. The owner shall notify the fire code official after a failed quality condition test and establish a timeframe for replacement foam concentrate and necessary components that is acceptable to the fire code official.

2024 International Building Code

[F] 904.7 Foam systems.
Foam-extinguishing systems shall be installed, maintained, periodically inspected and tested in accordance with NFPA 11 and their listing. Records of inspections and testing shall be maintained.

Add new text as follows:

[F] 904.7.1 Foam concentrate type. The foam concentrate type utilized in foam-extinguishing systems shall be in accordance with NFPA 11 and shall not contain intentionally-added polyfluoroalkyl substances or perfluoroalkyl substances (PFAS).

Reason: Aqueous film-forming foam concentrates (AFFF) contain PFAS (polyfluoroalkyl substances or perfluoroalkyl substances). PFAS is referred to as a “forever chemical”, and U.S. EPA has determined that exposure to PFAS can have detrimental health effects. To address this situation, this proposal is one of three code changes addressing AFFF in fire-extinguishing systems.

Thousands of existing foam fire-extinguishing systems exist across the country. EPA and some states have already taken actions to remove or reduce materials containing PFAS that could present an exposure. This proposal is designed to replace the current AFFF supplies, and have the foam concentrate supply replaced with a nonfluorinated foam concentrate.

Section 904.7.2 is added to the code to specify that the type of foam concentrate must be in accordance with NFPA 11 and must not contain any intentionally added PFAS. The 2021 edition of NFPA 11 now includes criteria for protection with nonfluorinated foam.

Section 904.7.3 is added to set a trigger replacement of existing AFFF foam concentrate supplies with a nonfluorinated foam supply. Along with the items listed in Section 904.7.2, EPA and states may specify a certain date for replacement. The items listed in Section 904.7.2 represent occurrences in the life of the foam-extinguishing system. When either of these situations occur, it is time to replace the foam concentrate supply. This section refers back to Section 904.7.2 for approval of the type of foam concentrate used as the new supply.

Replacement with the newer nonfluorinated foam concentrates is not a simple swap of tank contents—much or all of the existing system equipment and piping may need to be replaced. Usually, the quantity of foam will increase resulting in the need for a larger supply and tank. Often, the foam-water sprinklers or nozzles need to be replaced for this new concentrate. Nonfluorinated foam concentrates are typically more viscous than AFFF, so a different eductor or foam pump is required. With all of this time, work, supplies of concentrate and equipment needed, it is not possible to replace all of these systems in a short time. It is not uncommon for a single facility to have thousands of gallons of product ready for system activation, and another stock of AFFF for replenishment after system activation.

Item 1 states that when the AFFF bladder tank is due for hydrostatic testing, the foam is to be replaced. The requirement for testing is every ten years. During hydrostatic testing, the foam concentrate is removed from the tank presenting an obvious opportunity to refill the tank with nonfluorinated foam. The date for hydrostatic retesting is known years in advance. This advance notice provides time to determine what other components of the extinguishing system must also be replaced, with the intent to ensure a minimal down time.

Item 2 states that when the foam concentrate fails the annual quality condition testing, it shall be replaced. The real-world practice when the foam concentrate fails the quality condition test is to test it again. Once it is confirmed that the concentrate has failed, the next step is to establish a plan for replacement. At this point, the fire code official is involved in determining the timeframe for replacement. There have been incidents where foam, that has failed the quality condition testing, has successfully controlled and extinguished a fire. The decision on the urgency should be based on whether quality condition tests have been completed annually and what portion of the piping and appurtenances must be replaced at the same time the foam is replaced. This will allow the transition to nonfluorinated foam to occur with the least down time.

Cost Impact: Increase

Estimated Immediate Cost Impact:

This proposal does not increase the cost of construction, but it will increase the cost of maintenance of an existing AFFF system. U.S. EPA has placed a ban on use of AFFF for new installations and many manufacturers are no longer producing AFFF.

Estimated Immediate Cost Impact Justification (methodology and variables):

The estimate for construction costs is for little change in cost. An internet search on January 8, 2023 found the following product costs:

1. Chemguard 3%/6% AR-AFFF 5 gallons at $266.95
2. Chemguard 3%/3% AR-NFFF 5 gallons at $266.48

It is obvious that the cost of the product will have little impact.

The increase on maintenance costs could be significant depending on the size of the system, and whether the existing piping network needs to be replaced. There are too many variables to develop an accurate estimate.

F117-24

F118-24

IFC: 904.15.1.2, UL Chapter 80 (New); IBC: [F] 904.15.1.2, UL Chapter 35 (New)

Proponents: Jonathan Roberts, UL Solutions, UL Solutions (jonathan.roberts@ul.com)

2024 International Fire Code

Revise as follows:

904.15.1.2 Ignition prevention. Electric Cooktops and ranges shall include heating elements ~~burners~~ that have been tested and *listed* in accordance with UL 858 to prevent ignition of cooking oil ~~with burners turned on to their maximum heat settings and allowed to operate for 30 minutes.~~

Add new standard(s) as follows:

UL

Underwriters Laboratories LLC
333 Pfingsten Road
Northbrook, IL 60062

858-2014	Household Electric Ranges - with revisions through August 2023.

2024 International Building Code

Revise as follows:

[F] 904.15.1.2 Ignition prevention.
Electric cooktops ~~Cooktops~~ and ranges shall include heating elements ~~burners~~ that have been tested and *listed* in accordance with UL 858 to prevent ignition of cooking oil ~~with burners turned on to their maximum heat settings and allowed to operate for 30 minutes~~.

Add new standard(s) as follows:

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062

858-2014	Household Electric Ranges - with revisions through August 2023.

Staff Analysis: A review of the standard proposed for inclusion in the code, ***Household Electric Ranges - with revisions through August 2023 (UL 858-2014)***, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: This proposal correlates the appliance requirements in the IFC with the current requirements for electric cooktops and ranges in IRC M1503.2, IRC M1901.2, and IMC 917.1. The IRC and IMC already require the appliance to be listed and labeled to UL 858. The latest edition of UL 858 includes the testing requirement for the heating elements to prevent cooking oil ignition.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

There is no increase to cost of construction as these appliances are already required to be listed and labeled. The proposal merely identifies the appropriate product standard.

F118-24

F119-24

IFC: 905.3.8 (New); IBC: [F] 412.2.7 (New), [F] 905.3.8 (New)

Proponents: William Cooper, Protection Engineers, LLC, FAA Fire Protection Engineering Code Team (wacooper@protengineers.com); David Clark, Protection Engineers, LLC, FAA Fire Protection Engineering Code Team (dwclark@protengineers.com)

2024 International Fire Code

Add new text as follows:

905.3.8 Airport Traffic Control Towers. Class I standpipes in airport traffic control towers shall be permitted to be manual where approved by the fire code official.

2024 International Building Code

Add new text as follows:

[F] 412.2.7 Standpipe System.
An airport traffic control tower shall be equipped with a standpipe as required by Section 905.

[F] 905.3.8 Airport Traffic Control Towers. Class I standpipes in airport traffic control towers shall be permitted to be manual where approved by the fire code official.

Reason: The proposed addition to IBC 412 states the requirement for standpipes in airport traffic control towers, similar to the statement made in IBC 403 for high-rise buildings. The proposed IBC/ IFC Section 905 addition cites a permitted allowance for airport traffic control towers to be served by manual wet standpipe systems where permitted by the authority having jurisdiction.

This new section is needed for clarification because many designers incorrectly regard airport traffic control towers as high-rise buildings (specifically excluded in IBC 403.1 exceptions) where NFPA 14 (cited in IBC 905.2) specifically precludes the use of manual standpipes.

Unnecessarily increasing the size of the fire pump to serve an automatic Class I standpipe demand in lieu of the fire sprinkler demand only can substantively impact the critical electrical systems serving airport traffic control towers. The specific result being an engine generator which is oversized for the necessary electrical demands, even though the fire department may have the capability, equipment, and resources to adequately serve the hydraulic standpipe system demands.

The proposed language also includes “where permitted by the authority having jurisdiction” to assure the responding fire department apparatus and resources are capable of supplying the needed standpipe hydraulic demands where a manual wet system is leveraged.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

The estimated immediate cost impact for this code change is expected to be approximately $50k per installation.

Estimated Immediate Cost Impact Justification (methodology and variables):

Elements included in the immediate cost impact are:

1. Fire pump size reduction.
2. Engine generator size reduction.

Estimated Life Cycle Cost Impact:

The estimated life cycle cost impact for this code change is expected to be limited annually but approximately $50k per installation as infrastructure goes through routine life cycle replacements.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

Elements included in the life cycle replacement cost impact are:

1. Fire pump size reduction.
2. Engine generator size reduction.

F119-24

F120-24

IFC: 905.3.8 (New); IBC: [F] 905.3.8 (New)

Proponents: Jeffrey M Hugo, CBO, NFSA, National Fire Sprinkler Association (hugo@nfsa.org)

2024 International Fire Code

Add new text as follows:

905.3.8 High-piled storage. High-piled storage occupancies shall be equipped with Class I standpipes when required by Section 3206.9.

2024 International Building Code

Add new text as follows:

[F] 905.3.8 High-piled storage. High-piled storage occupancies shall be equipped with Class I standpipes when required by Section 3206.9 of the *International Fire Code*.

Reason: Section 905.3 of the IBC/IFC provides pointers to all areas in the code where standpipe systems are required but the current IBC/IFC is missing the pointer to high-piled storage in IFC Chapter 32.

Section 3206.9 requires Class I standpipes in exit passageways, where present in high-piled storage areas.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is already required but may be missed if the user is not familiar with Chapter 32 of the IFC.

F120-24

F121-24

IFC: 905.4; IBC: [F] 905.4

Proponents: Jeffrey Grove, Coffman Engineers, Coffman Engineers (jeff.grove@coffman.com)

2024 International Fire Code

Revise as follows:

905.4 Location of Class I standpipe hose connections.
Class I standpipe hose connections shall be provided in all of the following locations:

1. In every required *interior exit stairway* or *exterior exit stairway* , a hose connection shall be provided for each story above and below *grade plane*. Hose connections shall be located at the main floor landing unless otherwise *approved* by the *fire code official*.

   Exception: A single hose connection shall be permitted to be installed in the open *corridor* or open breezeway between open *stairs* that are not greater than 75 feet (22 860 mm) apart.

2. On each side of the wall adjacent to the exit opening of a horizontal exit. <u>The hose connections shall be visible from and provided within 20 feet (6096 mm) of each side of the horizontal exit.</u>

   Exception: Where <u>all</u> floor areas ~~adjacent to a horizontal *exit*~~ are reachable from an *interior exit stairway* or *exterior exit stairway* hose connection ~~by a 30-foot (9144 mm) hose stream from a nozzle attached to 100 feet (30 480 mm) of hose, a hose connection shall not be required at the horizontal *exit*.~~ <u>on the same side of a horizontal exit within 130 feet travel distance, the hose connection on the other side of the horizontal exit shall be permitted to be omitted. Where a building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2, this travel distance may be increased to 200 feet.</u>

3. In every exit *passageway*, at the entrance from the *exit passageway* to other areas of a building.

   Exception: Where <u>all</u> floor areas adjacent to an *exit passageway* are reachable from an *interior exit stairway* or *exterior exit stairway* hose connection ~~by a 30-foot (9144 mm) hose stream from a nozzle attached to 100 feet (30 480 mm) of hose, a hose connection shall not be required at the entrance from the *exit passageway* to other areas of the building.~~
   <u>within 130 feet travel distance, the hose connection at the exit passageway shall be permitted to be omitted. Where a building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2, this travel distance may be increased to 200 feet.</u>

4. In covered mall buildings, adjacent to each exterior public entrance to the mall and adjacent to each entrance from an *exit passageway* or *exit corridor* to the mall. In open mall buildings, adjacent to each public entrance to the mall at the perimeter line and adjacent to each entrance from an *exit passageway* or *exit corridor*to the mall.
5. Where the roof has a slope less than 4 units vertical in 12 units horizontal (33.3-percent slope), a hose connection shall be located to serve the roof or at the highest landing of an *interior exit stairway* with access to the roof provided in accordance with Section 1011.12.
6. Where the most remote portion of a nonsprinklered floor or story is more than 150 feet (45 720 mm) from a hose connection or the most remote portion of a sprinklered floor or story is more than 200 feet (60 960 mm) from a hose connection, the *fire code official* is authorized to require that additional hose connections be provided in *approved* locations.

2024 International Building Code

Revise as follows:

[F] 905.4 Location of Class I standpipe hose connections.
Class I standpipe hose connections shall be provided in all of the following locations:

1. In every required *interior exit stairway* or *exterior exit stairway* , a hose connection shall be provided for each *story* above and below *grade plane*. Hose connections shall be located at the main floor landing unless otherwise *approved* by the fire code official.

   Exception: A single hose connection shall be permitted to be installed in the open corridor or open breezeway between open *stairs* that are not greater than 75 feet (22 860 mm) apart.

2. On each side of the wall adjacent to the exit opening of a *horizontal exit*. The hose connections shall be visible from and provided within 20 feet (6096 mm) of each side of the horizontal exit.

   Exception: Where all floor areas ~~adjacent to a horizontal *exit*~~ are reachable from an *interior exit stairway* or *exterior exit stairway* hose connection ~~by a 30-foot (9144 mm) hose stream from a nozzle attached to 100 feet (30 480 mm) of hose, a hose connection shall not be required at the horizontal *exit*.~~ on the same side of a horizontal exit within 130 feet travel distance, the hose connection on the other side of the horizontal exit shall be permitted to be omitted. Where a building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2, this travel distance may be increased to 200 feet.

3. In every *exit passageway*, at the entrance from the *exit passageway* to other areas of a *building*.

   Exception: Where all floor areas adjacent to an *exit passageway* are reachable from an *interior exit stairway* or *exterior exit stairway* hose connection ~~by a 30-foot (9144 mm) hose stream from a nozzle attached to 100 feet (30 480 mm) of hose, a hose connection shall not be required at the entrance from the *exit passageway* to other areas of the building.~~ within 130 feet travel distance, the hose connection at the exit passageway shall be permitted to be omitted. Where a building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2, this travel distance may be increased to 200 feet.

4. In *covered mall buildings*, adjacent to each exterior public entrance to the *mall* and adjacent to each entrance from an exit *passageway* or exit *corridor* to the *mall*. In *open mall buildings*, adjacent to each public entrance to the *mall* at the perimeter line and adjacent to each entrance from an exit *passageway* or *exit* corridor to the *mall*.
5. Where the roof has a slope less than 4 units vertical in 12 units horizontal (33.3-percent slope), a hose connection shall be located to serve the roof or at the highest landing of an *interior exit stairway* with access to the roof provided in accordance with Section 1011.12.
6. Where the most remote portion of a nonsprinklered floor or *story* is more than 150 feet (45 720 mm) from a hose connection or the most remote portion of a sprinklered floor or *story* is more than 200 feet (60 960 mm) from a hose connection, the fire code official is authorized to require that additional hose connections be provided in *approved* locations.

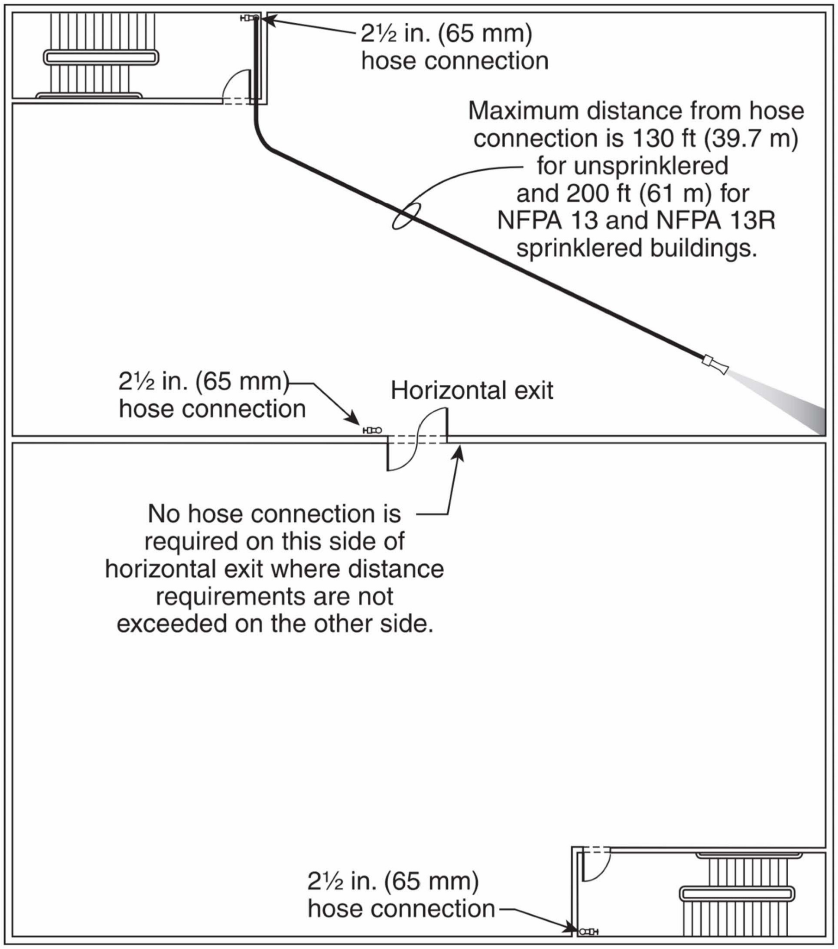
Reason: This change will remove ambiguity from the Exceptions to Item 2 and Item 3 by aligning the code language with NFPA 14, the governing design standard for standpipe systems as prescribed by Section 905.2. These changes, made in an effort to be consistent with NFPA 14, include:

- Provide definitive direction on the required location of hose connections at exit openings in a horizontal exit. 2019 NFPA 14 Section 7.3.2.2 did not contain quantitative requirements for the location of hose connections on each side of a horizontal exit. 2024 NFPA 14 Section 9.5.2.2 has been revised to specify that the hose connections must be, "visible from and provided within 20 feet of each side of horizontal exits."
- Streamline the distance measurements referenced in the Exceptions to Item 2 and Item 3 to be a standard measure of travel distance rather than a combination of hose pull and hose stream.
- Extend the Exceptions to Item 2 and Item 3 to increase the allowable travel distance for fully sprinklered buildings from 130 feet to 200 feet. Currently, IBC Section 905.4(6) allows an increase in hose connection distance to 200 feet with the following clarification in the Code Commentary: "...the need for prompt manual suppression is reduced by the presence of the sprinkler system." This change accounts for the increased protection provided by active fire suppression which allows additional time for the responding fire department to attach additional lengths of hose.

NFPA 14 (2024 Edition) Figure A.9.5.2.2.1 from the NFPA 14 annex demonstrates the intended application of this code change proposal. https://link.nfpa.org/free-access/publications/14/2024

Currently, the IBC is more restrictive than NFPA 14. While these changes will make Section 905.4 less restrictive overall, they will also align the IBC with the requirements of the governing design standard, NFPA 14, creating consistency across referenced codes and standards.

This change will also address and resolve comments raised by F80-21 in the previous code change cycle, which was rejected.



Bibliography: NFPA 14, Standard for the Installation of Standpipe and Hose Systems

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Code change proposal intends to coordinate requirements between NFPA 14 and the IFC and does not increase nor decrease the cost of construction.

F121-24

F122-24

IFC: 905.4, 905.5, 905.6; IBC: [F] 905.4, [F] 905.5, [F] 905.6

Proponents: Steve Thomas, Shums Coda Associates, Himself (sthomas@coloradocode.net)

2024 International Fire Code

Revise as follows:

905.4 Location of Class I standpipe hose connections.
Where standpipe systems are provided in accordance with Section 905.3, Class I standpipe hose connections shall be provided in all of the following locations:

1. In every required *interior exit stairway* or *exterior exit stairway* , a hose connection shall be provided for each story above and below *grade plane*. Hose connections shall be located at the main floor landing unless otherwise *approved* by the *fire code official*.

   Exception: A single hose connection shall be permitted to be installed in the open *corridor* or open breezeway between open *stairs* that are not greater than 75 feet (22 860 mm) apart.

2. On each side of the wall adjacent to the exit opening of a horizontal exit.

   Exception: Where floor areas adjacent to a horizontal *exit* are reachable from an *interior exit stairway* or *exterior exit stairway* hose connection by a 30-foot (9144 mm) hose stream from a nozzle attached to 100 feet (30 480 mm) of hose, a hose connection shall not be required at the horizontal *exit*.

3. In every exit *passageway*, at the entrance from the *exit passageway* to other areas of a building.

   Exception: Where floor areas adjacent to an *exit passageway* are reachable from an *interior exit stairway* or *exterior exit stairway* hose connection by a 30-foot (9144 mm) hose stream from a nozzle attached to 100 feet (30 480 mm) of hose, a hose connection shall not be required at the entrance from the *exit passageway* to other areas of the building.

4. In covered mall buildings, adjacent to each exterior public entrance to the mall and adjacent to each entrance from an *exit passageway* or *exit corridor* to the mall. In open mall buildings, adjacent to each public entrance to the mall at the perimeter line and adjacent to each entrance from an *exit passageway* or *exit corridor*to the mall.
5. Where the roof has a slope less than 4 units vertical in 12 units horizontal (33.3-percent slope), a hose connection shall be located to serve the roof or at the highest landing of an *interior exit stairway* with access to the roof provided in accordance with Section 1011.12.
6. Where the most remote portion of a nonsprinklered floor or story is more than 150 feet (45 720 mm) from a hose connection or the most remote portion of a sprinklered floor or story is more than 200 feet (60 960 mm) from a hose connection, the *fire code official* is authorized to require that additional hose connections be provided in *approved* locations.

905.5 Location of Class II standpipe hose connections. Where standpipe systems are provided in accordance with Section 905.3, Class II standpipe hose connections shall be located so that all portions of the building are within 30 feet (9144 mm) of a nozzle attached to 100 feet (30 480 mm) of hose. Class II standpipe hose connections shall be located where they will have *ready access*.

905.6 Location of Class III standpipe hose connections.
Where standpipe systems are provided in accordance with Section 905.3, Class III standpipe systems shall have hose connections located as required for Class I standpipes in Section 905.4 and shall have Class II hose connections as required in Section 905.5.

2024 International Building Code

Revise as follows:

[F] 905.4 Location of Class I standpipe hose connections. Where standpipe systems are provided in accordance with Section 905.3, Class I standpipe hose connections shall be provided in all of the following locations:

1. In every required *interior exit stairway* or *exterior exit stairway* , a hose connection shall be provided for each *story* above and below *grade plane*. Hose connections shall be located at the main floor landing unless otherwise *approved* by the fire code official.

   Exception: A single hose connection shall be permitted to be installed in the open corridor or open breezeway between open *stairs* that are not greater than 75 feet (22 860 mm) apart.

2. On each side of the wall adjacent to the exit opening of a *horizontal exit*.

   Exception: Where floor areas adjacent to a *horizontal exit* are reachable from an *interior exit stairway* or *exterior exit stairway* hose connection by a 30-foot (9144 mm) hose stream from a nozzle attached to 100 feet (30 480 mm) of hose, a hose connection shall not be required at the *horizontal exit*.

3. In every *exit passageway*, at the entrance from the *exit passageway* to other areas of a *building*.

   Exception: Where floor areas adjacent to an *exit passageway* are reachable from an *interior exit stairway* or *exterior exit stairway* hose connection by a 30-foot (9144 mm) hose stream from a nozzle attached to 100 feet (30 480 mm) of hose, a hose connection shall not be required at the entrance from the *exit passageway* to other areas of the *building*.

4. In *covered mall buildings*, adjacent to each exterior public entrance to the *mall* and adjacent to each entrance from an exit *passageway* or exit *corridor* to the *mall*. In *open mall buildings*, adjacent to each public entrance to the *mall* at the perimeter line and adjacent to each entrance from an exit *passageway* or *exit* corridor to the *mall*.
5. Where the roof has a slope less than 4 units vertical in 12 units horizontal (33.3-percent slope), a hose connection shall be located to serve the roof or at the highest landing of an *interior exit stairway* with access to the roof provided in accordance with Section 1011.12.
6. Where the most remote portion of a nonsprinklered floor or *story* is more than 150 feet (45 720 mm) from a hose connection or the most remote portion of a sprinklered floor or *story* is more than 200 feet (60 960 mm) from a hose connection, the fire code official is authorized to require that additional hose connections be provided in *approved* locations.

[F] 905.5 Location of Class II standpipe hose connections. Where standpipe systems are provided in accordance with Section 905.3, Class II standpipe hose connections located so that all portions of the *building* are within 30 feet (9144 mm) of a nozzle attached to 100 feet (30 480 mm) of hose. Class II standpipe hose connections shall be located where they will have *ready access*.

[F] 905.6 Location of Class III standpipe hose connections.
Where standpipe systems are provided in accordance with Section 905.3, Class III standpipe systems shall have hose connections located as required for Class I *standpipes* in Section 905.4 and shall have Class II hose connections as required in Section 905.5.

Reason: The language in Section 905 is confusing. Section 905.3 specifies where standpipe system are required. Sections 905.4, 905.5, and 905.6 specify when hose connections are required. The confusion comes when Section 905.3 does not require a standpipe system, but Sections 905.4 requires a hose connection. For example, in Section 905.4, Item 1, hose connections are required in every interior exit stairway. However, standpipes are only required in buildings that meet the provisions of Section 905.3.1. The intent of the section is that when standpipe systems are provided, the hose connections are required. A three story building would not be required to have a standpipe, but Section 905.4, Item 1 would say that you need hose connections in each stairway. The same condition applies when a horizontal exit is provided in a building that does not require standpipe system. The purpose of this proposal is to clarify that when standpipe systems are provided in a building, the various hose connections must be provided. But if there is no standpipe system, the hose connections are not required.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is a clarification of the code requirements. See reason statement.

F122-24

F123-24

IFC: 905.12 (New)

Proponents: Jeffrey M Hugo, CBO, NFSA, National Fire Sprinkler Association (hugo@nfsa.org)

2024 International Fire Code

Add new text as follows:

905.12 Pressure regulating devices. Where permitted by the fire code official, pressure regulating devices installed on Class I or Class III standpipe hose valves with a static pressure not exceeding 175 psi. shall be permitted to be replaced with standard hose valves.

Reason: Following the February 23, 1991, Meridian One Plaza fire that claimed the lives of three Philadelphia firefighters, NFPA 14 was amended during the 1990 standards cycle to allow outlet maximum pressures on hose connections to be increased from 100 psi to 175 psi. The substantiation at that time noted that the requirement for limiting outlet pressures to 100 psi may endanger firefighters due to inadequate nozzle pressure. This continues to be an issue for buildings built prior to the 1993 NFPA 14 standard amendment that allows for the higher pressures of 175 psi. This amendment would allow the fire service the option of taking advantage of higher pressures currently allowed in the standard while not exceeding the current 175 psi limitation. This change correlates to the current (2024) and referenced edition of NFPA 14.

Cost Impact: Increase

Estimated Immediate Cost Impact:

Source: Actual estimates and RS Means.

Removing and adding new hose valves:

- Crew: 8-12 hours: $2,000 - 3,000
- Range total cost of $300 – $350 per 2 ½ inch hose valve.
- Estimate for typical seven story high rise with two stair enclosures per floor (14 hose valves), $6,200 - $7,900.

Five-year testing and maintenance of all existing pressure regulating valve (14 PRVs):

- Crew: 12-16 hours: $3,000 - $4,000

Estimated Immediate Cost Impact Justification (methodology and variables):

Analogous methodology using actual current cost estimates and data from RS Means to create a range of cost. This change, where permitted in existing buildings, will add a cost of construction, however, it eliminates the five-year testing and maintenance cost on pressure regulating devices required by the IFC referenced standard, NFPA 25.

F123-24

F124-24

IFC: 906.5 (New); IBC: [F] 906.5 (New)

Proponents: Jacob David, Wiss, Janney, Elstner, Associates, Inc. (WJE), Jesse Corletto, EfireX (jesse@efirex.com) (jdavid@wje.com)

2024 International Fire Code

Add new text as follows:

906.5 Electrical energy storage system (ESS) fires. Fire extinguishers provided for the protection of fire areas within rooms, areas, and walk-in units containing ESS required to comply with Section 1207 shall be of an approved type and shall be selected and placed on the basis of the anticipated Class A hazard.

2024 International Building Code

Add new text as follows:

[F] 906.5 Electrical energy storage system (ESS) fires. Fire extinguishers provided for the protection of fire areas within rooms, areas, and walk-in units containing ESS required to comply with Section 1207 shall be of an approved type and shall be selected and placed on the basis of the anticipated Class A hazard.

Reason: The use of electrical energy storage systems (ESS) is becoming increasingly prevalent in order to meet today's energy and environmental demands. ESS are now allowed to use a variety of battery technologies including new generations of batteries such as lithium-ion and flow batteries. As ESS become more advanced and widely utilized, it is important to require the use of appropriate fire protection to protect building occupants and emergency responders. Currently, the selection and placement of portable fire extinguishers for ESS is based on the classification of the fire hazard as Class A, B, C, or D. However, ESS present unique challenges related to fire protection and can represent multiple fire classes within one entity. Additionally, each individual type of ESS poses specific threats based on the characteristics of the battery being used. The IFC should recognize these differences in ESS and allow for the selection of portable fire extinguishers based on the specific hazards posed by the ESS.

The intent of the proposed amendment is to reinforce the required installation of approved portable fire extinguishers for the protection of ESS hazards based on the appropriate battery technology/chemistry. Since ESS in part represent Class C hazards, the proposed language for the selection and placement of such fire extinguishers was based on the current IFC requirements for the selection and placement of fire extinguishers protecting Class C hazards. It is not the intent of the proposed amendment to remove requirements for portable fire extinguishers in rooms, areas, and walk-in units containing ESS that are not required to comply with Section 1207. Where an ESS is outside the scope of Section 1207, the requirements of Sections 906.1 and 906.2 remain in effect.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposed amendment will have no cost impact since it does not require additional portable fire extinguishers for the protection of ESS. Instead, the amendment is intended to reinforce the need for appropriate portable fire extinguishers for the protection of occupancies containing ESS.

F124-24

F125-24

IFC: 906.5 (New); IBC: [F] 906.5 (New)

Proponents: Jacob David, Wiss, Janney, Elstner Associates, Inc. (WJE), Jesse Corletto, EfireX (jesse@efirex.com) (jdavid@wje.com)

2024 International Fire Code

Add new text as follows:

906.5 Lithium-ion and lithium metal battery storage fires. Fire extinguishers provided for the protection of fire areas used for lithium-ion and lithium metal battery storage required to comply with Section 320 shall be of an approved type and shall be selected and placed on the basis of the anticipated Class A hazard.

2024 International Building Code

Add new text as follows:

[F] 906.5 Lithium-ion and lithium metal battery storage fires. Fire extinguishers provided for the protection of fire areas used for lithium-ion and lithium metal battery storage required to comply with Section 320 shall be of an approved type and shall be selected and placed on the basis of the anticipated Class A hazard.

Reason: Lithium-ion batteries constitute a unique fire hazard due to the inclusion of multiple fire hazard classes (Class A, Class B, Class C, and Class D) within one entity and the possibility of the occurrence of thermal runaway. The intent of the proposed amendment is to reinforce the required installation of approved portable fire extinguishers for the protection of hazards in industrial facilities used for storage of lithium-ion and lithium metal batteries. Since lithium batteries in part represent Class C hazards, the proposed language for the selection and placement of such fire extinguishers was based on the current IFC requirements for the selection and placement of fire extinguishers protecting Class C hazards. It is not the intent of the proposed amendment to remove requirements for portable fire extinguishers in occupancies used for lithium-ion and lithium metal battery storage required to comply with Section 320. Where a storgae occupancy is outside the scope of Section 320, the requirements of Sections 906.1 and 906.2 remain in effect.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposed amendment will have no cost impact since it does not require additional portable fire extinguishers for the protection of occupancies used for lithium-ion and lithium metal battery storage. Instead, the amendment is intended to reinforce the need for appropriate portable fire extinguishers for the protection of these occupancies.

F125-24

F126-24

IFC: 906.9, 906.9.2; IBC: [F] 906.9, [F] 906.9.2

Proponents: JED NEILSEN, Springville City, Colorado Chapter Code Development Committee (j.t.neilsen24@gmail.com)

2024 International Fire Code

Revise as follows:

906.9 Extinguisher installation.
The installation of portable fire extinguishers shall be in accordance with Sections 906.9.1 through 906.9.3. Installation of fire extinguishers within a *means of egress* shall also comply with Section 1003.3.3.

906.9.2 Extinguishers weighing more than 40 pounds. Hand-held portable fire extinguishers having a gross weight exceeding 40 pounds (18 kg) shall be installed so that the tops of the extinguisher is ~~their tops are~~ not more than 42 inches ~~3.5 feet~~(1067mm) above the floor.

2024 International Building Code

Revise as follows:

[F] 906.9 Extinguisher installation.
The installation of portable fire extinguishers shall be in accordance with Sections 906.9.1 through 906.9.3. Installation of fire extinguishers within a *means of egress* shall also comply with Section 1003.3.3.

[F] 906.9.2 Extinguishers weighing more than 40 pounds. Hand-held portable fire extinguishers having a gross weight exceeding 40 pounds (18 kg) shall be installed so that the tops of the extinguisher is ~~their tops are~~ not more than 42 inches ~~3.5 feet~~(1067mm) above the floor.

Reason: Additional wording needed in 906.9 Extinguisher installation to reference horizontal projections being installed within the *circulation path* of the means of egress. This is simply a pointer to help with compliance and does not change code requirements. Also, changes to clarify where measurement is taken to (top of extinguisher, not top of cabinet) and to make units of measurements consistent throughout code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is editorial.

F126-24

F127-24

IFC: SECTION 202 (New), 907.1.4 (New); IBC: SECTION 202 (New), [F] 907.1.4 (New)

Proponents: Maria Marks, Siemens, Siemens (maria.marks@siemens.com); Richard Roberts, Honeywell Building Automation, Honeywell Building Automatation (richard.roberts@systemsensor.com); Jason Webb, Potter Electric Signal, Automatic Fire Alarm Association Codes & Standards Committee (jasonw@pottersignal.com); Scott Lang, Honeywell, Honeywell (scott.lang@honeywell.com)

2024 International Fire Code

Add new definition as follows:

REMOTE SYSTEM ACCESS

. A mechanism for owners, facility managers, fire code officials, and installers to perform remote inspections, testing and system updates. Devices used to access a fire alarm or signaling system remotely included but not limited to laptop computers, cellular handheld devices, cloud-based systems, applications.

Add new text as follows:

907.1.4 Remote System Access. Accessing a fire alarm or signaling system using remote system access for testing, maintenance, diagnostics, software updates and reacceptance testing of software changes shall be in accordance with NFPA 72.

2024 International Building Code

Add new definition as follows:

[F] REMOTE SYSTEM ACCESS. A mechanism for owners, facility managers, fire code officials, and installers to perform remote inspections, testing and system updates. Devices used to access a fire alarm or signaling system remotely included but not limited to laptop computers, cellular handheld devices, cloud-based systems, applications.

Add new text as follows:

[F] 907.1.4 Remote System Access. Accessing a fire alarm or signaling system using remote system access for testing, maintenance, diagnostics, software updates and reacceptance testing of software changes shall be in accordance with NFPA 72.

Reason: This proposal seeks to provide guidance to designers, engineers, installers, users, and fire code officials for applications where remote access may be utilized. These locations may include areas where access to test devices is difficult to reach, or access to systems is restricted. Additionally, by using remote access, a user can verify system status securely and ensure the system is operational. Troubleshooting during maintenance can be streamlined to minimize downtime.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is a feature that is already incorporated into Fire Alarm Control Units (FACU).

F127-24

F128-24

IFC: SECTION 202 (New), 907.1.4 (New); IBC: SECTION 202 (New), [F] 907.1.4 (New)

Proponents: Shane Clary, Bay Alarm Company, Automatic Fire Alarm Association (smclary@bayalarm.com)

2024 International Fire Code

Add new definition as follows:

REMOTE SYSTEM ACCESS. Remote system access is a mechanism for owners, facility managers, fire code officials, and installers to perform remote inspections, testing and system updates.

Add new text as follows:

907.1.4 Remote System Access. Remote system access of a fire alarm or signaling system using laptop computers, cellular handheld devices, cloud-based systems, applications, or software for testing, maintenance, diagnostics, software updates and reacceptance testing of software changes shall be permitted in accordance with NFPA 72.

2024 International Building Code

Add new definition as follows:

[F] REMOTE SYSTEM ACCESS. Remote system access is a mechanism for owners, facility managers, fire code officials, and installers to perform remote inspections, testing and system updates.

Add new text as follows:

[F] 907.1.4 Remote System Access. Remote system access of a fire alarm or signaling system using laptop computers, cellular handheld devices, cloud-based systems, applications, or software for testing, maintenance, diagnostics, software updates and reacceptance testing of software changes shall be permitted in accordance with NFPA 72.

Reason: This proposal seeks to provide guidance to designers, engineers, installers, users, and fire code officials for applications where remote access may be utilized. These locations may include areas where access to test devices is difficult to reach, or access to systems is restricted. Additionally, by using remote access, a user can verify system status securely and ensure the system is operational. Troubleshooting during maintenance can be streamlined to minimize downtime.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal will not increase or decrease the cost of construction. See also the proponent's reason statement.

F128-24

F129-24

IFC: 907.2.9.3; IBC: [F] 907.2.9.3

Proponents: Ronald Clements, Chesterfield County, VA, Chesterfield County, VA (clementsro@chesterfield.gov)

2024 International Fire Code

Revise as follows:

907.2.9.3 Group R-2 college and university buildings. An *automatic smoke detection system* that activates the occupant notification system in accordance with Section 907.5 shall be installed in Group R-2 occupancies operated by a college or university for student or staff housing in all of the following locations:

1. Common spaces outside of *dwelling units* and *sleeping units*.
2. Laundry rooms, mechanical equipment rooms and storage rooms.
3. All interior *corridors* serving *sleeping units* or *dwelling units*.

Exception: An *automatic smoke detection system* is not required in buildings that do not have interior *corridors* serving *sleeping units* or *dwelling units* and where each *sleeping unit* or *dwelling unit* either has a *means of egress* door opening directly to an exterior *exit access* that leads directly to an *exit* or a *means of egress* door opening directly to an *exit*.

Required smoke alarms in *dwelling units* and *sleeping units* in Group R-2 occupancies operated by a college or university for student or staff housing shall be interconnected with the *fire alarm system* in accordance with NFPA 72. Activation of a smoke alarm shall initiate a visible and audible supervisory signal at a constantly attended location and report only as a supervisory signal and not as a fire alarm.

2024 International Building Code

Revise as follows:

[F] 907.2.9.3 Group R-2 college and university buildings.
An *automatic smoke detection system* that activates the occupant notification system in accordance with Section 907.5 shall be installed in Group R-2 occupancies operated by a college or university for student or staff housing in all of the following locations:

1. Common spaces outside of *dwelling units* and *sleeping units*.
2. Laundry rooms, mechanical equipment rooms and storage rooms.
3. All interior *corridors* serving *sleeping units* or *dwelling units*.

Exception: An *automatic smoke detection system* is not required in *buildings* that do not have interior *corridors* serving *sleeping units* or *dwelling units* and where each *sleeping unit* or *dwelling unit* either has a *means of egress* door opening directly to an exterior *exit access* that leads directly to an *exit* or a *means of egress* door opening directly to an *exit*.

Required *smoke alarms* in *dwelling units* and *sleeping units* in Group R-2 occupancies operated by a college or university for student or staff housing shall be interconnected with the *fire alarm system* in accordance with NFPA 72. Activation of a smoke alarm shall initiate a visible and audible supervisory signal at a constantly attended location and report only as a supervisory signal and not as a fire alarm.

Reason: The requirement in 907.2.9.3 to interconnect unit smoke alarms with the fire alarm system has been a point of confusion. The base paragraph states that the smoke detection system that activates the occupant notification system shall be provided in the three locations listed in the number list after the colon. The provision provided in the last sentence below the exception does not state what kind of signal or function activation of the unit smoke alarm devices are to produce. The ICC IBC Commentary states:

"This interconnection is only for the purpose of making occupants within each unit aware of the fire alarm activation in the building. The intent is not to activate the building fire alarm system by smoke alarms in each unit."

The Commentary states the intent is not to activate the fire alarm system by the unit smoke alarms, which suggests a supervisory function similar to what is required in 907.2.11 #3. This makes sense as false alarms and fire alarm fatigue are common problems in college dormitories and providing a supervisory function would provide notification that a smoke alarm has activated but without activating the full building fire alarm notification system. This also is similar to the requirement for duct smoke detectors to produce a supervisory signal.

This code change clarifies it is a supervisory signal, consistent with the ICC Commentary explanation, and uses language copied from the duct smoke detector provision in section 907.3.1.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This code change adds language to make the code provision consistent with what the ICC Commentary states is the intent of the section.

F129-24

F130-24

IFC: 907.2.11, 907.2.11.1, 907.2.11.2; IBC: [F] 907.2.11, [F] 907.2.11.1, [F] 907.2.11.2

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Fire Code

Revise as follows:

907.2.11 Single- and multiple-station smoke alarms.
Listed and *labeled* single- and multiple-station smoke alarms complying with UL 217 shall be installed in accordance with Sections 907.2.11.1 through 907.2.11.7, NFPA 72 and the manufacturer's instructions.

907.2.11.1 Group R-1. Single- or multiple-station smoke alarms shall be installed in all of the following locations in Group R-1:

1. In each room used for sleeping purposes ~~areas~~.
2. In every room in the path of the *means of egress* from the sleeping area to the door leading from the *sleeping unit*.
3. In each story within the *sleeping unit*, including *basements*. For *sleeping units* with split levels and without an intervening door between the adjacent levels, a smoke alarm installed on the upper level shall suffice for the adjacent lower level provided that the lower level is less than one full story below the upper level.
4. In the sleeping loft or within the room to which a sleeping loft is open, in the immediate vicinity of the sleeping loft.

907.2.11.2 Groups R-2, R-3, R-4 and I-1.
Single- or multiple-station smoke alarms shall be installed and maintained in Groups R-2, R-3, R-4 and I-1 regardless of *occupant load* at all of the following locations:

1. On the ceiling or wall outside of each separate sleeping area in the immediate vicinity of the bedrooms.
2. In each room used for sleeping purposes.
3. In each story within a *dwelling unit*, including *basements* but not including crawl spaces and uninhabitable attics. In *dwellings* or *dwelling units* with split levels and without an intervening door between the adjacent levels, a smoke alarm installed on the upper level shall suffice for the adjacent lower level provided that the lower level is less than one full story below the upper level.
4. In the sleeping loft or within the room to which a sleeping loft is open, in the immediate vicinity of the sleeping loft.

2024 International Building Code

Revise as follows:

[F] 907.2.11 Single- and multiple-station smoke alarms.
Listed and *labelled* *single-* and *multiple-station smoke alarms* complying with UL 217 shall be installed in accordance with Sections 907.2.11.1 through 907.2.11.7 , NFPA 72 and the manufacturer's instructions.

[F] 907.2.11.1 Group R-1.
Single- or *multiple-station smoke alarms* shall be installed in all of the following locations in Group R-1:

1. In each room used for sleeping purposes ~~areas~~.
2. In every room in the path of the *means of egress* from the sleeping area to the door leading from the *sleeping unit*.
3. In each *story* within the *sleeping unit*, including *basements*. For *sleeping units* with split levels and without an intervening door between the adjacent levels, a *smoke alarm* installed on the upper level shall suffice for the adjacent lower level provided that the lower level is less than one full *story* below the upper level.
4. In the sleeping loft or within the room to which a sleeping loft is open, in the immediate vicinity of the sleeping loft.

[F] 907.2.11.2 Groups R-2, R-3, R-4 and I-1.

Single- or *multiple-station smoke alarms* shall be installed and maintained in Groups R-2, R-3, R-4 and I-1 regardless of *occupant load* at all of the following locations:

1. On the ceiling or wall outside of each separate sleeping area in the immediate vicinity of bedrooms.
2. In each room used for sleeping purposes.
3. In each *story* within a *dwelling unit*, including *basements* but not including crawl spaces and uninhabitable *attics*. In *dwellings* or *dwelling units* with split levels and without an intervening door between the adjacent levels, a *smoke alarm* installed on the upper level shall suffice for the adjacent lower level provided that the lower level is less than one full *story* below the upper level.
4. In the sleeping loft or within the room to which a sleeping loft is open, in the immediate vicinity of the sleeping loft.

Reason: FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Occupants utilizing a sleeping loft should be protected with a smoke alarm. Smoke alarms are required to be installed within in the sleeping loft or in the "immediate vicinity" of the sleeping loft as a compliance option.

This language correlates with requirements in the 2024 IRC as revised by RB153-22 (AM/AMPC 1, 2 & 3).

The loft requirement is not applicable to R-Occupancies or I-2 Occupancies regulated by the IBC/IFC, as that requirement in the IRC (Section R314.3 Location) is specific to design features for lofts in IRC regulated buildings.

Cost Impact: Increase

Estimated Immediate Cost Impact:

Cost may be increased by the requirement to add one or more smoke alarms where sleeping lofts are provided. Cost estimate would not exceed $100 for the purchase of the new smoke alarm and installation.

Estimated Immediate Cost Impact Justification (methodology and variables):

This cost estimate is based on the average retail price of a smoke alarm.

F130-24

F131-24

IFC: 907.2.22; IBC: [F] 907.2.22

Proponents: William Cooper, Protection Engineers, LLC, FAA Fire Protection Engineering Code Team (wacooper@protengineers.com); David Clark, Protection Engineers, LLC, FAA Fire Protection Engineering Code Team (dwclark@protengineers.com)

2024 International Fire Code

Revise as follows:

907.2.22 Airport traffic control towers.
An *automatic smoke detection system* that activates the occupant notification system in accordance with Section 907.5 shall be provided in airport control towers in accordance with Sections 907.2.22.1 and 907.2.22.2.

Exception: Notification ~~Audible~~ appliances shall be provided and located so as not ~~be installed within the control tower cab~~ to inhibit the conduct of airport traffic control operations.

2024 International Building Code

Revise as follows:

[F] 907.2.22 Airport traffic control towers.
An *automatic smoke detection system* that activates the occupant notification system in accordance with Section 907.5 shall be provided in airport control towers in accordance with Sections 907.2.22.1 and 907.2.22.2.

Exception: Notification ~~Audible~~ appliances shall be provided and located so as not ~~be installed within the control tower cab~~ to inhibit the conduct of airport traffic control operations.

Reason: The physical configuration of airport traffic control tower observation levels is variable as related to its separation from adjacent spaces. The existing language prescribes a solution which does not fully address the following:

- Alarm notification sound bleed from adjacent spaces which may disrupt critical air traffic control operations and endanger the safety of the flying public.
- Use of xenon strobes on the observation level which may impact night vision of air traffic controllers and endanger the safety of the flying public.

The proposed language cues the designer to consider alarm notification impact to critical air traffic control operations and provides greater latitude to leverage various solutions and options of the referenced other sections of Chapter 907 and NFPA 72 (referenced by IBC 907) to provide adequate alarm notification on the observation levels.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposal should not substantively alter the cost of fire alarm installations in this facility type because notification applications will be required but the type of device selected by the designer may be different or may be placed differently to limit impact to critical air traffic control operations.

F131-24

F132-24

IFC: 907.2.22, 907.2.22.1, 907.2.22.2; IBC: [F] 907.2.22, [F] 907.2.22.1, [F] 907.2.22.2

Proponents: William Cooper, Protection Engineers, LLC, FAA Fire Protection Engineering Code Team (wacooper@protengineers.com); David Clark, Protection Engineers, LLC, FAA Fire Protection Engineering Code Team (dwclark@protengineers.com)

2024 International Fire Code

Revise as follows:

907.2.22 Airport traffic control towers.
All airport traffic control towers shall be provided with a~~A~~n *automatic smoke detection system* that activates the occupant notification system in accordance with Section 907.5 and shall be provided ~~in airport control towers in accordance with Sections 907.2.22.1 and 907.2.22.2.~~with smoke detectors in all of the following locations:

1. Airport traffic control cab.
2. Electrical, mechanical, terminal radar, and electronic equipment rooms.
3. Airport terminal radar and electronics rooms.
4. All *occupiable spaces* including office and other business use spaces, lounges for employees, and sanitary facilities.
5. *Means of egress.*
6. Utility spaces, storage, and shafts where permitted by other applicable standards.

Exception: Audible appliances shall not be installed within the control tower cab.

Delete without substitution:

~~**907.2.22.1 Airport traffic control towers with multiple exits and automatic sprinklers.**~~
~~Airport traffic control towers with multiple *exits* and equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 shall be provided with smoke detectors in all of the following locations:~~

1. ~~Airport traffic control cab.~~
2. ~~Electrical and mechanical equipment rooms.~~
3. ~~Airport terminal radar and electronics rooms.~~
4. ~~Outside each opening into *interior exit stairways* .~~
5. ~~Along the single *means of egress* permitted from observation levels.~~
6. ~~Outside each opening into the single *means of egress* permitted from observation levels.~~

~~**907.2.22.2 Other airport traffic control towers.** Airport traffic control towers with a single *exit* or where sprinklers are not installed throughout shall be provided with smoke detectors in all of the following locations:~~

1. ~~Airport traffic control cab.~~
2. ~~Electrical and mechanical equipment rooms.~~
3. ~~Airport terminal radar and electronics rooms.~~
4. ~~Office spaces incidental to the tower operation.~~
5. ~~Lounges for employees, including sanitary facilities.~~
6. ~~*Means of egress.*~~
7. ~~Utility shafts where *access* to smoke detectors can be provided.~~

2024 International Building Code

Revise as follows:

[F] 907.2.22 Airport traffic control towers. All airport traffic control towers shall be provided with a~~A~~n *automatic smoke detection system* that activates the occupant notification system in accordance with Section 907.5 and shall be provided ~~in airport control towers in accordance with Sections 907.2.22.1 and 907.2.22.2.~~with smoke detectors in all of the following locations:

1. Airport traffic control cab.
2. Electrical, mechanical, terminal radar, and electronic equipment rooms.
3. Airport terminal radar and electronics rooms.
4. All *occupiable spaces* including office and other business use spaces, lounges for employees, and sanitary facilities.
5. *Means of egress*.
6. Utility spaces, storage, and shafts where permitted by other applicable standards.

Exception: Audible appliances shall not be installed within the control tower cab.

Delete without substitution:

~~**[F] 907.2.22.1 Airport traffic control towers with multiple exits and automatic sprinklers.**~~
~~Airport traffic control towers with multiple *exits* and equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 shall be provided with *smoke detectors* in all of the following locations:~~

1. ~~Airport traffic control cab.~~
2. ~~Electrical and mechanical equipment rooms.~~
3. ~~Airport terminal radar and electronics rooms.~~
4. ~~Outside each opening into *interior exit stairways*.~~
5. ~~Along the single *means of egress* permitted from observation levels.~~
6. ~~Outside each opening into the single *means of egress* permitted from observation levels.~~

~~**[F] 907.2.22.2 Other airport traffic control towers.**~~
~~Airport traffic control towers with a single exit or where sprinklers are not installed throughout shall be provided with *smoke detectors* in all of the following locations:~~

1. ~~Airport traffic control cab.~~
2. ~~Electrical and mechanical equipment rooms.~~
3. ~~Airport terminal radar and electronics rooms.~~
4. ~~Office spaces incidental to the tower operation.~~
5. ~~Lounges for employees, including sanitary *facilities*.~~
6. ~~*Means of egress*.~~
7. ~~Utility *shafts* where access to *smoke detectors* can be provided.~~

Reason: Operation of airport traffic control towers includes special air traffic and operational contingency planning and evolutions to assure, in the event of a fire emergency, air traffic is transferred in an orderly and safe manner to another control facility. Such evolutions dictate extended pre-mobilization times for the occupants of the tower cab to prepare for egress, when compared to a typical business occupancy. The intent of this change is to ensure sufficient smoke detection is provided throughout the airport traffic control tower to achieve early warning of a fire event and initiate the air traffic controllers' orderly transfer of traffic, prior to their safe and timely evacuation.

The proposal alters the requirement to provide smoke detection in all usable and occupied spaces in all airport traffic control tower regardless of the sprinkler protection or egress configuration provided. The smoke detection required by the proposal is consistent with the language in the current IBC/ IFC Section 907.2.21.2 with several revisions to align with current standards and technologies, as follows:

(1) Smoke detection required by the current language for offices, employee lounges and sanitary facilities was expanded by using these areas as typical examples of business use spaces in airport traffic control towers, and requiring smoke detection for all *occupiable spaces* as defined by the IBC.

(2) The term "incidental to tower operation," associated with offices in the current code language was deleted as unnecessary to ensure any office in an airport traffic control tower will receive smoke detection.

(3) The term in the current code language "where smoke detection can be provided" as related to shafts is ambiguous and not needed with the advent of small ASSD systems which may be used for elevator shafts and addressed in ASME A17.1 as referenced by the IBC.

(4) The proposal also states shaft detection "where permitted by other standards" recognizes and defers to the specific prohibition for detection in certain elevator shafts by the IBC referenced NFPA 72.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposal identifying the requirements of smoke detection reflects the Federal Aviation Administration practice and it's incorporation will harmonize the ICC smoke detection mandates and federal practice.

F132-24

F133-24

IFC: 907.3; IBC: [F] 907.3

Proponents: William Koffel, Koffel Associates, Inc., Semiconductor Industry Association (wkoffel@koffel.com)

2024 International Fire Code

Revise as follows:

907.3 Fire safety functions.
Automatic fire detectors utilized for the purpose of performing fire safety functions shall be connected to the building's fire alarm control unit where a *fire alarm system* is required by Section 907.2. Detectors shall, upon actuation, perform the intended function and activate the alarm notification appliances or activate a visible and audible supervisory signal at a constantly attended location. In buildings not equipped with a *fire alarm system*, the automatic fire detector shall be powered by normal electrical service and, upon actuation, perform the intended function. The detectors shall be located in accordance with NFPA 72.

<u>**Exception:** In a Group H-5 occupancy, automatic shutdown of the air distribution system shall not be required where an automatic smoke detection system, with remote indication and manual shutdown capability at the emergency control station, is provided.</u>

2024 International Building Code

Revise as follows:

[F] 907.3 Fire safety functions.
Automatic fire detectors utilized for the purpose of performing *fire safety functions* shall be connected to the *building*'s *fire alarm control unit* where a *fire alarm system* is required by Section 907.2. Detectors shall, upon actuation, perform the intended function and activate the *alarm notification appliances* or activate a visible and audible *supervisory signal* at a *constantly attended location*. In *buildings* not equipped with a *fire alarm system*, the *automatic fire detector* shall be powered by normal electrical service and, upon actuation, perform the intended function. The detectors shall be located in accordance with NFPA 72.

<u>**Exception:** In a Group H-5 occupancy, automatic shutdown of the air distribution system shall not be required where an automatic smoke detection system, with remote indication and manual shutdown capability at the emergency control station, is provided.</u>

Reason: The 2024 Edition of the IBC allows an increased travel distance in Group H-5 occupancies based upon computer fire modeling. One of the assumptions in the modeling, and a criteria to increase the travel distance, is that the ventilation system remains operational. The proposal provides the correlation language to allow the HVAC system to continue to operate but a requirement to provide annunciation and manual shutdown capability at the emergency control station has been added. Related proposals have been submitted to Chapter 10 of the IBC and Chapter 6 of the IMC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposal correlates with 2024 changes and a proposed change in Chapter 10 that is based upon the ventilation system continuing to operate.

F133-24

F134-24

IFC: 907.5.2.1, 907.5.2.2; IBC: [F] 907.5.2.1, [F] 907.5.2.2

Proponents: Shane Clary, Bay Alarm Company, Automatic Fire Alarm Association (smclary@bayalarm.com); Maria Marks, Siemens, Siemens (maria.marks@siemens.com); Richard Roberts, Honeywell Building Automation, Honeywell Building Automatation (richard.roberts@systemsensor.com); Jason Webb, Potter Electric Signal, Automatic Fire Alarm Association Codes & Standards Committee (jasonw@pottersignal.com); Scott Lang, Honeywell, Honeywell (scott.lang@honeywell.com)

2024 International Fire Code

Revise as follows:

907.5.2.1 Audible alarms.
Audible alarm notification appliances shall be provided and emit a distinctive soundin accordance with NFPA 72 that is not to be used for any purpose other than that of a fire alarm. Where a roof level or portion thereof is used as an occupiable roof in accordance with 503.1.4 of the *International Building Code*, audible alarm notification appliances shall be provided.

Exceptions:

1. Audible alarm notification appliances are not required in critical care areas of Group I-2, Condition 2 occupancies that are in compliance with Section 907.2.6, Exception 2.
2. A visible alarm notification appliance installed in a nurses' control station or other continuously attended staff location in a Group I-2, Condition 2 suite shall be an acceptable alternative to the installation of audible alarm notification appliances throughout a suite or unit in Group I-2, Condition 2 occupancies that are in compliance with Section 907.2.6, Exception 2.
3. Where provided, audible notification appliances located in each enclosed occupant evacuation elevator lobby in accordance with Section 3008.9.1 of the International Building Code shall be connected to a separate notification zone for manual paging only.

907.5.2.2 Emergency voice/alarm communication systems.
Emergency voice/alarm communication systems required by this code shall be designed and installed in accordance with NFPA 72. Where a roof level or portion thereof is used as an occupiable roof in accordance with 503.1.4 of the *International Building Code*, audible alarm notification appliances shall be provided.
The operation of any automatic fire detector, sprinkler waterflow device or manual fire alarm box shall automatically sound an alert tone followed by voice instructions giving *approved* information and directions for a general or staged evacuation in accordance with the building's fire safety and evacuation plans required by Section 404. In high-rise buildings, the system shall operate on at least the alarming floor, the floor above and the floor below. Speakers shall be provided throughout the building by paging zones. At a minimum, paging zones shall be provided as follows:

1. Elevator groups.
2. *Interior exit stairways*.
3. Each floor.
4. *Areas of refuge* as defined in Chapter 2.

Exception: In Group I-1 and I-2 occupancies, the alarm shall sound in a constantly attended area and a general occupant notification shall be broadcast over the overhead page.

2024 International Building Code

Revise as follows:

[F] 907.5.2.1 Audible alarms. *Audible alarm notification appliances* shall be provided and emit a distinctive soundin accordance with NFPA 72 that is not to be used for any purpose other than that of a fire alarm. Where a roof level or portion thereof is used as an occupiable roof in accordance with 503.1.4, audible alarm notification appliances shall be provided.

Exceptions:

1. *Audible alarm notification appliances* are not required in critical care areas of Group I-2, Condition 2 occupancies that are in compliance with Section 907.2.6, Exception 2.
2. A *visible alarm notification appliance* installed in a nurses' control station or other continuously attended staff location in a Group I-2, Condition 2 suite shall be an acceptable alternative to the installation of *audible alarm notification appliances* throughout a suite or unit in Group I-2, Condition 2 occupancies that are in compliance with Section 907.2.6, Exception 2.
3. Where provided, audible notification appliances located in each enclosed occupant evacuation elevator lobby in accordance with Section 3008.9.1 shall be connected to a separate *notification zone* for manual paging only.

[F] 907.5.2.2 Emergency voice/alarm communication systems. Emergency voice/alarm communication systems required by this code shall be designed and installed in accordance with NFPA 72. <u>Where a roof level or portion thereof is used as an occupiable roof in accordance with 503.1.4, audible alarm notification appliances shall be provided.</u> The operation of any *automatic fire detector*, sprinkler waterflow device or *manual fire alarm box* shall automatically sound an alert tone followed by voice instructions giving *approved* information and directions for a general or staged evacuation in accordance with the *building*'s fire safety and evacuation plans required by Section 404 of the International Fire Code. In *high-rise buildings*, the system shall operate on at least the alarming floor, the floor above and the floor below. Speakers shall be provided throughout the *building* by paging zones. At a minimum, paging zones shall be provided as follows:

1. *Elevator groups*.
2. *Interior exit stairways.*
3. Each floor.
4. *Areas of refuge* as defined in Chapter 2.

Exception: In Group I-1 and I-2 occupancies, the alarm shall sound in a constantly attended area and a general occupant notification shall be broadcast over the overhead page.

Reason: This proposal seeks to add clarity to section 907.5.2.1 and 907.5.2.2 for a fire alarm system to provide audible occupant notification in the areas of occupied roofs and provides a pointer to 503.1.4 of the International Building Code relating to occupiable roofs.

This proposal is not requiring visual notification (strobes) in areas of occupied roofs because outdoor strobes are listed to UL 1638 and they are designed for "private mode" usage only. UL 1638 has no provision for outdoor public mode certification. The reason that strobes are only listed for private mode is that the environment outdoors is not controlled in terms of illumination level. It is not possible to design a device that would be bright enough to alert individuals when the ambient light level is 50,000 lux. In addition, NFPA 72 assumes that strobes will reflect off other surfaces indoors to help alert occupants; this is not possible outdoors. Finally, NFPA 72 has no requirements or provisions for public mode alerting outdoors for the reasons outlined above. The annex explains this in A.18.5.9.9, which says "*The application of visual notification appliances in outdoor areas has not been tested and is not addressed in this Code. Visual notification appliances that are mounted outdoors should be listed for outdoor use (under UL 1638, for example) and should be located for direct viewing because reflected light will usually be greatly reduced*."

Cost Impact: Increase

Estimated Immediate Cost Impact:

There would be an additional notification appliance circuit or circuits, power for said circuits and the notification appliances. There would be the labor for the work. The cost would be less than 1% of the total fire alarm system cost for the building. Labor cost would vary based on the geographic location of the project.

Estimated Immediate Cost Impact Justification (methodology and variables):

This is a percentage based estimate based off of the total cost of the fire alarm and signaling system.

F134-24

F135-24

IFC: SECTION 202 (New), 907.5.2.1.3 (New); IBC: SECTION 202 (New), [F] 907.5.2.1.3 (New)

Proponents: Maria Marks, Siemens, Siemens (maria.marks@siemens.com); Richard Roberts, Honeywell Building Automation, Honeywell Building Automatation (richard.roberts@systemsensor.com); Jason Webb, Potter Electric Signal, Automatic Fire Alarm Association Codes & Standards Committee (jasonw@pottersignal.com); Scott Lang, Honeywell, Honeywell (scott.lang@honeywell.com)

2024 International Fire Code

Add new definition as follows:

RESTRICTED AUDIBLE MODE OPERATION (RAMO) NOTIFICATION.
Restricted audible mode operation (RAMO) is to be used for areas where loud sounds might be detrimental to typical occupants of the notification zones. This could be include early education classrooms or facilities occupied by people with autism spectrum disorder, other neurodiversity's, or other medical conditions that might include sensitivity to noise, light, or other stimuli.

Add new text as follows:

907.5.2.1.3 Restricted Audible Mode Operation (RAMO) Notification . In areas where typical occupants of a notification zone have medical conditions which cause sensitivity to noise, light, or other stimuli. RAMO notification in accordance with NFPA 72 shall be permitted to reduce the sound pressure level within a notification zone below the requirements specified in 907.5.2.1.1 and 907.5.2.1.2.

2024 International Building Code

Add new definition as follows:

[F] RESTRICTED AUDIBLE MODE OPERATION (RAMO) NOTIFICATION. Restricted audible mode operation (RAMO) is to be used for areas where loud sounds might be detrimental to typical occupants of the notification zones. This could be include early education classrooms or facilities occupied by people with autism spectrum disorder, other neurodiversity's, or other medical conditions that might include sensitivity to noise, light, or other stimuli.

Add new text as follows:

[F] 907.5.2.1.3 Restricted Audible Mode Operation (RAMO) Notification. In areas where typical occupants of a notification zone have medical conditions which cause sensitivity to noise, light, or other stimuli. RAMO notification in accordance with NFPA 72 shall be permitted to reduce the sound pressure level within a notification zone below the requirements specified in 907.5.2.1.1 and 907.5.2.1.2.

Reason: This proposal seeks to provide guidance to designers, engineers, users, and fire code officials for applications where the audible sound pressure level within a notification zone needs to be controlled to avoid causing undue health issues for certain occupants who are sensitive to loud sounds. There are instances where the very loud audible notification appliances frighten or cause undo panic of occupants, which can impede the orderly evacuation of the protected space.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is just an adjustment to the sound pressure level of the system. No additional notification appliances, circuits or labor would be required.

F135-24

F136-24

IFC: SECTION 202 (New), 907.5.2.1.3 (New); IBC: SECTION 202 (New), [F] 907.5.2.1.3 (New)

Proponents: Shane Clary, Bay Alarm Company, Automatic Fire Alarm Association (smclary@bayalarm.com)

2024 International Fire Code

Add new definition as follows:

RESTRICTED AUDIBLE MODE OPERATION (RAMO). Restricted audible mode operation (RAMO) is to be used for areas where loud sounds might be detrimental to typical occupants of the notification zones. This could be include early education classrooms or facilities that service people with autism spectrum disorder, other neurodiversity's, or other conditions that might include sensitivity to noise, light, or other stimuli.

Add new text as follows:

907.5.2.1.3 Restricted audible mode operation (RAMO) notification. Where required by relevant laws, ordinances, rules, or regulations as determined by the fire code official the sound pressure level within a notification zone shall be permitted to be reduced below the requirements specified in 907.5.2.1.1 and 907.5.2.1.2 in restricted audible mode operation, and in accordance with NFPA 72.

2024 International Building Code

Add new definition as follows:

[F] RESTRICTED AUDIBLE MODE OPERATION (RAMO). Restricted audible mode operation (RAMO) is to be used for areas where loud sounds might be detrimental to typical occupants of the notification zones. This could be include early education classrooms or facilities that service people with autism spectrum disorder, other neurodiversity's, or other conditions that might include sensitivity to noise, light, or other stimuli.

Add new text as follows:

[F] 907.5.2.1.3 Restricted audible mode operation (RAMO) notification. Where required by relevant laws, ordinances, rules, or regulations as determined by the fire code official the sound pressure level within a notification zone shall be permitted to be reduced below the requirements specified in 907.5.2.1.1 and 907.5.2.1.2 in restricted audible mode operation, and in accordance with NFPA 72.

Reason: This proposal seeks to provide guidance to designers, engineers, users, and fire code officials for applications where the audible sound pressure level within a notification zone needs to be controlled to avoid causing undue health issues for certain occupants who are sensitive to loud sounds. There are instances where the very loud audible notification appliances frighten or cause undo panic of occupants, which can impede the orderly evacuation of the protected space.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal will not increase or decrease the cost of construction. See also the proponent's reason statement.

F136-24

F137-24

IFC: 907.5.2.3.1; IBC: [F] 907.5.2.3.1

Proponents: Crystal Sujeski, CAL FIRE/OSFM, CAL FIRE/Office of the State Fire Marshal (crystal.sujeski@fire.ca.gov)

2024 International Fire Code

Revise as follows:

907.5.2.3.1 Public use areas and common use areas. Visible alarm notification appliances shall be installed in rooms that are normally occupied and used by two or more persons, as well as ~~provided~~ in *public use areas* and *common use areas*. Thisincludes, but is not limited to, the following spaces:

1. Band rooms.
2. Classrooms.
3. Corridors.
4. Gymnasiums.
5. Lobbies.
6. Meeting and conference rooms.
7. Multipurpose rooms.
8. Music practice rooms.
9. Occupational shops.
10. Occupied rooms where ambient noise impairs hearing of the fire alarm.
11. Sanitary facilities including restrooms, bathrooms, and shower rooms.
12. Shared office rooms used by two or more persons.
13. Huddle room, mother's room, phone room, quite-room, wellness-room, etc.
14. Storage room/area.
15. Exam rooms in medical office buildings.

Exception: Where employee work areas have audible alarm coverage, the notification appliance circuits serving the employee work areas shall be initially designed with not less than 20-percent spare capacity to account for the potential of adding visible notification appliances in the future to accommodate hearing-impaired employee(s).

2024 International Building Code

Revise as follows:

[F] 907.5.2.3.1 Public use areas and common use areas. Visible alarm notification appliances shall be installed in rooms that are normally occupied and used by two or more persons, as well as ~~provided~~ in *public use areas* and *common use areas*. Thisincludes, but is not limited to, the following spaces:

1. Band rooms.
2. Classrooms.
3. Corridors.
4. Gymnasiums.
5. Lobbies.
6. Meeting and conference rooms.

7. Multipurpose rooms.
8. Music practice rooms.
9. Occupational shops.
10. Occupied rooms where ambient noise impairs hearing of the fire alarm.
11. Sanitary facilities including restrooms, bathrooms, and shower rooms.
12. Shared office rooms used by two or more persons.
13. Huddle room, mother's room, phone room, quite-room, wellness-room, etc.
14. Storage room/area.
15. Exam rooms in medical office buildings.

Exception: Where *employee work areas* have audible alarm coverage, the notification appliance circuits serving the *employee work areas* shall be initially designed with not less than 20-percent spare capacity to account for the potential of adding visible notification appliances in the future to accommodate hearing-impaired employee(s).

Reason: The proposal adds specific examples where strobes shall be provided.

Conference rooms are specifically intended for meetings purposes. They are intended for common-use by the occupants/employees of the building and/or for public-use by the public, regardless their size. However, since Conference and Huddle rooms are not specifically defined in IBC/IFC as meeting rooms, this proposed change clarifies their use and purpose as rooms intended for meetings.

Shared-office rooms are common-use areas used by the occupants/employees of the building, they are shared by two or more persons, and they are enclosed rooms which are different than open/ non-enclosed shared office-space. This specific item also clarifies that a “Private-Office” used by ONE person only, who is a building occupant/employee, will not require a strobe.

The term “Normally-Occupied” is used in CBC and in NFPA 72. These rooms are not specifically defined by CBC or CFC. They could vary in size, (be very small or very large), they could have different furniture layouts, etc. and they are normally occupied and used by either the building’s occupants/employees and/or by the general public. Therefore, strobe protection is required in these undefined rooms regardless their size and configuration if they are classified and intended by the owner/architect to be used by two or more persons.

The term “Normally-Occupied” is used in CBC and in NFPA 72. Storage rooms could be normally used by the occupants/employees of the building and/or by the general public. If these rooms are normally not-occupied such as a private storage room or closet, they are not required to have strobes in them. However, if they are common or public use areas which are normally occupied and used by the building occupants/employees and/or by the public, they should have strobe protection in them.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

See reason statement.

F137-24

F138-24

IFC: 907.6.6; IBC: [F] 907.6.6

Proponents: Jeffrey Shapiro, International Code Consultants, Lake Travis Fire Rescue (jshapiro@ltfr.org)

2024 International Fire Code

Revise as follows:

907.6.6 Monitoring.
Fire alarm systems required by this code ~~chapter~~ or by the *International Building Code* shall be monitored by an *approved* supervising station in accordance with NFPA 72.

Exception: Monitoring by a supervising station is not required for:

1. Single- and multiple-station smoke alarms required by Section 907.2.11.
2. Smoke detectors in Group I-3 occupancies.
3. *Automatic sprinkler systems* in one- and two-family *dwellings*.

2024 International Building Code

Revise as follows:

[F] 907.6.6 Monitoring.
Fire alarm systems required by this code ~~chapter~~ or by the *International Fire Code* shall be monitored by an *approved supervising station* in accordance with NFPA 72.

Exception: Monitoring by a *supervising station* is not required for:

1. *Single-* and *multiple-station smoke alarms* required by Section 907.2.11.
2. *Smoke detectors* in Group I-3 occupancies.
3. *Automatic sprinkler systems* in one- and two-family *dwellings*.

Reason: This proposal corrects an apparent oversight in coordinating IFC Chapters 9 and 11 and the IBC and IFC. Given that the IFC requires monitoring for systems required by the IBC (in its entirety), and that the IBC requires monitoring for systems required by the IFC (in its entirety), the "this chapter" text is moot. I came across this issue when working on IFC Chapter 11. Technically, the IFC alone would not require fire alarm systems called for by Chapter 11 to be monitored since IFC Section 907.6.6 only requires monitoring of systems "required by this chapter" (Chapter 9, not Chapter 11). However, because IBC Section 907.6.6 requires any IFC required fire alarm system to be monitored, an IFC Chapter 11 required fire alarm system still ends up needing to be monitored. Accordingly, changing 907.6.6 to "required by this code" allows either code to stand on its own and eliminates the misleading "required by this chapter" text.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Clarifies existing code text.

F138-24

F139-24

IFC: 909.12.2; IBC: [F] 909.12.2; IMC®: [F] 512.12.2

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Fire Code

Revise as follows:

909.12.2 Wiring.
In addition to meeting requirements of NFPA 70, all wiring, regardless of voltage used for circuits supplying detection and control functions shall be protected using one of the following methods:~~, shall be fully~~

1. Fully enclosed within continuous raceways.
2. Cables used for survivability of required critical circuits shall be listed in accordance with UL 2196 and shall have a fire-resistance rating of not less than 1 hour.
3. Electrical circuit protective systems shall have a fire-resistance rating of not less than 1 hour. Electrical circuit protective systems shall be installed in accordance with their listing requirements.
4. Construction having a fire-resistance rating of not less than 1 hour.
5. The cable is encased in a minimum of 2 inches (51 mm) of concrete.

2024 International Building Code

Revise as follows:

[F] 909.12.2 Wiring.
In addition to meeting requirements of NFPA 70, all wiring, regardless of voltage used for circuits supplying detection and control functions shall be protected using one of the following methods: ~~shall be fully~~

1. Fully enclosed within continuous raceways.
2. Cables used for survivability of required critical circuits shall be listed in accordance with UL 2196 and shall have a fire-resistance rating of not less than 1 hour.
3. Electrical circuit protective systems shall have a fire-resistance rating of not less than 1 hour. Electrical circuit protective systems shall be installed in accordance with their listing requirements.
4. Construction having a fire-resistance rating of not less than 1 hour.
5. The cable is encased in a minimum of 2 inches (51 mm) of concrete

2024 International Mechanical Code

Revise as follows:

[F] 512.12.2 Wiring. In addition to meeting the requirements of NFPA 70, all wiring, regardless of voltage used for circuits supplying detection and control functions shall be protected using one of the following methods:~~, shall be fully~~

1. Fully enclosed within continuous raceways.
2. Cables used for survivability of required critical circuits shall be listed in accordance with UL 2196 and shall have a fire-resistance rating of not less than 1 hour.
3. Electrical circuit protective systems shall have a fire-resistance rating of not less than 1 hour. Electrical circuit protective systems shall be installed in accordance with their listing requirements.

4. Construction having a fire-resistance rating of not less than 1 hour.
5. The cable is encased in a minimum of 2 inches (51 mm) of concrete.

Reason: The purpose of this proposal is to provide additional options for survivability protection of smoke control system circuits that are applied elsewhere in the code for critical circuits. The language added was from Section 913.2.2.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the FCAC Website

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0.00

Estimated Immediate Cost Impact Justification (methodology and variables):

This simply provides additional options for compliance beyond continuous raceways. Will likely not change construction cost or possibly reduce.

F139-24

F140-24

IFC: 910.2, TABLE 3206.2; IBC: [F] 910.2

Proponents: Jeffrey M Hugo, CBO, NFSA, National Fire Sprinkler Association (hugo@nfsa.org); Jeffrey H. Greenwald, Controlled Environment Building Association, Controlled Environment Building Association (jgreenwald@gcca.org)

2024 International Fire Code

Revise as follows:

910.2 Where required.
Smoke and heat vents or a mechanical smoke removal system shall be installed as required by Sections 910.2.1 and 910.2.2.

Exceptions:

1. Refrigerated ~~Frozen~~ food warehouses used solely for storage of Class I, II, and III commodities where protected by an *approved automatic sprinkler system*.
2. Smoke and heat removal shall not be required in areas of Group S buildings equipped with early suppression fast-response (ESFR) sprinklers or control mode special application (CMSA) sprinklers with a response time index (RTI) of 50 (m x s) 1/2 or less that are listed to control a fire in stored commodities with 12 or fewer sprinklers.
3. ~~Smoke and heat removal shall not be required in areas of buildings equipped with control mode special application sprinklers with a response time index of 50(m × s)~~ $\cancel{^{1/2}}$ ~~or less that are *listed* to control a fire in stored commodities with 12 or fewer sprinklers.~~

TABLE 3206.2 GENERAL FIRE PROTECTION AND LIFE SAFETY REQUIREMENTS

COMMODITY CLASS	SIZE OF HIGH-PILED STORAGE AREA[a] (square feet) (see Sections 3206.2 and 3206.3)	ALL STORAGE AREAS (see Sections 3206, 3207 and 3208)[b]				SOLID-PILED STORAGE, SHELF STORAGE AND PALLETIZED STORAGE (see Section 3207.3)		
		Automatic fire-extinguishing system (see Section 3206.4)	Fire detection system (see Section 3206.5)	Fire department access doors (see Section 3206.7)	Smoke and heat removal (see Section 3206.8)	Maximum pile dimension[c] (feet)	Maximum permissible storage height[d] (feet)	Maximum pile volume (cubic feet)
I–IV	0–500	Not Required[a]	Not Required	Not Required	Not Required	Not Required	Not Required	Not Required
	501–2,500	Not Required[a]	Yes[g]	Not Required	Not Required	120	40	100,000
	2,501–12,000 Open to the public	Yes	Not Required	Not Required	Not Required	120	40	400,000
	2,501–12,000 Not open to the public (Option 1)	Yes	Not Required	Not Required	Not Required	120	40	400,000
	2,501–12,000 Not open to the public (Option 2)	Not Required[a]	Yes	Yes	Yes[h, i]	120	30[e]	200,000
	12,001–500,000	Yes	Not Required	Yes	Yes[h, i]	120	40	400,000
	Greater than 500,000[f]	Yes	Not Required	Yes	Yes[h, i]	120	40	400,000
High hazard	0–500	Not Required[a]	Not Required	Not Required	Not Required	60	Not Required	Not Required
	501–2,500 Open to the public	Yes	Not Required	Not Required	Not Required	60	30	75,000
	501–2,500 Not open to the public (Option 1)	Yes	Not Required	Not Required	Not Required	60	30	75,000
	501–2,500 Not open to the public (Option 2)	Not Required[a]	Yes[g]	Yes	Yes[h, i]	60	20	50,000
	2,501–300,000	Yes	Not Required	Yes	Yes[h, i]	60	30	75,000
	Greater than 300,000[f]	Yes	Not Required	Yes	Yes[h, i]	60	30	75,000

For SI: 1 foot = 304.8 mm, 1 cubic foot = 0.02832 m^3, 1 square foot = 0.0929 m^2.

a. Where automatic sprinklers are required for reasons other than those in Chapter 32, the portion of the sprinkler system protecting the high-piled storage area shall be designed and installed in accordance with Sections 3207 and 3208.

b. For aisles, see Section 3206.10.

c. Piles shall be separated by aisles complying with Section 3206.10.

d. For storage in excess of the height indicated, special fire protection shall be provided in accordance with Note f where required by the fire code official. See Chapters 51 and 57 for special limitations for aerosols and flammable and combustible liquids, respectively.

e. For storage exceeding 30 feet in height, Option 1 shall be used.

f. Special fire protection provisions including, but not limited to, fire protection of exposed steel columns; increased sprinkler density; additional in-rack sprinklers, without associated reductions in ceiling sprinkler density; or fire department hose connections shall be provided where required by the fire code official.

g. Not required where an automatic fire-extinguishing system is designed and installed to protect the high-piled storage area in accordance with Sections 3207 and 3208.

h. Not required where storage areas are protected by either early suppression fast response (ESFR) sprinkler systems or control mode special application sprinklers (CMSA) with a response time index of 50 (meters-seconds)$^{1/2}$ or less that are listed to control a fire in the stored commodities with 12 or fewer sprinklers, installed in accordance with Section 903.3.1.1~~NFPA 13~~.

i. Not required in refrigerated ~~frozen~~ food warehouses used solely for storage of Class I, II and III commodities where protected by an *approved* automatic sprinkler system.

2024 International Building Code

Revise as follows:

[F] 910.2 Where required.
Smoke and heat vents or a mechanical smoke removal system shall be installed as required by Sections 910.2.1 and 910.2.2.

Exceptions:

1. Refrigerated ~~Frozen~~ food warehouses used solely for storage of Class I, II, and III commodities where protected by an *approved automatic sprinkler system*.
2. Smoke and heat removal shall not be required in areas of Group S *buildings* equipped with early suppression fast-response (ESFR) sprinklers or control mode special application (CMSA) sprinklers with a response time index (RTI) of 50 (m x s) 1/2 or less that are listed to control a fire in stored commodities with 12 or fewer sprinklers. .
3. ~~Smoke and heat removal shall not be required in areas of *buildings* equipped with control mode special application sprinklers with a response time index of 50 (m × s)$^{1/2}$ or less that are *listed* to control a fire in stored commodities with 12 or fewer sprinklers.~~

Reason: This proposal updates the name of these frozen food facilities, an increase in commodity classification, and clarifying which sprinklers are acceptable for the exception.

There are many different types of cold storage, not just freezers. From individual units to entire dedicated facilities: refrigerated containers blast freezers and chillers, cold rooms, pharmaceutical grade cold storage, plant-attached cold storage, dedicated custom facilities and more. According to the Global Cold Chain Alliance (GCCA), the best term to use that replaces “frozen” is “refrigerated warehouse”, defined as, “A warehouse that provides refrigeration and temperature control for perishable products.”

In Exception 1, the limitation to only Class I and II commodities is inconsistent with other standards. Upon reviewing commodity classifications outlined in various standards (NFPA 13, FM Global and the International Fire Code), there are only minor differences in criteria between Class II and Class III commodities. FM Global actually has the same criteria for Class I-III commodities and further segregates Class IV with Cartoned Unexpanded Plastics. In the IFC, Tables 3203.9 (1) and 3203.9 (2), although used for mixed commodities, it helps to see that the IFC also puts Class III along with Class I and II in the mixed commodity tables. NFPA 13, Figures

20.4.3.3 (a) and 20.4.3.3 (b) are mixed commodity tables, just like the IFC has, and starts with Class III.

Add this IFC Table 3203.9 (1): https://www.cdpaccess.com/proposal/10040/29300/files/download/4149/

Adding Group S (Storage) to Exception 2 would apply to both S-1 and S-2 facilities, which could include the refrigerated food warehouses. If the Group-S building is sprinklered with ESFR and CMSA sprinklers, no smoke or heat vents are required. If the Group-S building is not sprinklered, (as an unlimited area building per IBC Section 507.3) then Section 910.2.1 or 910.2.2 would apply.NFPA 13 eliminated the exception exclusively for ESFR sprinklers in the upcoming 2025 edition of NFPA 13 and has applied the same criteria for all sprinklers protecting storage, i.e., CMDA, CMSA, and ESFR sprinklers. This change (Exception 2) would limit the exception to CMSA and ESFR, leaving CMDAs out. Below is the reason statement from the NFPA Discharge Technical Committee reason on (first revision) FR1266 -2022:

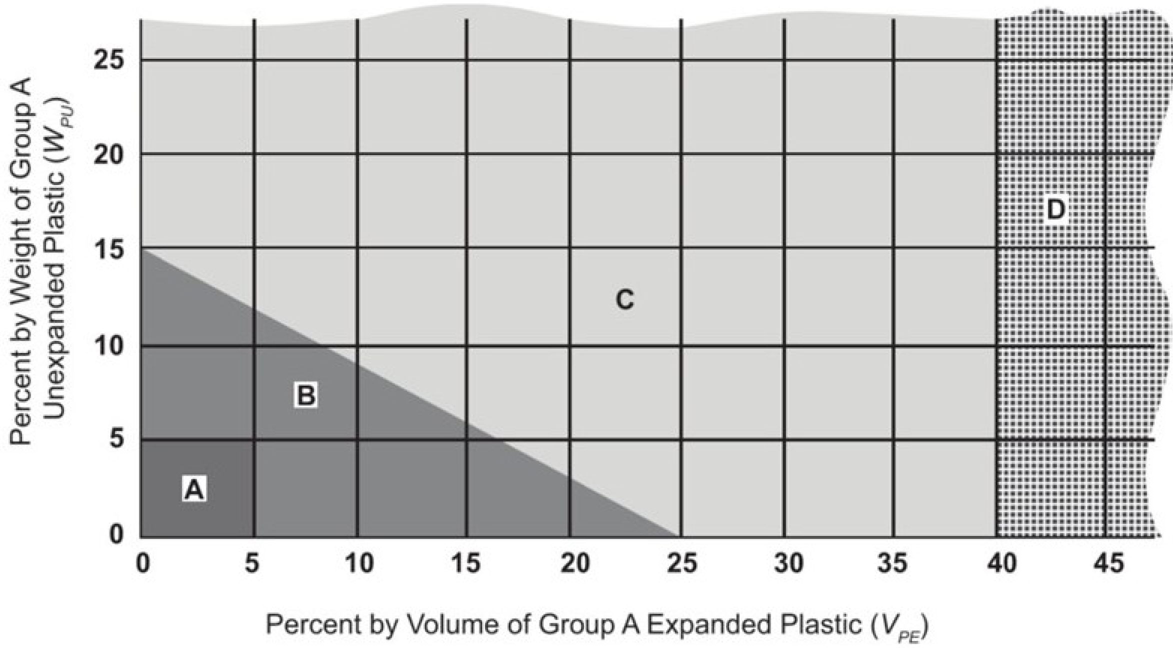
The presence of open roof vents is not considered in the sprinkler system design criteria in NFPA 13 and could detrimentally impact the operation of automatic sprinklers. This concern, while originally added to NFPA 13 for ESFR sprinklers, also exists for other types of automatic sprinklers and the requirements have been revised to include all types of sprinklers. Guidance has been added to the annex to caution again the use of manual roof vents prior to the control or suppression of the fire, which could also interfere with the performance of the automatic sprinkler system. Finally, in situations where automatic roof vents are provided and cannot be eliminated, requirements are provided to reasonably limit the detrimental impact of automatic roof vents on the performance of automatic sprinkler systems by limiting the potential for the roof vents to open automatically during a fire controlled by the sprinkler system.

Exception 3 is removed but is added to the exception 2, as is done in Footnote h in IFC Table 3206.2. There is no technical change by putting these criteria together. Footnote h and i have been updated to correlate with the proposed changes to Section 910.2.

CEBA reason: Experience with the installation of smoke ventilation systems in refrigerated warehouses shows that these systems do not perform as designed. The smoke ventilation systems act as a penetration of the thermal envelope, impacting the energy efficiency of the building. The systems also penetrate the vapor envelopes and thus become points of vapor drive into the buildings. In freezers, this leads to frost build-up. While operators will try to maintain the systems and break up the frost, it ultimately leads to the failure of the mechanisms. In cooler warehouses or in freezers where heat trace is used to mitigate frost build-up, the vapor will become condensation, leading to indoor rain that can compromise the safety of food stored in these warehouses. Finally, Ice build-up (from vapor leaks) leads to potential slip and fall accidents along with falling ice, etc.

Ultimately, the requirements for smoke ventilation in refrigerated warehouses, if met in new construction, become an ongoing maintenance issue, sacrificing energy efficiency and risking food safety for systems that will typically end up failing to perform as designed due to the unique factors on the environment in which they are installed.

FIGURE 3203.9(1)—EVALUATION OF CARTONED COMMODITIES CONTAINING GROUP A PLASTICS[a, b]



A = Class I, II or III commodity
B = Class IV commodity
C = High-hazard commodity (Group A Unexpanded)
D = High-hazard commodity (Group A Expanded)

Cost Impact: Decrease

Estimated Immediate Cost Impact:

Source: Actual estimates and RS Means

Eliminates a \$2,500 - \$3,500 smoke or heat vent every 180 ft. on center (for a 45ft. high warehouse), \$0.08 – \$0.11/sq ft savings.

This does not include labor, other materials, such as framing openings and flashing.

For a 1,000,000 sq ft warehouse, it saves from \$80,000 to 110,000 in construction costs and also eliminates the cost of annual maintenance and operational tested every five years required by this code.

Estimated Immediate Cost Impact Justification (methodology and variables):

Analogous methodology using actual current cost estimates and data from RS Means to create a range of cost. This code already eliminates smoke and heat vents in buildings with automatic sprinkler systems, specifically using ESFR or CMSA sprinklers. This proposal adds another class (III) commodity in refrigerated warehousing.

F140-24

F141-24

IFC: 910.3.5; IBC: [F] 910.3.5

Proponents: Chase Browning, Chase A. Browning Consulting (chase.browning@cityofmedford.org)

2024 International Fire Code

Revise as follows:

910.3.5 ~~Fusible link temperature rating~~ Vent operation in areas protected with automatic sprinklers. Where vents are installed in areas provided with automatic fire sprinklers, ~~and~~ the automatic means of operation required by 910.3.4 shall be limited to one of the following methods:

1. ~~vents operate by fusible link, the fusbile~~ Fusible ~~link~~ links ~~shall~~ that have a minimum temperature rating of 360°F (182°C).
2. Fixed temperature heat detection that has a minimum temperature rating of 360°F (182°C).
3. Approved automatic means of operation which prevents vents from operating prior to sprinkler activation.

2024 International Building Code

Revise as follows:

[F] 910.3.5 ~~Fusible link temperature rating~~ Vent operation in areas protected with automatic sprinklers.
Where vents are installed in areas provided with automatic fire sprinklers, ~~and~~ the automatic means of operation required by 910.3.4 shall be limited to one of the following methods:

1. ~~vents operate by fusible link, the fusbile~~ Fusible ~~link~~ links ~~shall~~ that have a minimum temperature rating of 360°F (182°C).
2. Fixed temperature heat detection that has a minimum temperature rating of 360°F (182°C).
3. Approved automatic means of operation which prevents vents from operating prior to sprinkler activation.

Reason: There are smoke and heat vents available on the market that can utilize detection systems for automatic release, and release from smoke detection can be problematic in areas protected with automatic sprinklers, as there could be a delay in sprinkler activation if smoke detectors release the vents too early. This proposal is intended to build upon the 2021 revisions that address fusible automatic vent operations in areas protected with sprinklers by providing an automatic means beyond fusible links, and at the same time limiting the use of a detection system to fixed temperature heat detectors.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Utilizing automatic means beyond a conventional fusible link is permissive.

F141-24

F142-24

IFC: 910.4.3, AMCA (New) IBC: [F] 910.4.3, AMCA Chapter 35 (New)

Proponents: Amanda Hickman, The Hickman Group, Air Movement and Control Association International, Inc. (AMCA) (amanda@thehickmangroup.com)

2024 International Fire Code

Revise as follows:

910.4.3 System design criteria. The mechanical smoke removal system shall be sized to exhaust the building at a minimum rate of two air changes per hour based on the volume of the building or portion thereof without contents. The capacity of each exhaust fan shall not exceed 30,000 cubic feet per minute (14.2 m^3/s).<u>Exhaust fan performance shall be *listed* and *labeled* in accordance with ANSI/AMCA 210-ANSI/ASHRAE 51.</u>

Add new text as follows:

Add new standard(s) as follows:

<u>**ANSI/AMCA 210-ANSI/ASHRAE 51-16.**</u> <u>Laboratory Methods of Testing Fans for Aerodynamic Performance Rating</u>

2024 International Building Code

Revise as follows:

[F] 910.4.3 System design criteria. The mechanical smoke removal system shall be sized to exhaust the *building* at a minimum rate of two air changes per hour based on the volume of the *building* or portion thereof without contents. The capacity of each exhaust fan shall not exceed 30,000 cubic feet per minute (14.2 m^3/s).<u>Exhaust fan performance shall be *listed* and *labeled* in accordance with ANSI/AMCA 210-ANSI/ASHRAE 51.</u>

Add new standard(s) as follows:

AMCA

Air Movement and Control Association International
30 West University Drive
Arlington Heights, IL 60004

<u>ANSI/AMCA 210-ANSI/ASHRAE 51-16</u> <u>Laboratory Methods of Testing Fans for Aerodynamic Performance Rating</u>

Staff Analysis: The proposed referenced standard, ***Laboratory Methods of Testing Fans for Aerodynamic Performance Rating (ANSI/AMCA 210—16/ANSI/ASHRAE 51—16)***, is currently referenced in the ***IMC***.

Reason: This proposal provides the appropriate test standards to ensure that exhaust fans will meet the performance requirements of the mechanical smoke removal system design. Including listing and labeling requirements to the appropriate standards will not only ensure that the fans are tested to the appropriate standards, but also will facilitate easier code enforcement. This is critical for life-safety products that must function as designed to protect building occupants. This proposal is also consistent with the general requirements of section 301.7 of this code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Because listing and labeling to AMCA 210 is common practice, especially for life-safety fans and because the cost to list/certify a product is incurred by the manufacturer and divided across multiple projects, there is no cost increase associated with this proposal.

F142-24

F143-24

IFC: 911.1, 911.2, 911.3, 911.4, 911.5

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Fire Code

Revise as follows:

911.1 General.
Explosion control in accordance with this section shall be provided in the following locations:

1. Where a structure, room or space is occupied for purposes involving explosion hazards as identified in Table 911.1.
2. Where quantities of hazardous materials specified in Table 911.1 exceed the maximum allowable quantities in Table 5003.1.1(1).

~~Such areas shall be provided with explosion (*deflagration*) venting, explosion (*deflagration*) prevention systems or *barricades* in accordance with this section and NFPA 68, NFPA 69 or NFPA 495 as applicable. *Deflagration* venting shall not be utilized as a means to protect buildings from *detonation* hazards.~~

Delete without substitution:

~~**911.2 Required deflagration venting.**~~
~~Areas that are required to be provided with *deflagration* venting shall comply with the following:~~

1. ~~Walls, ceilings and roofs exposing surrounding areas shall be designed to resist a minimum internal pressure of 100 pounds per square foot (psf) (4788 Pa). The minimum internal design pressure shall be not less than five times the maximum internal relief pressure specified in Item 5 of this section.~~
2. ~~*Deflagration* venting shall be provided only in *exterior walls* and roofs.~~

   ~~**Exception:** Where sufficient *exterior wall* and roof venting cannot be provided because of inadequate *exterior wall* or roof area, *deflagration* venting shall be allowed by specially designed shafts vented to the exterior of the building.~~
3. ~~*Deflagration* venting shall be designed to prevent unacceptable structural damage. Where relieving a *deflagration*, vent closures shall not produce projectiles of sufficient velocity and mass to cause life threatening injuries to the occupants or other persons on the property or adjacent *public ways*.~~
4. ~~The aggregate clear area of vents and venting devices shall be governed by the pressure resistance of the construction assemblies specified in Item 1 of this section and the maximum internal pressure allowed by Item 5 of this section.~~
5. ~~Vents shall be designed to withstand loads in accordance with the *International Building Code*. Vents shall consist of any one or any combination of the following to relieve at a maximum internal pressure of 20 pounds per square foot (958 Pa), but not less than the loads required by the *International Building Code*:~~
   - ~~5.1. *Exterior walls* designed to release outward.~~
   - ~~5.2. Hatch covers.~~
   - ~~5.3. Outward swinging doors.~~
   - ~~5.4. Roofs designed to uplift.~~
   - ~~5.5. Venting devices *listed* for the purpose.~~
6. ~~Vents designed to release from the *exterior walls* or roofs of the building when venting a *deflagration* shall discharge directly to the exterior of the building where an unoccupied space not less than 50 feet (15 240 mm) in width is provided between the *exterior walls* of the building and the *lot line*.~~

   ~~**Exception:** Vents complying with Item 7 of this section.~~

7. ~~Vents designed to remain attached to the building when venting a *deflagration* shall be so located that the discharge opening shall be not less than 10 feet (3048 mm) vertically from window openings and *exits* in the building and 20 feet (6096 mm) horizontally from *exits* in the building, from window openings and *exits* in adjacent buildings on the same lot and from the *lot line*.~~
8. ~~Discharge from vents shall not be into the interior of the building.~~

Revise as follows:

~~911.3~~ 911.2 Explosion prevention systems.
Explosion prevention systems shall be of an *approved* type and installed and maintained in accordance with the provisions of this code and NFPA 69.

~~911.4~~ 911.3 Deflagration venting.
Deflagration venting shall be of an *approved* type and installed and maintained in accordance with the provisions of this code and NFPA 68.

~~911.5~~ 911.4 Barricades.
Barricades shall be designed and installed in accordance with NFPA 495.

Reason: This proposal is to delete the limited prescriptive language that had been in the IFC specifying how deflagration venting should be designed and installed. The language existed prior to the reference to NFPA 68 Standard on Explosion Protection by Deflagration Venting was added to the IFC starting with the 2021 edition.

The existing language was simplistic, lacked proper guidance and because of of it's simplicity it can conflict with NFPA 68 provisions. By applying NFPA 68 Issues such as the degree of health hazard (health hazard rating) of the material involved is addressed, performance and well as prescriptive options are available and specific guidance on deflagration of Gas Mixtures and Mists, Dusts and Hybrid Mixtures, Gases ad Dusts in Pipes and Ducts Operating at or Near Atmospheric Pressure, is provided along with guidance on Deflagration Vents and Vent Closures.

Existing Sections 911.3 and 911.4 are modified to include "and maintained" because both documents contain extensive maintenance requirements and maintenance is not currently provided by the IFC.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the FCAC Website

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

These revisions better correlate with the appropriate industry standard.

F143-24

F144-24

IFC: 508.1.6; IBC: [F] 911.1.6

Proponents: Steve Skalko, Stephen V. Skalko, P.E. & Associates LLC, self (svskalko@svskalko-pe.com)

2024 International Fire Code

Revise as follows:

508.1.6 Required features.

The *fire command center* shall comply with NFPA 72 and shall contain the following features:

1. The emergency voice/alarm communications system control unit, where required.
2. The fire department communications system.
3. Fire detection and alarm system annunciator.
4. Where elevators are provided, the ~~Annunciator~~ annunciator unit visually indicating the location of the elevators and whether they are operational.
5. Status indicators and controls for air distribution systems.
6. Where smoke control is provided, ~~The~~ the firefighter’s control panel required by Section 909.16 for smoke control systems installed in the building.
7. Where *interior exit stairways* are provided, ~~Controls~~ controls for unlocking *interior exit stairway* doors simultaneously.
8. Sprinkler valve and water-flow detector display panels.
9. Where emergency and standby power are provided, ~~Emergency~~ emergency and standby power status indicators.
10. A telephone for fire department use with controlled access to the public telephone system.
11. Where fire pumps are provided, ~~Fire~~ fire pump status indicators.
12. Schematic building plans indicating the typical floor plan and detailing the building core, *means of egress*, *fire protection systems*, firefighter air-replenishment systems, firefighting equipment and fire department access, and the location of *fire walls*, *fire barriers, fire partitions, smoke barriers* and smoke partitions.

13. An *approved* Building Information Card that includes, but is not limited to, all of the following information:
    13.1. General building information that includes: property name, address, the number of floors in the building above and below grade, use and occupancy classification (for mixed uses, identify the different types of occupancies on each floor) and the estimated building population during the day, night and weekend.
    13.2. Building emergency contact information that includes: a list of the building's emergency contacts including but not limited to building manager, building engineer and their respective work phone number, cell phone number and email address.
    13.3. Building construction information that includes: the type of building construction including but not limited to floors, walls, columns and roof assembly.
    13.4. *Exit access stairway* and *exit stairway* information that includes: number of *exit access stairways* and *exit stairways* in building; each *exit access stairway* and *exit stairway* designation and floors served; location where each *exit access stairway* and *exit stairway* discharges, *interior exit stairways* that are pressurized; *exit stairways* provided with emergency lighting; each *exit stairway* that allows reentry; *exit stairways* providing roof access; elevator information that includes: number of elevator banks, elevator bank designation, elevator car numbers and respective floors that they serve; location of elevator machine rooms, control rooms and control spaces; location of sky lobby; and location of freight elevator banks.
    13.5. Building services and system information that includes: location of mechanical rooms, location of building management system, location and capacity of all fuel oil tanks, location of emergency generator and location of natural gas service.
    13.6. *Fire protection system* information that includes: location of standpipes, location of fire pump room, location of fire department connections, floors protected by automatic sprinklers and location of different types of *automatic sprinkler systems* installed including but not limited to dry, wet and pre-action.
    13.7. Hazardous material information that includes: location and quantity of hazardous material.

14. Work table.
15. Generator supervision devices, manual start and transfer features.
16. Public address system, where specifically required by other sections of this code.
17. Elevator fire recall switch in accordance with ASME A17.1/CSA B44.
18. Elevator emergency or standby power selector switch(es) in accordance with ASME A17.1/CSA B44.

2024 International Building Code

Revise as follows:

[F] 911.1.6 Required features.
The *fire command center* shall comply with NFPA 72 and shall contain ~~all of~~ the following features:
1. The emergency voice/alarm communication system control unit, where required.
2. The fire department communications system.
3. Fire detection and alarm system *annunciator*.
4. Where elevators are provided, the ~~*Annunciator*~~annunciator unit visually indicating the location of the elevators and whether they are operational.
5. Status indicators and controls for air distribution systems.
6. Where smoke control is provided, ~~The~~ the firefighter's control panel required by Section 909.16 for smoke control systems installed in the building.
7. Where *interior exit stairways* are provided, ~~Controls~~ controls for unlocking *interior exit stairway* doors simultaneously.
8. Sprinkler valve and waterflow detector display panels.

9. Where emergency and standby power are provided, ~~Emergency~~ emergency and standby power status indicators.
10. A telephone for fire department use with controlled access to the public telephone system.
11. Where fire pumps are provided, ~~Fire~~ fire pump status indicators.
12. Schematic building plans indicating the typical floor plan and detailing the building core, *means of egress*, *fire protection systems*, firefighter air replenishment system, firefighting equipment and fire department access and the location of *fire walls, fire barriers, fire partitions, smoke barriers* and *smoke partitions*.
13. An *approved Building* Information Card that contains, but is not limited to, the following information:
    - 13.1. General building information that includes: property name, address, the number of floors in the *building* above and below grade, use and occupancy classification (for mixed uses, identify the different types of occupancies on each floor), and the estimated building population during the day, night and weekend.
    - 13.2. Building emergency contact information that includes: a list of the building's emergency contacts including but not limited to building manager and building engineer and their respective work phone number, cell phone number, e-mail address.
    - 13.3. Building construction information that includes: the type of building construction including but not limited to floors, walls, columns, and roof assembly.
    - 13.4. *Exit access* and *exit stairway* information that includes: number of *exit access* and *exit stairways* in the building, each *exit access* and *exit stairway* designation and floors served, location where each *exit access* and *exit stairway* discharges, *interior exit stairways* that are pressurized, *exit stairways* provided with emergency lighting, each *exit stairway* that allows reentry, *exit stairways* providing roof access; elevator information that includes: number of elevator banks, elevator bank designation, elevator car numbers and respective floors that they serve; location of elevator machine rooms, control rooms and control spaces; location of sky lobby, location of freight elevator banks.
    - 13.5. Building services and system information that includes: location of mechanical rooms, location of *building* management system, location and capacity of all fuel oil tanks, location of emergency generator, location of natural gas service.
    - 13.6. *Fire protection system* information that includes: location of *standpipes*, location of fire pump room, location of fire department connections, floors protected by automatic sprinklers, location of different types of *automatic sprinkler systems* installed including, but not limited to, dry, wet and pre-action.
    - 13.7. *Hazardous material* information that includes: location of *hazardous material*, quantity of *hazardous material*.
14. Work table.
15. Generator supervision devices, manual start and transfer features.
16. Public address system, where specifically required by other sections of this code.
17. Elevator fire recall switch in accordance with ASME A17.1/CSA B44.
18. Elevator emergency or standby power selector switch(es), where emergency or standby power is provided.

Reason: Section [F] 911.1.6 specifies required features of a fire command center and indicates the command center shall contain "all of the following features." However, though the items listed are common in high-rise buildings, not all of the items listed may be present or required in large single story Group F-1 or S-1 buildings. The submitter of the original code change F42-18 (i.e. California Fire Chiefs Association) acknowledged in their reason statement that the intent was not to *"require items not otherwise required by the building construction."* The Fire Committee also noted in their approval reason that a *"more defined list as to what will be included in the fire command center that possibly differs from what is necessary for a high-rise building may be necessary."* These statements made clear the addition of large F-1 and S-1 buildings to the requirement for a Fire Command Center did not automatically require that additional features such as an emergency voice/alarm communication system noted in Section [F] 911.1.6 Item No. 1, or smoke control in Item 6, or a fire pump in Item 11 be provided in such building types if not required.

This change clarifies that if such listed items are not required, then feature associated with the item need not be provided.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposal makes clear that if fire safety features listed for the fire command center are not required, then they need not be provided. There is no cost associated with such a decision.

F144-24

F145-24

IFC: 911.3, 911.3.1 (New), 1203.2, 1203.2.7 (New), 105.6.7 (New); IBC: [F] 2702.2, 2702.2.7 (New)

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Fire Code

911.3 Explosion prevention systems.
Explosion prevention systems shall be of an *approved* type and installed in accordance with the provisions of this code and NFPA 69.

Add new text as follows:

911.3.1 Emergency power. Powered components included as part of explosion prevention systems shall be provided with emergency power. The required duration for operation on emergency power shall be established in the hazard analysis required by NFPA 69.

Revise as follows:

1203.2 Where required.
Emergency and standby power systems shall be provided where required by Sections 1203.2.1 through ~~1203.2.19~~ 1203.2.20.

Add new text as follows:

1203.2.7 Explosion prevention systems.. Emergency power shall be provided for explosion prevention systems as required in Section 911.3.1.

105.6.7 Explosion control systems. A construction permit is required for installation of or modification to explosion control systems.

2024 International Building Code

Revise as follows:

[F] 2702.2 Where required.
Emergency and *standby power systems* shall be provided where required by Sections 2702.2.1 through ~~2702.2.19~~ 2702.2.20.

Add new text as follows:

2702.2.7 Explosion prevention systems. Emergency power shall be provided for explosion prevention systems as required in Section 911.3.1 of the *International Fire Code*.

Reason: Explosion prevention systems rely on components requiring power to function including detection systems, exhaust fans, louvers, etc. The fire code relies on NFPA 69 for the design of the systems, but NFPA 69 does not provide specific guidance on emergency power needs other than a general requirement for reliability which is found at NFPA 69 Section 6.3.

There have been designs for explosion prevention systems with as little as 2 hours of emergency power for events (hazards) that can last as long as 6-12 hours. By adding these sections, the designer will be required to include in a hazard analysis addressing how long the hazard may exist to determine the length of time the emergency power must be available for. The difference would be where some designers attempt to use a UPS with limited time duration as compared to installing an emergency generator.

NFPA 69 currently requires a hazard analysis to be performed at Section 4.2.3, this proposed language would dovetail with that requirement and ensure that the necessary emergency power is addressed.

A construction permit is added to Section 105 for explosion control systems. These systems need to be designed and inspected as part of the overall building safety scheme.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the FCAC Website

Cost Impact: Increase

Estimated Immediate Cost Impact:

$0.00

Estimated Immediate Cost Impact Justification (methodology and variables):

This proposal could add cost to some explosion prevention system designs that do not properly address the necessary emergency power needs in the required hazard analysis and ultimately the design. However, if the explosion prevention system is not provided with the necessary emergency power it is not reliable as required presently and the resulting explosive event would cost much more in property loss and potentially serious injuries and/or loss of lives.

F145-24

F146-24

IFC: 912.5, 912.5.1, 912.5.2, 912.5.3, 912.5.4, 912.2.2; IBC: [F] 912.5, [F] 912.5.1, [F] 912.5.2, [F] 912.5.3, [F] 912.5.4, [F] 912.2.2

Proponents: Chad Sievers, NYS, NYS DOS (chad.sievers@dos.ny.gov); Jeanne Rice, NYS DOS, NYS DOS (jeanne.rice@dos.ny.gov); Kevin Duerr-Clark, NYS DOS, NYS DOS (kevin.duerr-clark@dos.ny.gov); China Clarke, New York State Dept of State, Manager Technical Support Unit (china.clarke@dos.ny.gov); Brian Tollisen, NYS Department of State, NYS Department of State (brian.tollisen@dos.ny.gov); John R Addario - NYS Department of State, NEW YORK STATE CODES DIVISION, New York State Department of State Division of Building Standards and Codes (john.addario@dos.ny.gov)

2024 International Fire Code

Revise as follows:

912.5 Signs.
A metal sign with raised letters not less than 1 inch (25 mm) in size shall be mounted on all fire department connections serving automatic sprinklers, standpipes or fire pump connections. Such signs shall read: “AUTOMATIC SPRINKLERS,” “STANDPIPES,” “TEST CONNECTION,” “STANDPIPE AND AUTOSPKR” or “AUTOSPKR AND STANDPIPE,” or a combination thereof as applicable.

912.5.1 Lettering.
Each fire department connection (FDC) shall be designated by a sign with letters not less than 1 inch (25.4 mm) in height. For manual standpipe systems, the sign shall also indicate that the system is manual and that it is either wet or dry.

912.5.2 Serving multiple buildings.
Where a fire department connection (FDC) services multiple buildings, structures or locations, a sign shall be provided indicating the building, structures or locations served. Where the FDC does not serve the entire building, a sign shall be provided indicating the portions of the building served.

912.5.3 Multiple or combined systems.
Where combination or multiple system types are supplied by the fire department connection, the sign or combination of signs shall indicate both designated services.

912.5.4 Indication of pressure.
The sign also shall indicate the pressure required at the outlets to deliver the standpipe system demand.

Exception: Where the pressure required is 150 pounds per square inch (1034 kPa) or less.

Revise as follows:

~~912.2.2~~ 912.5.5 Existing buildings. On existing buildings, wherever the fire department connection is not visible to approaching fire apparatus, the fire department connection shall be indicated by an *approved* sign mounted on the street front or on the side of the building. Such sign shall have the letters “FDC” not less than 6 inches (152 mm) high and words in letters not less than 2 inches (51 mm) high or an arrow to indicate the location. Such signs shall be subject to the approval of the *fire code official*.

2024 International Building Code

[F] 912.5 Signs.
A metal sign with raised letters not less than 1 inch (25 mm) in size shall be mounted on all fire department connections serving automatic sprinklers, standpipes or fire pump connections. Such signs shall read: “AUTOMATIC SPRINKLERS,” “*STANDPIPES*,” “TEST CONNECTION,” “STANDPIPE AND AUTOSPKR” or “AUTOSPKR AND STANDPIPE,” or a combination thereof as applicable.

[F] 912.5.1 Lettering.
Each fire department connection (FDC) shall be designated by a sign with raised letters not less than 1 inch (25.4 mm) in height. For manual standpipe systems, the sign shall also indicate that the system is manual and that it is either wet or dry.

[F] 912.5.2 Serving multiple buildings.
Where a fire department connection (FDC) services multiple *buildings*, *structures* or locations, a sign shall be provided indicating the *building*, *structures* or locations served. Where the FDC does not serve the entire *building*, a sign shall be provided indicating the portions of the *building* served.

[F] 912.5.3 Multiple or combined systems.
Where combination or multiple system types are supplied by the fire department connection, the sign or combination of signs shall indicate both designated services.

[F] 912.5.4 Indication of pressure. The sign also shall indicate the pressure required at the outlets to deliver the *standpipe system* demand.

Exception: Where the pressure required is 150 pounds per square inch (1034 kPa) or less.

Revise as follows:

[F] ~~912.2.2~~ 912.5.5 Existing buildings. On *existing buildings*, wherever the fire department connection is not visible to approaching fire apparatus, the fire department connection shall be indicated by an *approved* sign mounted on the street front or on the side of the *building*. Such sign shall have the letters “FDC” not less than 6 inches (152 mm) high and words in letters not less than 2 inches (51 mm) high or an arrow to indicate the location. Such signs shall be subject to the approval of the *fire code official*.

Reason: This is a simple editorial modification to the code, moving the requirement for a sign (which directs fire departments to the FDC on existing buildings) from the FDC “Location” code section to the more appropriate code section that addresses signs, the FDC “Sign” section. The intent is to include the FDC sign requirements in one section.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is just an organizational change in the code moving the requirment from one location to another.

F146-24

F147-24

IFC: 912.2.3 (New); IBC: [F] 912.2.3 (New)

Proponents: John Swanson, NFSA, National Fire Sprinkler Association (swanson@nfsa.org); Jeffrey M Hugo, CBO, NFSA, National Fire Sprinkler Association (hugo@nfsa.org)

2024 International Fire Code

Add new text as follows:

912.2.3 Connection height. Fire department connections shall be located not less than 18 inches (457 mm) and not more than 4 feet (1.2 m) above the level of the adjacent grade or access level.

2024 International Building Code

Add new text as follows:

[F] 912.2.3 Connection height. Newly installed fire department connections shall be located not less than 18 inches (457 mm) and not more than 4 feet (1.2 m) above the level of the adjacent grade or access level.

Reason: This addition to the IFC will provide clear and enforceable criteria for minimum and maximum mounting height of the fire department connection. Currently, both NFPA 13 (sprinklers) and NFPA 14 (standpipes) contain requirements for minimum and maximum mounting heights of fire department connections. It is not uncommon for criteria within NFPA standards to be carried forward to the IFC. The IFC currently does not provide any guidance on mounting height in Section 912. Therefore, this proposal takes similar language currently found in NFPA 13 and NFPA 14 and adds it to the IFC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This addition will not increase or decrease the cost of construction.
Fire department connections are already required by the referenced installation standards at these height ranges, this proposal installs them at a standard height in the codes.

F147-24

F148-24

IFC: SECTION 915, 1103.9; IBC: SECTION 915

Proponents: Jeffrey Shapiro, International Code Consultants, Lake Travis Fire Rescue (jshapiro@ltfr.org)

2024 International Fire Code

SECTION 915
CARBON MONOXIDE (CO) DETECTION

Delete without substitution:

~~915.1 General~~.
~~Carbon monoxide (CO) detection shall be installed in new buildings in accordance with Section 915.1.1. Carbon monoxide detection shall be installed in existing buildings in accordance with Section 1103.9.~~

> **~~Exception:~~** ~~Carbon monoxide detection is not required in Group S, Group F and Group U occupancies that are not normally occupied.~~

~~915.1.1 Where required~~.
~~Carbon monoxide detection shall be installed in the locations specified in Section 915.2 where any of the following conditions exist.~~

1. ~~In buildings that contain a *CO source*.~~
2. ~~In buildings that contain or are supplied by a CO-producing forced-air furnace.~~
3. ~~In buildings with attached private garages.~~
4. ~~In buildings that have a CO-producing vehicle that is used within the building.~~

~~915.2 Locations~~.
~~Carbon monoxide detection shall be installed in the locations specified in Sections 915.2.1 through 915.2.3.~~

~~915.2.1 Dwelling units~~. ~~Carbon monoxide detection shall be installed in *dwelling units* outside of each separate sleeping area in the immediate vicinity of the bedrooms. Where a *CO source* is located within a bedroom or its attached bathroom, carbon monoxide detection shall be installed within the bedroom.~~

~~915.2.2 Sleeping units~~.
~~Carbon monoxide detection shall be installed in *sleeping units*.~~

> **~~Exception:~~** ~~Carbon monoxide detection shall be allowed to be installed outside of each separate sleeping area in the immediate vicinity of the *sleeping unit* where the *sleeping unit* or its attached bathroom does not contain a *CO source* and is not served by a CO-producing forced-air furnace.~~

~~915.2.3 Group E occupancies~~. ~~A carbon monoxide system that uses carbon monoxide detectors shall be installed in Group E occupancies. Alarm signals from carbon monoxide detectors shall be automatically transmitted to an on-site location that is staffed by school personnel.~~

> **~~Exception:~~** ~~Carbon monoxide alarm signals shall not be required to be automatically transmitted to an on-site location that is staffed by school personnel in Group E occupancies with an *occupant load* of 30 or less.~~

~~915.2.4 CO-producing forced-air furnace~~.

~~Carbon monoxide detection complying with Item 2 of Section 915.1.1 shall be installed in all enclosed rooms and spaces served by a fuel-burning, forced-air furnace.~~

~~Exceptions:~~

1. ~~Where a carbon monoxide detector is provided in the first room or space served by each main duct leaving the furnace, and the carbon monoxide alarm signals are automatically transmitted to an *approved* location.~~
2. ~~*Dwelling units* that comply with Section 915.2.1.~~

~~915.2.5 Private garages~~.

~~Carbon monoxide detection complying with Item 3 of Section 915.1.1 shall be installed within enclosed occupiable rooms or spaces that are contiguous to the attached private garage.~~

~~Exceptions:~~

1. ~~In buildings without communicating openings between the private garage and the building.~~
2. ~~In rooms or spaces located more than one story above or below a private garage.~~
3. ~~Where the private garage connects to the building through an *open*-ended corridor.~~
4. ~~An open parking garage complying with Section 406.5 of the *International Building Code* or an enclosed parking garage complying with Section 406.6 of the *International Building Code* shall not be considered a private garage.~~
5. ~~*Dwelling units* that comply with Section 915.2.1.~~

~~915.2.6 All other occupancies~~.

~~For locations other than those specified in Sections 915.2.1 through 915.2.5, carbon monoxide detectors shall be installed on the ceiling of enclosed rooms or spaces containing CO producing devices or served by a *CO source* forced-air furnace.~~

~~**Exception:** Where environmental conditions prohibit the installation of carbon monoxide detector in an enclosed room or space, carbon monoxide detectors shall be installed in an *approved* enclosed location contiguous with the room or space that contains a *CO source.*~~

~~915.3 Carbon monoxide detection~~.

~~Carbon monoxide detection required by Sections 915.1 through 915.2.3 shall be provided by carbon monoxide alarms complying with Section 915.4 or carbon monoxide detection systems complying with Section 915.5.~~

~~915.3.1 Alarm limitations~~.

~~Carbon monoxide alarms shall only be installed in *dwelling units* and in sleeping units. They shall not be installed in locations where the code requires carbon monoxide detectors to be used.~~

~~915.3.2 Fire alarm system required.~~

~~New buildings that are required by Section 907.2 to have a *fire alarm system* and by Section 915.2 to have carbon monoxide detectors shall be connected to the *fire alarm system* in accordance with NFPA 72.~~

~~915.3.3 Fire alarm systems not required.~~

~~In new buildings that are not required by Section 907.2 to have a *fire alarm system*, carbon monoxide detection shall be provided by one of the following:~~

1. ~~Carbon monoxide detectors connected to an *approved* carbon monoxide detection system in accordance with NFPA 72.~~

2. ~~Carbon monoxide detectors connected to an *approved* combination system in accordance with NFPA 72.~~
3. ~~Carbon monoxide detectors connected to an *approved fire alarm system* in accordance with NFPA 72.~~
4. ~~Where *approved* by the *fire code official*, carbon monoxide alarms maintained in accordance with the manufacturer's instructions.~~

~~915.3.4 Installation~~.
~~Carbon monoxide detection shall be installed in accordance with NFPA 72 and the manufacturer's instructions.~~

~~915.4 Carbon monoxide alarms~~.
~~Carbon monoxide alarms shall comply with Sections 915.4.1 through 915.4.4.~~

~~915.4.1 Power source~~. ~~Carbon monoxide alarms shall receive their primary power from the building wiring where such wiring is served from a commercial source, and when primary power is interrupted, shall receive power from a battery. Wiring shall be permanent and without a disconnecting switch other than that required for overcurrent protection.~~

> **~~Exception:~~** ~~Where installed in buildings without commercial power, battery-powered carbon monoxide alarms shall be an acceptable alternative.~~

~~915.4.2 Listings~~. ~~Carbon monoxide alarms shall be *listed* in accordance with UL 2034.~~

~~915.4.3 Combination alarms~~.
~~Combination carbon monoxide/smoke alarms shall be an acceptable alternative to carbon monoxide alarms. Combination carbon monoxide/smoke alarms shall be *listed* in accordance with UL 217 and UL 2034.~~

~~915.4.4 Interconnection~~.
~~Where more than one carbon monoxide alarm is required to be installed, carbon monoxide alarms shall be interconnected in such a manner that the actuation of one alarm will activate all of the alarms. Physical interconnection of carbon monoxide alarms shall not be required where listed wireless alarms are installed and all alarms sound upon activation of one alarm.~~

~~915.5 Carbon monoxide detection systems~~.
~~Carbon monoxide detection systems shall be an acceptable alternative to carbon monoxide alarms and shall comply with Sections 915.5.1 through 915.5.3.~~

~~915.5.1 General~~.
~~Carbon monoxide detectors shall be *listed* in accordance with UL 2075.~~

~~915.5.2 Locations~~.
~~Carbon monoxide detectors shall be installed in the locations specified in Section 915.2. These locations supersede the locations specified in NFPA 72.~~

~~915.5.3 Combination detectors~~.
~~Combination carbon monoxide/smoke detectors shall be an acceptable alternative to carbon monoxide detectors, provided that they are *listed* in accordance with UL 268 and UL 2075.~~

~~**915.5.4 Occupant notification.**~~

~~Activation of a carbon monoxide detector shall annunciate at the control unit and shall initiate audible and visible alarm notification throughout the building.~~

> ~~**Exception:** Occupant notification is permitted to be limited to the area where the carbon monoxide alarm signal originated and other signaling zones in accordance with the fire safety plan, provided that the alarm signal from an activated carbon monoxide detector is automatically transmitted to an *approved* on-site location or off-premises location.~~

~~**915.5.5 Duct detection.**~~

~~Carbon monoxide detectors placed in environmental air ducts or plenums shall not be used as a substitute for the required protection in Section 915.~~

~~**915.6 Maintenance.**~~

~~Carbon monoxide alarms and carbon monoxide detection systems shall be maintained in accordance with NFPA 72. Carbon monoxide alarms and carbon monoxide detectors that become inoperable or begin producing end-of-life signals shall be replaced.~~

~~**915.6.1 Enclosed parking garages.**~~

~~Carbon monoxide and nitrogen dioxide detectors installed in enclosed parking garages in accordance with Section 404.1 of the International Mechanical Code shall be maintained in accordance with the manufacturer's instructions and their listing. Detectors that become inoperable or begin producing end-of-life signals shall be replaced.~~

Delete and substitute as follows:

~~**CARBON MONOXIDE SOURCE.** A piece of commonly used equipment or permanently installed appliance, fireplace or process that produces or emits carbon monoxide gas.~~

CARBON MONOXIDE SOURCE. A combustion process that has the potential to: 1. Produce carbon monoxide as a product of combustion under normal or abnormal conditions, and 2. Expose building occupants to carbon monoxide. Carbon monoxide sources include, but are not limited to solid-, liquid-, or gas-fueled appliances, equipment, devices, or systems, such as fireplaces, furnaces, heaters, boilers, cooking equipment, and vehicles with internal combustion engines.

Carbon Monoxide Source, Direct. A permanently installed *carbon monoxide source*, other than a *direct-vent appliance*, that is located in an interior space

Carbon Monoxide Source, Forced-indirect. A *carbon monoxide source* connected to an interior space by a forced air supply duct.

Add new text as follows:

915.1 General. New and existing buildings shall be provided with carbon monoxide (CO) detection in accordance with Sections 915.2 through 915.5.

915.2 Where required. Carbon monoxide detection shall be provided in interior spaces, other than dwelling units or sleeping units, that are exposed to a *carbon monoxide source* in accordance with Sections 915.2.1 through 915.2.3. Carbon monoxide detection for dwelling units or sleeping units that are exposed to a *carbon monoxide source* shall be in accordance with Section 915.2.4.

915.2.1 Interior spaces with direct carbon monoxide sources. In all occupancies, interior spaces with a *direct carbon monoxide source* shall be provided with carbon monoxide detection located in close proximity to the *direct carbon monoxide source* and in accordance with Section 915.3.

> **Exception**: Where environmental conditions in an enclosed space are incompatible with carbon monoxide detection devices, carbon

monoxide detection shall be provided in an *approved* adjacent location.

915.2.2 Interior spaces adjacent to a space containing a carbon monoxide source. In *Groups A, B, E, I, M and R Occupancies*, interior spaces that are separated from and adjacent to an enclosed parking garage or an interior space that contains a *direct carbon monoxide source* shall be provided with carbon monoxide detection if there are communicating openings between the spaces. Detection devices shall be located in close proximity to communicating openings on the side that is furthest from the *carbon monoxide source* and in accordance with Section 915.3

Exceptions:

1. Where communicating openings between the space containing a *direct carbon monoxide source* and the adjacent space are permanently sealed airtight, carbon monoxide detection is not required for the adjacent space.
2. Where the *fire code official* determines that the volume or configuration of the adjacent interior space is such that dilution or geometry would diminish the effectiveness of carbon monoxide detection devices located in such spaces, detection devices additional to those required by Section 915.2.1 shall be located on the side of communicating openings that is closest to the *carbon monoxide source*.

915.2.3 Interior spaces with forced-indirect carbon monoxide sources. In all occupancies, interior spaces with a *forced-indirect carbon monoxide source* shall be provided with carbon monoxide detection in accordance with either of the following:

1. Detection in each space with a forced-indirect carbon monoxide source, located in accordance with Section 915.3.
2. Detection only in the first space served by the main duct leaving the *forced-indirect carbon monoxide source*, located in accordance with Section 915.3, with an audible and visual alarm signal provided at an *approved* location.

915.2.4 Dwelling units and sleeping units. Carbon monoxide detection for *dwelling units* and *sleeping units* shall comply with Sections 915.2.4.1 and 915.2.4.2.

915.2.4.1 Direct carbon monoxide sources. Where a *direct carbon monoxide* source is located in a bedroom or sleeping room, or a bathroom attached to either, carbon monoxide detection shall be installed in the bedroom or sleeping room.
Where carbon monoxide detection is not installed in bedrooms or sleeping rooms, carbon monoxide detection shall be installed outside of each separate sleeping area in close proximity to bedrooms or sleeping rooms for either of the following conditions:

1. The *dwelling unit* or *sleeping unit* has a communicating opening to an attached, enclosed garage.
2. A *direct carbon monoxide source* is located in the *dwelling unit* or *sleeping unit* outside of bedrooms or sleeping rooms.

915.2.4.2 Forced-indirect carbon monoxide sources. Bedrooms or sleeping rooms in dwelling units or sleeping units that are exposed to a forced-indirect carbon monoxide source shall be provided with carbon monoxide detection in accordance with Section 915.2.4.1 or Section 915.2.3.

915.3 Location of detection devices. Carbon monoxide detection devices shall be installed in accordance with manufacturer's instructions in a location that avoids dead air spaces, turbulent air spaces, fresh air returns, open windows, and obstructions that would inhibit accumulation of carbon monoxide at the detection location. Carbon monoxide detection in air ducts or plenums shall not be permitted as an alternative to required detection locations.

915.4 Permissible detection devices. Carbon monoxide detection shall be provided by a carbon monoxide detection system complying with Section 915.4.2 unless *carbon monoxide alarms* are permitted by Sections 915.4.1.

915.4.1 Carbon monoxide alarms. *Carbon monoxide alarms* complying with Sections 915.4.1.1 through 915.4.1.3 shall be permitted in lieu of a carbon monoxide detection system in both of the following:

1. *Dwelling units* and *sleeping units*.
2. Locations other than *dwelling units* or *sleeping units*, where *approved*, provided that the manufacturer's instructions do not prohibit installation in locations other than *dwelling units* or *sleeping units* and that the alarm signal for any *carbon monoxide alarm* installed in a normally unoccupied location is annunciated by an audible and visual signal in an *approved* location.

915.4.1.1 Power source. In buildings with a wired power source, *carbon monoxide alarms* shall receive their primary power from a permanent connection to building wiring, with no disconnecting means other than for overcurrent protection, and shall be provided with a battery backup. In buildings without a wired power source, *carbon monoxide alarms* shall be battery powered.

Exception: *Carbon monoxide alarms* shall be permitted to be battery powered or plug-in with a battery backup where such alarms are being retrofitted into an existing building that was not previously required to have carbon monoxide detection permanently connected to a wired power source.

915.4.1.2 Listings. *Carbon monoxide alarms* shall be *listed* in accordance with UL 2034. Combination carbon monoxide/smoke alarms shall also be listed in accordance with UL 217.

915.4.1.3 Interconnection. Where more than one *carbon monoxide alarm* is installed, actuation of any alarm shall cause all of the alarms to signal an alarm condition.

915.4.2 Carbon monoxide detection systems. Carbon monoxide detection systems shall be installed in accordance with NFPA 72.

915.4.2.1 Fire alarm system integration. Where a building fire alarm system or combination fire alarm system, as defined in NFPA 72, is installed, carbon monoxide detection shall be provided by connecting *carbon monoxide detectors* to the fire alarm system. Where a building fire alarm system or a combination fire alarm system is not installed, carbon monoxide detection shall be provided by connecting *carbon monoxide detectors* to a carbon monoxide detection system complying with NFPA 72.

915.4.2.2 Listings. *Carbon monoxide detectors* shall be *listed* in accordance with UL 2075. Combination carbon monoxide/smoke detectors shall be listed in accordance with UL 268 and UL 2075.

915.4.2.3 Alarm notification. For other than Group E Occupancies, activation of a *carbon monoxide detector* shall initiate alarm notification in accordance with any of the following:

1. An audible and visible alarm notification throughout the building and at the control unit.
2. Where specified in an *approved* fire safety plan, an audible and visible alarm in the signaling zone where the carbon monoxide has been detected and other signaling zones specified in the fire safety plan, and at the control unit.
3. Where a sounder base is provided for each detector, an audible alarm at the activated *carbon monoxide detector* and an audible and visible alarm at the control unit.

For Group E Occupancies having an occupant load of 30 or less, alarm notification shall be provided in an on-site location staffed by school personnel or in accordance with the notification requirements for other occupancies. For Group E occupancies having an occupant load of more than 30, an audible and visible alarm shall be provided in an on-site location staffed by school personnel.

915.5 Maintenance. *Carbon monoxide alarms* and carbon monoxide detection systems shall be maintained in accordance with NFPA 72 and the manufacturer's instructions. *Carbon monoxide alarms* and *carbon monoxide detectors* that become inoperable or begin producing end-of-life signals shall be replaced.

Delete and substitute as follows:

~~**1103.9 Carbon monoxide detection.**~~

~~Carbon monoxide detection shall be installed in existing buildings where any of the conditions identified in Section 915.1.1~~

~~exist. Carbon monoxide alarms shall be installed in the locations specified in Section 915.2 and the installation shall be in accordance with Section 915.4.~~

~~**Exceptions:**~~

1. ~~Carbon monoxide alarms are permitted to be solely battery operated where the code that was in effect at the time of construction did not require carbon monoxide detectors to be provided.~~
2. ~~Carbon monoxide alarms are permitted to be solely battery operated in *dwelling units* that are not served from a commercial power source.~~
3. ~~A carbon monoxide detection system in accordance with Section 915.5 shall be an acceptable alternative to carbon monoxide alarms.~~

1103.9 Carbon monoxide detection. Carbon monoxide detection shall be installed in existing buildings in accordance with Section 915.

2024 International Building Code

SECTION 915
CARBON MONOXIDE (CO) DETECTION

Delete without substitution:

~~**[F] 915.1 General.**~~
~~Carbon monoxide (CO) detection shall be installed in new *buildings* in accordance with Section 915.1.1. Carbon monoxide detection shall be installed in *existing buildings* in accordance with Chapter 11 of the International Fire Code.~~

~~**Exception:** Carbon monoxide detection is not required in Group S, Group F and Group U occupancies that are not normally occupied.~~

~~**[F] 915.1.1 Where required.**~~
~~Carbon monoxide detection shall be installed in the locations specified in Section 915.2 where any of the following conditions exist.~~

1. ~~In *buildings* that contain a CO source.~~
2. ~~In *buildings* that contain or are supplied by a CO-producing forced-air furnace.~~
3. ~~In *buildings* with attached *private garages*.~~
4. ~~In *buildings* that have a CO-producing vehicle that is used within the *building*.~~

~~**[F] 915.2 Locations.**~~
~~Carbon monoxide detection shall be installed in the locations specified in Sections 915.2.1 through 915.2.3.~~

~~**[F] 915.2.1 Dwelling units.**~~
~~Carbon monoxide detection shall be installed in *dwelling units* outside of each separate sleeping area in the immediate vicinity of the bedrooms. Where a CO source is located within a bedroom or its attached bathroom, carbon monoxide detection shall be installed within the bedroom.~~

~~**[F] 915.2.2 Sleeping units.** Carbon monoxide detection shall be installed in *sleeping units*.~~

~~**Exception:** Carbon monoxide detection shall be allowed to be installed outside of each separate sleeping area in the immediate vicinity of the *sleeping unit* where the *sleeping unit* or its attached bathroom does not contain a CO source and is not served by a CO-~~

~~producing forced-air furnace.~~

~~**[F] 915.2.3 Group E occupancies**. A carbon monoxide system that uses carbon monoxide detectors shall be installed in Group E occupancies. *Alarm signals* from carbon monoxide detectors shall be automatically transmitted to an on-site location that is staffed by school personnel.~~

~~**Exception:** *Carbon monoxide alarm* signals shall not be required to be automatically transmitted to an on-site location that is staffed by school personnel in Group E occupancies with an *occupant load* of 30 or less.~~

~~**[F] 915.2.4 CO-producing forced-air furnace.**~~

~~Carbon monoxide detection complying with Item 2 of Section 915.1.1 shall be installed in all enclosed rooms and spaces served by a fuel-burning, forced-air furnace.~~

~~**Exceptions:**~~

1. ~~Where a *carbon monoxide detector* is provided in the first room or space served by each main duct leaving the furnace, and the carbon monoxide *alarm signals* are automatically transmitted to an *approved* location.~~
2. ~~*Dwelling units* that comply with Section 915.2.1.~~

~~**[F] 915.2.5 Private garages.**~~

~~Carbon monoxide detection complying with Item 3 of Section 915.1.1 shall be installed within enclosed occupiable rooms or spaces that are contiguous to the attached *private garage*.~~

~~**Exceptions:**~~

1. ~~In *buildings* without communicating openings between the *private garage* and the *building*.~~
2. ~~In rooms or spaces located more than one *story* above or below a *private garage*.~~
3. ~~Where the *private garage* connects to the *building* through an *open-ended corridor*.~~
4. ~~An *open parking garage* complying with Section 406.5 or an enclosed parking garage complying with Section 406.6shall not be considered a *private garage*.~~
5. ~~*Dwelling units* that comply with Section 915.2.1.~~

~~**[F] 915.2.6 All other occupancies.**~~

~~For locations other than those specified in Section 915.2.1 through 915.2.5, *carbon monoxide detectors* shall be installed on the ceiling of enclosed rooms or spaces containing CO producing devices or served by a CO source forced-air furnace.~~

~~**Exception:** Where environmental conditions prohibit the installation of *carbon monoxide detector* in an enclosed room or space, *carbon monoxide detectors* shall be installed in an *approved* enclosed location contiguous with the room or space that contains a CO source.~~

~~**[F] 915.3 Carbon monoxide detection.**~~

~~Carbon monoxide detection required by Sections 915.1 through 915.2.3 shall be provided by *carbon monoxide alarms* complying with Section 915.4 or carbon monoxide detection systems complying with Section 915.5.~~

~~**[F] 915.3.1 Alarm limitations.**~~

~~*Carbon monoxide alarms* shall only be installed in *dwelling units* and in *sleeping units*. They shall not be installed in locations where the code requires *carbon monoxide detectors* to be used.~~

~~**[F] 915.3.2 Fire alarm system required.**~~

~~New *buildings* that are required by Section 907.2 to have a *fire alarm system* and by Section 915.2 to have *carbon monoxide detectors* shall be connected to the *fire alarm system* in accordance with NFPA 72.~~

~~**[F] 915.3.3 Fire alarm systems not required.**~~

~~In new *buildings* that are not required by Section 907.2 to have a *fire alarm system*, carbon monoxide detection shall be provided by one of the following:~~

1. ~~*Carbon monoxide detectors* connected to an *approved* carbon monoxide detection system in accordance with NFPA 72.~~
2. ~~*Carbon monoxide detectors* connected to an *approved* combination system in accordance with NFPA 72.~~
3. ~~*Carbon monoxide detectors* connected to an *approved fire alarm system* in accordance with NFPA 72.~~
4. ~~Where *approved* by the fire code official, *carbon monoxide alarms* maintained in accordance with the manufacturer's instructions.~~

~~**[F] 915.3.4 Installation.**~~

~~Carbon monoxide detection shall be installed in accordance with NFPA 72 and the manufacturer's instructions.~~

~~**[F] 915.4 Carbon monoxide alarms.**~~

~~*Carbon monoxide alarms* shall comply with Sections 915.4.1 through 915.4.4.~~

~~**[F] 915.4.1 Power source.**~~

~~*Carbon monoxide alarms* shall receive their primary power from the *building* wiring where such wiring is served from a commercial source, and when primary power is interrupted, shall receive power from a battery. Wiring shall be permanent and without a disconnecting switch other than that required for overcurrent protection.~~

~~**Exception:** Where installed in *buildings* without commercial power, battery-powered *carbon monoxide alarms* shall be an acceptable alternative.~~

~~**[F] 915.4.2 Listings.**~~

~~*Carbon monoxide alarms* shall be *listed* in accordance with UL 2034.~~

~~**[F] 915.4.3 Combination alarms.**~~

~~Combination carbon monoxide/*smoke alarms* shall be an acceptable alternative to *carbon monoxide alarms*. Combination carbon monoxide/*smoke alarms* shall be *listed* in accordance with UL 217 and UL 2034.~~

~~**[F] 915.4.4 Interconnection.**~~

~~Where more than one *carbon monoxide alarm* is required to be installed, *carbon monoxide alarms* shall be interconnected in such a manner that the actuation of one alarm will activate all of the alarms. Physical interconnection of *carbon monoxide alarms* shall not be required where *listed* wireless alarms are installed and all alarms sound upon activation of one alarm.~~

~~**[F] 915.5 Carbon monoxide detection systems.**~~

~~Carbon monoxide detection systems shall be an acceptable alternative to *carbon monoxide alarms* and shall comply with Sections 915.5.1 through 915.5.3.~~

~~**[F] 915.5.1 General**~~**.**
~~*Carbon monoxide detectors* shall be *listed* in accordance with UL 2075.~~

~~**[F] 915.5.2 Locations**~~**.**
~~*Carbon monoxide detectors* shall be installed in the locations specified in Section 915.2. These locations supersede the locations specified in NFPA 72.~~

~~**[F] 915.5.3 Combination detectors**~~**.**
~~Combination carbon monoxide/*smoke detectors* shall be an acceptable alternative to *carbon monoxide detectors*, provided that they are *listed* in accordance with UL 268 and UL 2075.~~

~~**[F] 915.5.4 Occupant notification**~~**.**
~~Activation of a *carbon monoxide detector* shall annunciate at the control unit and shall initiate audible and visible alarm notification throughout the *building*.~~

> ~~**Exception:** Occupant notification is permitted to be limited to the area where the carbon monoxide *alarm signal* originated and other signaling zones in accordance with the fire safety plan, provided that the *alarm signal* from an activated *carbon monoxide detector* is automatically transmitted to an *approved* on-site location or off-premises location.~~

~~**[F] 915.5.5 Duct detection**~~**.**
~~*Carbon monoxide detectors* placed in environmental air ducts or plenums shall not be used as a substitute for the required protection in Section 915.~~

~~**[F] 915.6 Maintenance**~~**.**
~~*Carbon monoxide alarms* and carbon monoxide detection systems shall be maintained in accordance with the *International Fire Code* .~~

Add new text as follows:

[F] 915.1 General. New and existing buildings shall be provided with carbon monoxide (CO) detection in accordance with Sections 915.2 through 915.5.

[F] 915.2 Where required. Carbon monoxide detection shall be provided in interior spaces, other than dwelling units or sleeping units, that are exposed to a *carbon monoxide source* in accordance with Sections 915.2.1 through 915.2.3. Carbon monoxide detection for dwelling units or sleeping units that are exposed to a *carbon monoxide source* shall be in accordance with Section 915.2.4.

[F] 915.2.1 Interior spaces with direct carbon monoxide sources. In all occupancies, interior spaces with a *direct carbon monoxide source* shall be provided with carbon monoxide detection located in close proximity to the *direct carbon monoxide source* and in accordance with Section 915.3.

> **Exception**: Where environmental conditions in an enclosed space are incompatible with carbon monoxide detection devices, carbon monoxide detection shall be provided in an *approved* adjacent location.

[F] 915.2.2 Interior spaces adjacent to a space containing a carbon monoxide source. *Groups A, B, E, I, M and R Occupancies*, interior spaces that are separated from and adjacent to an enclosed parking garage or an interior space that contains a *direct carbon monoxide source* shall be provided with carbon monoxide detection if there are communicating openings between the spaces. Detection devices shall be located in close proximity to communicating openings on the side that is furthest from the *carbon monoxide* *source* and in accordance with Section 915.3

Exceptions:

1 Where communicating openings between the space containing a *direct carbon monoxide source* and the adjacent space are permanently sealed airtight, carbon monoxide detection is not required for the adjacent space.

2 Where the *fire code official* determines that the volume or configuration of the adjacent interior space is such that dilution or geometry would diminish the effectiveness of carbon monoxide detection devices located in such spaces, detection devices additional to those required by Section 915.2.1 shall be located on the side of communicating openings that is closest to the *carbon monoxide source*.

[F] 915.2.3 Interior spaces with forced-indirect carbon monoxide sources. In all occupancies, interior spaces with a *forced-indirect carbon monoxide source* shall be provided with carbon monoxide detection in accordance with either of the following:

1. Detection in each space with a forced-indirect carbon monoxide source, located in accordance with Section 915.3.
2. Detection only in the first space served by the main duct leaving the *forced-indirect carbon monoxide source*, located in accordance with Section 915.3, with an audible and visual alarm signal provided at an *approved* location.

[F] 915.2.4 Dwelling units and sleeping units. Carbon monoxide detection for *dwelling units* and *sleeping units* shall comply with Sections 915.2.4.1 and 915.2.4.2.

[F] 915.2.4.1 Direct carbon monoxide sources. Where a *direct carbon monoxide* source is located in a bedroom or sleeping room, or a bathroom attached to either, carbon monoxide detection shall be installed in the bedroom or sleeping room.
Where carbon monoxide detection is not installed in bedrooms or sleeping rooms, carbon monoxide detection shall be installed outside of each separate sleeping area in close proximity to bedrooms or sleeping rooms for either of the following conditions:

1. The *dwelling unit* or *sleeping unit* has a communicating opening to an attached, enclosed garage.
2. A *direct carbon monoxide source* is located in the *dwelling unit* or *sleeping unit* outside of bedrooms or sleeping rooms.

[F] 915.2.4.2
Forced-indirect carbon monoxide sources.
. Bedrooms or sleeping rooms in dwelling units or sleeping units that are exposed to a forced-indirect carbon monoxide source shall be provided with carbon monoxide detection in accordance with Section 915.2.4.1 or Section 915.2.3.

[F] 915.3 Location of detection devices. Carbon monoxide detection devices shall be installed in accordance with manufacturer's instructions in a location that avoids dead air spaces, turbulent air spaces, fresh air returns, open windows, and obstructions that would inhibit accumulation of carbon monoxide at the detection location. Carbon monoxide detection in air ducts or plenums shall not be permitted as an alternative to required detection locations.

[F] 915.4 Permissible detection devices.. Carbon monoxide detection shall be provided by a carbon monoxide detection system complying with Section 915.4.2 unless *carbon monoxide alarms* are permitted by Sections 915.4.1.

[F] 915.4.1 Carbon monoxide alarms.. *Carbon monoxide alarms* complying with Sections 915.4.1.1 through 915.4.1.3 shall be permitted in lieu of a carbon monoxide detection system in both of the following:

1. *Dwelling units* and *sleeping units*.
2. Locations other than *dwelling units* or *sleeping units*, where *approved*, provided that the manufacturer's instructions do not prohibit installation in locations other than *dwelling units* or *sleeping units* and that the alarm signal for any *carbon monoxide alarm* installed in a normally unoccupied location is annunciated by an audible and visual signal in an *approved* location.

[F] 915.4.1.1 Power source. In buildings with a wired power source, *carbon monoxide alarms* shall receive their primary power from a permanent connection to building wiring, with no disconnecting means other than for overcurrent protection, and shall be provided with a battery backup. In buildings without a wired power source, *carbon monoxide alarms* shall be battery powered.

> **Exception:** *Carbon monoxide alarms* shall be permitted to be battery powered or plug-in with a battery backup where such alarms are being retrofitted into an existing building that was not previously required to have carbon monoxide detection permanently connected to a wired power source.

[F] 915.4.1.2 Listings. *Carbon monoxide alarms* shall be *listed* in accordance with UL 2034. Combination carbon monoxide/smoke alarms shall also be listed in accordance with UL 217.

[F] 915.4.1.3 Interconnection.. Where more than one *carbon monoxide alarm* is installed, actuation of any alarm shall cause all of the alarms to signal an alarm condition.

[F] 915.4.2 Carbon monoxide detection systems.. Carbon monoxide detection systems shall be installed in accordance with NFPA 72.

[F] 915.4.2.1 Fire alarm system integration.. Where a building fire alarm system or combination fire alarm system, as defined in NFPA 72, is installed, carbon monoxide detection shall be provided by connecting *carbon monoxide detectors* to the fire alarm system. Where a building fire alarm system or a combination fire alarm system is not installed, carbon monoxide detection shall be provided by connecting *carbon monoxide detectors* to a carbon monoxide detection system complying with NFPA 72.

[F] 915.4.2.2 Listings.. *Carbon monoxide detectors* shall be *listed* in accordance with UL 2075. Combination carbon monoxide/smoke detectors shall be listed in accordance with UL 268 and UL 2075.

[F] 915.4.2.3 Alarm notification. For other than Group E Occupancies, activation of a *carbon monoxide detector* shall initiate alarm notification in accordance with any of the following:

1. An audible and visible alarm notification throughout the building and at the control unit.
2. Where specified in an *approved* fire safety plan, an audible and visible alarm in the signaling zone where the carbon monoxide has been detected and other signaling zones specified in the fire safety plan, and at the control unit.
3. Where a sounder base is provided for each detector, an audible alarm at the activated *carbon monoxide detector* and an audible and visible alarm at the control unit.

For Group E Occupancies having an occupant load of 30 or less, alarm notification shall be provided in an on-site location staffed by school personnel or in accordance with the notification requirements for other occupancies. For Group E occupancies having an occupant load of more than 30, an audible and visible alarm shall be provided in an on-site location staffed by school personnel.

[F] 915.5
Maintenance
. *Carbon monoxide alarms* and carbon monoxide detection systems shall be maintained in accordance with the International Fire Code.

Reason: The final version of the 2024 edition text for Section 915 that was approved at the public comment hearing last cycle fell short of clearly conveying requirements. When I was asked by interested parties this cycle to help develop text for a couple "simple" changes, it became evident to me that this section of the code, which has been in flux for multiple editions, was so difficult to follow that an entire re-write was needed. I initially attempted to do this in legislative format, but the result was nearly impossible to follow. Furthermore, the adopted code text seems to require a level of protection for some occupancies that is excessive and for other occupancies insufficient.

This rewrite is intended to add clarity and was filtered by what I considered to be reasonable interpretation of the existing provisions, guided by New York state regulations, NFPA 72, and other sources of similar content. Beyond that, I modified content to address what I considered to be shortcomings or excessive provisions, or which were suggested by the task group that assisted with development of this proposal. For example:

1. The current code treats most buildings/occupancies in an equivalent fashion. It seems reasonable to provide a higher level of protection for occupancies with more occupant exposure (those other than F, H, S or U), so detection in adjacent spaces with communicating openings to a space with a CO source have been added.
2. The current code recognizes battery powered CO alarms in existing buildings but does not allow plug-in detectors in such cases. It seems reasonable to allow a plug-in detector if a battery-powered detector is allowed.
3. The allowance of expanded use of CO alarms in 915.4.1 was suggested by others.
4. The current code requires most detection to take place at the ceiling level. Clearly, that's not optimal for high ceiling, large volume spaces, especially if the CO source is small or if there is not a heat source to add buoyancy to a CO release. While the suggested text of locating "in close proximity" to a source isn't optimal or prescriptive, it allows for the designer to determine preferred locations.
5. Requiring CO detection for any occupancy that has a CO producing vehicle seems excessive. One LP forklift or a riding LP floor cleaner?
6. Detection device location guidance in 915.3 is derived from NY State regulations.
7. The allowance of detectors with sounder bases in lieu of alarm system notification was agreed to by the task group.
8. Exceptions that were in 1103.9 have been incorporated into 915 for simplification and to avoid conflict/overlap.

I expect that others will have differing opinions on some of the technical changes that have been suggested, and I welcome that dialogue during the code development process. I have no client interest in this proposal and my contribution of many hours developing and submitting this is exclusively seeking to clarify and improve the code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

It is impossible to assess the cost impact of this proposal because many of the current code provisions are vague and difficult, if not impossible, to uniformly interpret. The overall intent of this proposal is to make the provisions intelligible so that the requirements are clearly stated for more uniform application and enforcement. Beyond that, some of the revisions might be seen as increasing costs in some cases; whereas, others might be seen as decreasing costs by allowing new reduced-cost compliance options or clarifying a lesser extent of detection areas.

F148-24

F149-24

IFC: 915.3.2, 915.3.3, 915.5.4; IBC: [F] 915.3.2, [F] 915.3.3, [F] 915.5.4

Proponents: Kevin Scott, KH Scott & Associates LLC, self (khscottassoc@gmail.com)

2024 International Fire Code

Revise as follows:

915.3.2 ~~Fire~~ Connection to fire alarm system ~~required~~.
~~New~~ In buildings ~~that are~~ required to provide a fire alarm system by Section 907.2 ~~to have a *fire alarm system*~~ and carbon monoxide detection by Section 915.2, ~~to have~~ the carbon monoxide detectors shall be connected to the *fire alarm system* in accordance with NFPA 72.

915.3.3 Fire alarm systems not required.
In ~~new~~ buildings ~~that are~~ not required to provide a fire alarm system by Section 907.2 ~~to have a *fire alarm system*~~, carbon monoxide detection shall be provided by one of the following:

1. Carbon monoxide detectors connected to an *approved* carbon monoxide detection system in accordance with NFPA 72.
2. Carbon monoxide detectors connected to an *approved* combination system in accordance with NFPA 72.
3. Carbon monoxide detectors connected to an *approved fire alarm system* in accordance with NFPA 72.
4. Where *approved* by the *fire code official*, carbon monoxide alarms maintained in accordance with the manufacturer's instructions.

915.5.4 Occupant notification.
Activation of a carbon monoxide detector shall annunciate at the control unit and shall initiate audible and ~~visible~~ visual alarm notification throughout the building.

Exception: Occupant notification is permitted to be limited to the area where the carbon monoxide alarm signal originated and other signaling zones in accordance with the fire safety and evacuation plan, provided that the alarm signal from an activated carbon monoxide detector is automatically transmitted to an *approved* on-site location or off-premises location.

2024 International Building Code

Revise as follows:

[F] 915.3.2 ~~Fire~~ Connection to fire alarm system ~~required~~.
~~New~~ In buildings ~~that are~~ required to provide a fire alarm system by Section 907.2 ~~to have a *fire alarm system*~~ and carbon monoxide detection by Section 915.2, ~~to have~~ the carbon monoxide detectors shall be connected to the *fire alarm system* in accordance with NFPA 72.

[F] 915.3.3 Fire alarm systems not required.
In ~~new~~ buildings ~~that are~~ not required to provide a fire alarm system by Section 907.2 ~~to have a *fire alarm system*~~, carbon monoxide detection shall be provided by one of the following:

1. *Carbon monoxide detectors* connected to an *approved* carbon monoxide detection system in accordance with NFPA 72.
2. *Carbon monoxide detectors* connected to an *approved* combination system in accordance with NFPA 72.
3. *Carbon monoxide detectors* connected to an *approved fire alarm system* in accordance with NFPA 72.
4. Where *approved* by the fire code official, *carbon monoxide alarms* maintained in accordance with the manufacturer's instructions.

[F] 915.5.4 Occupant notification.
Activation of a carbon monoxide detector shall annunciate at the control unit and shall initiate audible and ~~visible~~ visual alarm notification throughout the building.

Exception: Occupant notification is permitted to be limited to the area where the carbon monoxide alarm signal originated and other signaling zones in accordance with the fire safety and evacuation plan, provided that the alarm signal from an activated carbon monoxide detector is automatically transmitted to an *approved* on-site location or off-premises location.

Reason: These sections were added in the 2021 Group A cycle. This proposal does not change the requirements; it simply clarifies the requirements.

Section 915.3.2 is editorially revised to remove unnecessary words and clarify that the building is required to a fire alarm system vs. a fire alarm system was installed for some other reason.

Section 915.3.3 is revised to correlate with the wording in Section 915.5.2.

Section 915.5.4 is revised to utilize the correct terms found in the IFC. The code uses “visual notification” and Chapter 4 addresses fire safety and evacuation plans.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

See reason statement.

F149-24

F150-24

IFC: SECTION 916, 916.1, 916.3, 916.4, 916.5, 916.6, 916.7, 916.8, 916.9, 916.10, 916.11, 1203.2.7, SECTION 6004, 6004.2.2.7; IBC: SECTION 916, [F] 916.1, [F] 916.3, [F] 916.4, [F] 916.5, [F] 916.6, [F] 916.7, [F] 916.8, [F] 916.9, [F] 916.10, [F] 916.11, SECTION 2702, [F] 2702.2.7

Proponents: Robert J Davidson, Davidson Code Concepts LLC, Self (rjd@davidsoncodeconcepts.com); Scott Lang, Honeywell, Honeywell (scott.lang@honeywell.com); Richard Roberts, Honeywell Building Automation, Honeywell Building Automatation (richard.roberts@systemsensor.com)

2024 International Fire Code

SECTION 916
GAS DETECTION SYSTEMS

Revise as follows:

916.1 Gas detection systems.
Gas detection systems required by this code shall comply with Sections 916.2 through ~~916.11~~ <u>916.10</u>.

916.3 Equipment. *Gas detection system* equipment shall be designed for use with the gases being detected and shall be installed in accordance with <u>an engineering analysis, the</u> manufacturer’s instructions , <u>and their listings when applicable.</u>

916.4 Power connections. *Gas detection systems* shall be ~~permanently connected to the building electrical power supply or shall be permitted to be cord connected to an unswitched receptacle using an *approved* restraining means that secures the plug to the receptacle~~ <u>powered in accordance with NFPA 72.</u>

916.5 Emergency ~~and standby~~ power. ~~Standby or e~~ <u>E</u>mergency power shall be provided ~~or the *gas detection system* shall initiate a trouble signal at an *approved* location if the power supply is interrupted~~ <u>in accordance with NFPA 110 or NFPA 111 for a length of time that is based upon an engineering analysis of the hazards the gas detection system is providing protection for in relation to how long the protection systems are needed to function to respond to a potential hazard.</u>

916.6 Sensor locations. Sensors shall be installed in *approved* locations ~~where leaking gases are expected to accumulate~~ <u>pursuant to an engineering evaluation in accordance with NFPA 72.</u>

916.7 Gas sampling. Gas sampling shall be performed ~~continuously~~<u>in accordance with the engineering analysis performed in accordance with NFPA 72 and manufacturer's instructions.</u> ~~Sample analysis shall be processed immediately after sampling, except as follows:~~

1. ~~For HPM gases, sample analysis shall be performed at intervals not exceeding 30 minutes~~
2. ~~For toxic gases that are not HPM, sample analysis shall be performed at intervals not exceeding 5 minutes, in accordance with Section 6004.2.2.7.~~
3. ~~Where a less frequent or delayed sampling interval is *approved*~~

916.8 System activation.
A gas detection alarm shall be initiated ~~where any sensor detects a concentration of gas exceeding the following thresholds:~~ <u>based upon the engineering analysis prepared and submitted in compliance with NFPA 72.</u>

1. ~~For *flammable gases*, a gas concentration exceeding 25 percent of the lower flammability limit (LFL).~~
2. ~~For nonflammable gases, a gas concentration exceeding one-half of the IDLH, unless a different threshold is specified by the section of this code requiring a *gas detection system.*~~

~~Upon activation of a gas detection alarm, alarm signals or other required responses shall be as specified by the section of this code~~

~~requiring a *gas detection system*. Audible and visible alarm signals associated with a gas detection alarm shall be distinct from fire alarm and carbon monoxide alarm signals.~~

916.9 ~~Signage~~ Signal response.. ~~Signs shall be provided adjacent to *gas detection system* alarm signaling devices~~ Facility emergency action plans shall include procedures and training that advise occupants of the nature of the signals and actions to take in response to the signal.

Delete without substitution:

~~**916.10 Fire alarm system connections.** Gas sensors and *gas detection systems* shall not be connected to fire alarm systems unless *approved* and connected in accordance with the fire alarm equipment manufacturer's instructions.~~

Revise as follows:

~~916.11~~ 916.10 Inspection, testing and sensor calibration.
Inspection and testing of *gas detection systems* shall be conducted ~~not less than annually~~ in accordance with NFPA 72. Sensor calibration shall be confirmed at the time of sensor installation and calibration shall be performed at the frequency specified by the sensor manufacturer.

1203.2.7 Gas detection systems.
Emergency power shall be provided for *gas detection systems* ~~where required by Sections 1203.2.10 and 1203.2.17. Standby power shall be provided for *gas detection systems* where required by Sections 916.5 and 1207.6.1.2.4~~ fora length of time that is based upon an engineering analysis of the hazards the gas detection system is providing protection for in relation to how long the protection systems are needed to function to respond to a potential hazard.

SECTION 6004
HIGHLY TOXIC AND TOXIC COMPRESSED GASES

Revise as follows:

6004.2.2.7 Treatment systems.
The exhaust ventilation from gas cabinets, exhausted enclosures and gas rooms, and local exhaust systems required in Sections 6004.2.2.4 and 6004.2.2.5 shall be directed to a treatment system. The treatment system shall be utilized to handle the accidental release of gas and to process exhaust ventilation. The treatment system shall be designed in accordance with Sections 6004.2.2.7.1 through 6004.2.2.7.5 and Section 509 of the International Mechanical Code.

Exceptions:

1. Highly toxic and toxic gases—storage. A treatment system is not required for cylinders, containers and tanks in storage where all of the following controls are provided:
    1.1. Valve outlets are equipped with gastight outlet plugs or caps.
    1.2. Handwheel-operated valves have handles secured to prevent movement.
    1.3. *Approved* containment vessels or containment systems are provided in accordance with Section 6004.2.2.3.
2. Toxic gases—use. Treatment systems are not required for toxic gases supplied by cylinders or portable tanks not exceeding 1,700 pounds (772 kg) water capacity where a *gas detection system* complying with Section 6004.2.2.10 and *listed* or *approved* automatic-closing fail-safe valves are provided. The *gas detection system* shall have a sensing interval not exceeding 5 minutes. Automatic-closing fail-safe valves shall be located immediately adjacent to cylinder valves and shall close when gas is detected at the permissible exposure limit (PEL) by a gas sensor monitoring the exhaust system at the point of discharge from the gas cabinet, exhausted enclosure, ventilated enclosure or gas room.

2024 International Building Code

SECTION 916
GAS DETECTION SYSTEMS

Revise as follows:

[F] 916.1 Gas detection systems.
Gas detection systems required by this code shall comply with Sections 916.2 through ~~916.11~~ 916.10.

[F] 916.3 Equipment. *Gas detection system* equipment shall be designed for use with the gases being detected and shall be installed in accordance with an engineering analysis, the manufacturer's instructions , and their listing when applicable.

[F] 916.4 Power connections. *Gas detection systems* shall be ~~permanently connected to the *building* electrical power supply or shall be permitted to be cord connected to an unswitched receptacle using an *approved* restraining means that secures the plug to the receptacle~~ powered in accordance with NFPA 72.

[F] 916.5 Emergency ~~and standby~~ power. ~~Standby or e~~ Emergency power shall be provided ~~or the *gas detection system* shall initiate a *trouble signal* at an *approved* location if the power supply is interrupted~~ in accordance with NFPA 110 or NFPA 111 for a length of time that is based upon an engineering analysis of the hazards the gas detection system is providing protection for in relation to how long the protection systems are needed to function to respond to a potential hazard.

[F] 916.6 Sensor locations.
Sensors shall be installed in *approved* locations ~~where leaking gases are expected to accumulate~~ pursuant to an engineering evaluation in accordance with NFPA 72..

[F] 916.7 Gas sampling.
Gas sampling shall be performed ~~continuously~~in accordance with the engineering analysis performed in accordance with NFPA 72 and manufacturer's instructions. ~~. Sample analysis shall be processed immediately after sampling, except as follows:~~

1. ~~For *HPM* gases, sample analysis shall be performed at intervals not exceeding 30 minutes.~~
2. ~~For *toxic* gases that are not *HPM*, sample analysis shall be performed at intervals not exceeding 5 minutes in accordance with Section 6004.2.2.7 of the International Fire Code.~~
3. ~~Where a less frequent or delayed sampling interval is *approved*.~~

[F] 916.8 System activation.
A gas detection alarm shall be initiated ~~where any sensor detects a concentration of gas exceeding the following thresholds:~~ based upon the engineering analysis prepared and submitted in compliance with NFPA 72.

1. ~~For flammable gases, a gas concentration exceeding 25 percent of the lower flammability limit (*LFL*).~~
2. ~~For nonflammable gases, a gas concentration exceeding one-half of the *IDLH*, unless a different threshold is specified by the section of this code requiring a *gas detection system*.~~

~~Upon activation of a gas detection alarm, *alarm signals* or other required responses shall be as specified by the section of this code requiring a *gas detection system*. Audible and visible *alarm signals* associated with a gas detection alarm shall be distinct from fire alarm and carbon monoxide *alarm signals*.~~

[F] 916.9 ~~Signage~~ Signal response..
~~Signs shall be provided adjacent to *gas detection system* alarm signaling devices~~ Facility emergency action plans shall include procedures and training that advise occupants of the nature of the signals and actions to take in response to the signal.

Delete without substitution:

~~**[F] 916.10 Fire alarm system connections**~~**.**

~~Gas sensors and *gas detection systems* shall not be connected to *fire alarm systems* unless *approved* and connected in accordance with the fire alarm equipment manufacturer's instructions.~~

Revise as follows:

[F] ~~916.11~~ 916.10 Inspection, testing and sensor calibration.
Gas detection systems and sensors shall be inspected, tested and calibrated in accordance with the *International Fire Code* .

SECTION 2702
EMERGENCY AND STANDBY POWER SYSTEMS

Revise as follows:

[F] 2702.2.7 Gas detection system.
Emergency ~~or standby~~ power shall be provided for *gas detection systems* in accordance with the *International Fire Code* .

Reason: The main purpose of this proposal is correlation. Gas detection systems are now part of NFPA 72 which the IFC and IBC reference and this section should be correlated with that document.

Section 916 is modified to include and engineering analysis which NFPA 72 requires for placement of gas detectors. Factually you cannot place a gas detector and expect a proper response without an engineering analysis. It also includes complying with listing when applicable.

Section 916.4 is modified to delete the prescriptive language and to refer to NFPA 72.

Section 916.5 is modified to refer to emergency power only, NFPA 110 has been modified to refer to Emergency Power Supply Systems (EPSS) generally, then engineering analysis provides for the Classification, Type and Level of emergency power supply. The new language specifies that the duration of the emergency power is based upon the expected duration of the required gas detection protection. There are no cookie cutter time frames for this need, each hazard protected will have differing needs.

Section 916.6 deletes subjective language and links the sensor location to the NFPA 72 required engineering analysis.

Section 916.7 again deletes all the subjective language and links this issue to the engineering analysis and manufacturer's instructions. This section had a link to IFC Section 6004.2.2.7, and that section is included in this proposal with a deletion of that subjective language.

Section 916.8 deletes the prescriptive language and ties the gas sampling to the NFPA 72 required engineering analysis.

Section 916.9 Is modified to eliminate signs for employees to read when an event occurs and replace same with a requirement that the facility EAP include procedures and training for employees on their expected response.

Section 916.10 is deleted. In many cases the gas detection shares the FACP in accordance with NFPA 72. The code requires all alarm system submittals to be approved.

Section 916.11 is renumbered, and the inspection and testing has been linked to NFPA 72.

Section 1203.2.7 has been modified to state that the gas detection emergency power must be provided based upon the engineering analysis of the hazards being protected, there are no set time frames, each situation requires separate analysis.

Section 6004.2.2.7 has been modified to delete the prescriptive 5-minute response time (which actually could be too long in some circumstances), the required engineering analysis will address this issue.

From a practical standpoint, engineering submittals typically comply with NFPA 72 and include the analysis that these changes correlate with.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is primarily editorial. It correlates the existing IFC language with the standards that the IFC refers to that have undergone improvements since these provisions were added to the IFC.

F151-24

IFC: 917.1, 917.2; IBC: [F] 917.1, [F] 917.2

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Fire Code

Revise as follows:

917.1 ~~College and university campuses~~ General.
A mass notification risk analysis in accordance with NFPA 72 shall be conducted prior
~~Prior~~ to construction of a new building requiring a *fire alarm system*
~~on a multiple-building college or university campus having a cumulative building *occupant load* of 1,000 or more, a mass notification risk analysis shall be conducted in accordance with NFPA 72.~~ for any of the following:

1. The building is part of a college or university campus having multiple buildings and a cumulative occupant load of 1,000 or more
2. The building is a Group E occupancy having an occupant load of 500 or more.
3. For occupancies other than Group E, the building has a lockdown plan in accordance with Section 404.2.3.

Where the risk analysis determines a need for mass notification, an approved mass notification system shall be provided in accordance with the findings of the risk analysis.

Delete without substitution:

~~**917.2 Group E occupancies.**~~
~~Prior to construction of a new building containing a Group E occupancy requiring a *fire alarm system* and having an occupant load of 500 or more, a mass notification risk analysis shall be conducted in accordance with NFPA 72. Where the risk analysis determines a need for mass notification, an *approved* mass notification system shall be provided in accordance with the findings of the risk analysis.~~

2024 International Building Code

Revise as follows:

[F] 917.1 ~~College and university campuses~~ General.
A mass notification risk analysis in accordance with NFPA 72 shall be conducted prior ~~Prior~~ to construction of a new *building* requiring a *fire alarm system* ~~on a multiple-*building* college or university campus having a cumulative *building occupant load* of 1,000 or more, a mass notification risk analysis shall be conducted in accordance with NFPA 72.~~ for any of the following:

1. The building is part of a college or university campus having multiple buildings and a cumulative occupant load of 1,000 or more.
2. The building is a Group E occupancy having an occupant load of 500 or more.
3. For occupancies other than Group E, the building has a lockdown plan in accordance with Section 404.2.3 of the International Fire Code.

Where the risk analysis determines a need for mass notification, an *approved* mass notification system shall be provided in accordance with the findings of the risk analysis.

Delete without substitution:

~~**[F] 917.2 Group E occupancies.**~~
~~Prior to construction of a new *building* containing a Group E occupancy requiring a *fire alarm system* and having an *occupant load* of 500 or more, a mass notification risk analysis shall be conducted in accordance with NFPA 72. Where the risk analysis determines a need for mass notification, an *approved* mass notification system shall be provided in accordance with the findings of the risk analysis.~~

Reason: This is the first of two proposals relating to notifying occupants during a lockdown. This proposal reorganizes, consolidates, and clarifies the previous 917.1 and 917.2, but does not change the requirements for educational occupancies, or colleges and universities.

The risk of death and injuries are shifting from fire incidences towards incidences of violence through a combination of reduction of fire deaths and an increase of violence. Mass notification often utilizes both voice and other communication technologies and is intended to communicate information about emergencies including but not limited to fire, human caused events (accidental and intentional), other dangerous situations, accidents, and natural disasters. A lockdown situation often requires a subsequent evacuation depending on the threat, and therefore is a reasonable trigger to perform a mass notification risk analysis. Furthermore, although lockdown planning is addressed in section 404.2.3, a lockdown response is not mandated by the code. Since lockdown is voluntary this proposed requirement is not compulsory unless lockdown is a planned emergency response.

For example, active shooters are one specific kind of threat that is often a concern. Active shooter incidences continue to increase in frequency, and the number of injuries and fatalities. Many associate active shooters with K-12 schools, colleges, and universities. However, statistics gathered by the FBI, and US Secret Service, National Institute of Justice, and The Violence Project show that workplaces (Business/Commerce/Retail/Factory) exceed educational occupancies as locations of concern. [1]

Every facility is unique and has specific risks. A risk analysis is a process to determine the likelihood, vulnerability, and magnitude of all potential emergencies. The complexity of the risk analysis should be commensurate to the complexity of the building(s) and hazards being considered. The risk analysis will determine if a mass notification system is needed and the type of mass notification system that best meets the specific needs of the building. This is important because mass notification is defined as "a technology capable of sending different layers of messaging that provides real-time information to groups of individuals within buildings, campus settings, geographic regions, or entire nations by using one or a combination of the following technologies:

<u>Layer 1:</u>

Voice messages

Visible notification appliances

Digital signage

<u>Layer 2:</u>

Wide-area outdoor mass notification systems

<u>Layer 3:</u>

Text messages

Emails

Tactile devices

Computer pop-ups

<u>Layer 4:</u>

Social networks

Radio broadcast

Television broadcast

Weather radios

Moreover, the key to determining if a mass notification system is required, is to review the Fire Safety, Lockdown and Evacuation Plans in-conjunction with the mass notification risk analysis. The risk analysis may identify hazards that are facility specific that lead to specific response plans with specific communication system requirements for that facility.

Requiring a risk analysis will result in a more comprehensive emergency response plan that is customized for the specific hazards and risks associated with the building. The risk analysis and emergency response plan can be as elaborate or as basic as the fire code official and building owner determines it needs to be. In some cases, other types of one-way communications may be needed to provide effective protection. This proposal ***only*** emphasizes the need to document how communicating with the occupants of the building and possibly occupants that are outside the building will be accomplished.

Sections 917.1 and 917.2 are moved to Items 1 and 2. In the proposal, these two items are clarified. The occupant load threshold for college and university campuses is based on the aggregate occupant load of all buildings on the campus. In Item 2, the occupant load is the occupant load of the single new building, not an aggregate occupant load of the school. The trigger for Item 3 is the construction of a new building as stated in the 1st sentence. The trigger is not the development of a new lockdown plan for an existing building. Item 3 requires any occupancy where a fire alarm system is required must provide a risk analysis. For all Items 1 through 3, if the risk analysis determines a need for mass notification, mass notification must be provided.This proposal **does not automatically** mandate the installation of any mass notification systems. Rather, it only requires a risk analysis be conducted for a new building that chooses to utilize lockdown in conjunction with evacuation plans as detailed in section 404. The responsibility for the risk analysis rests on the building owner who may employ the necessary professionals to satisfy the requirements.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Bibliography: [1] References

FBI: https://www.fbi.gov/file-repository/active-shooter-incidents-in-the-us-2022-042623.pdf/view

US Secret Service: https://www.secretservice.gov/sites/default/files/reports/2023-01/usss-ntac-maps-2016-2020.pdf

The Violence Project: https://www.theviolenceproject.org/key-findings/

National Institute of Justice: https://nij.ojp.gov/topics/articles/public-mass-shootings-database-amasses-details-half-century-us-mass-shootings

Cost Impact: Increase

Estimated Immediate Cost Impact:

The code change proposal will increase the costs of construction for buildings utilizing lockdown as a planned emergency response.

Estimated Immediate Cost Impact Justification (methodology and variables):

The code change proposal will increase the costs of construction for buildings, not classified as Group E, utilizing lockdown as a planned emergency response. Group E Occupancies with occupant load over 500 and College campus buildings with cumulative occupant load over 1000 already requires a mass notification risk analysis and so there is no cost increase associated with those occupancies.

The cost of the risk analysis will be based on the complexity of the facility, and in most cases, there will be some additional costs to conduct the risk analysis. Typically, the cost of an MNS Risk Analysis is in the range of 0.5% of the cost of the fire alarm system.

In extreme cases, the risk analysis may cost thousands of dollars to produce an expansive report of risks, and strategies to mitigate those risks. For example, a comprehensive analysis for a typical K-12 school with 500 to 1000 occupants may require 25-50 hours to complete at an engineering cost of ~$200/hour. This varies depending on overall size, location, and school features (i.e., simple/small vs. theater buildings, athletic facilities and fields, etc.). An MNS Risk Analysis for a campus educational occupancy (e.g., college/university) may cost $12,000 - $25,000 depending on overall size, location, number of students, number of buildings, and campus features (i.e., again simple/small vs. large/complex, large arenas, large stadiums, etc.).

While the K-12 & Collage University MNS Risk Analysis is not part of this proposal, these examples may be applied to other occupancies of similar size and complexity. But there are many other variables that affect the cost including: types of risks associated with the location, facility type, nearby facilities and types of risks associated with those, maturity of emergency response planning already in place, etc.

An MNS Risk Analysis for a hospitality and entertainment complex (e.g., hotel and casino, hotel and waterpark, etc.) is $10,000 -

$25,000 depending on overall size, location, number of occupants, high-rise vs. non-high-rise, number of buildings or interconnected buildings, and facility features (i.e., again simple/small vs. large/complex; use of alternative notification sequences like high-rise sequencing, positive alarm sequence, and Pre Signal; and use of building paging systems, PAVA, house sound systems, etc.).

When already required emergency communications systems (i.e., EVAC) are identified as the only means of communication needed, there will be no increased cost of construction other than performing the risk analysis. If the conclusion of the risk analysis identifies the need for additional methods of notification, there will be some additional incremental expense for systems.

F151-24

F152-24

IFC: (New), SECTION 202 (New), SECTION 918 (New), 918.1 (New), 918.2 (New), 918.2.1 (New), 918.2.1.2 (New), 918.2.1.3 (New), 918.3 (New), 918.3.1 (New), 918.3.1.1 (New), 918.3.1.2 (New), 918.3.1.3 (New), 918.3.2 (New), 918.3.2.1 (New), 918.3.2.2 (New), 918.3.2.3 (New), 918.4 (New), NFPA Chapter 80 (New), UL Chapter 80 (New); IBC: SECTION 202 (New), SECTION 918 (New), [F] 918.1 (New), [F] 918.2 (New), [F] 918.2.1 (New), [F] 918.2.1.2 (New), [F] 918.2.1.3 (New), [F] 918.3 (New), [F] 918.3.1 (New), [F] 918.3.1.1 (New), [F] 918.3.1.2 (New), [F] 918.3.1.3 (New), [F] 918.3.2 (New), [F] 918.3.2.1 (New), [F] 918.3.2.2 (New), [F] 918.3.2.3 (New), [F] 918.4 (New), NFPA Chapter 35 (New), UL Chapter 35 (New)

Proponents: Rick Trieste, Consolidated Edison Company of New York, Consolidated Edison Company of New York (triester@coned.com)

2024 International Fire Code

Add new definition as follows:

FUEL GAS ALARM . A single- or multiple-station alarm intended to detect fuel gas and alert occupants by a distinct audible signal. It incorporates a sensor, control components and an alarm notification appliance in a single unit.

FUEL GAS DETECTOR. A device with an integral sensor to detect fuel gas and transmit an alarm signal to a connected alarm control unit and is part of a fuel gas detection system.

FUEL GAS DETECTION SYSTEM. A system or portion of a combination system consisting of components and circuits arranged to monitor and annunciate the status of fuel gas detectors and to initiate the appropriate response to those signals.

FUEL-GAS SOURCE. Any combustion equipment that utilizes a gas that, when combined with an oxidizer (typically air or oxygen), could be burned to produce thermal energy. Examples of fuel gases include, but are not limited to, natural gas, methane, or liquefied petroleum gases (LP-Gas) such as propane and butane.

Add new text as follows:

SECTION 918
FUEL-GAS DETECTION

918.1 General. New and existing buildings shall be provided with fuel-gas detection in accordance with Section 918.

918.2 Where required. Fuel-gas detection shall be provided in Group R occupancies that are served by a fuel-gas source.

918.2.1 Dwelling units and sleeping units. Fuel-gas detection for *dwelling units* and *sleeping units* shall comply with Sections 918.2.1.2 and 918.2.1.3.

918.2.1.2 Fuel-Gas source. Where a *fuel-gas source* is located outside of a bedroom or sleeping room, fuel-gas detection shall be installed in *dwelling units* and *sleeping units* either outside of each separate sleeping area in the immediate vicinity of the bedrooms or sleeping room or within each bedroom or sleeping room. Where a fuel-gas source is located within a bedroom or sleeping room, or a bathroom attached to either, fuel-gas detection shall be installed within the bedroom or sleeping room.

918.2.1.3 Environmental limitations for detection devices. Where environmental conditions in an enclosed room or space are incompatible with fuel-gas detection devices, fuel-gas detection shall be provided in an approved adjacent location.

918.3 Detection devices. Fuel-gas detection shall be provided by fuel-gas alarms complying with Section 918.3.1 or a fuel-gas detection system complying with Section 918.3.2.

918.3.1 Fuel-gas alarms. Fuel-gas alarms complying with Sections 918.3.1 through 918.3.1.3 and installed in accordance with NFPA

715 and the manufacturer’s instructions shall be provided in either of the following:

1. In dwelling units and sleeping units in accordance with 918.2.1.
2. In normally occupied locations other than dwelling units or sleeping units, where approved by the fire code official and the manufacturer’s instructions, fuel-gas alarms shall be annunciated by an audible and visual signal in an approved location.

918.3.1.1 Power source. Fuel-gas alarms shall receive their primary power from the building wiring where such wiring is served from a commercial source and shall be provided with a battery backup. Wiring shall be permanent and without a disconnecting switch other than that required for overcurrent protection.

Exception: Fuel-gas alarms shall be permitted to be battery powered in buildings without a power source.

918.3.1.2 Listings. Fuel-gas alarms shall be listed in accordance with UL 1484.

918.3.1.3 Interconnection. Where more than one fuel-gas alarm is installed, actuation of any alarm shall cause all alarms to signal an alarm condition.

918.3.2 Fuel-gas detection systems. Fuel-gas detection systems shall be installed in accordance with NFPA 715 and the manufacturer’s instructions.

918.3.2.1 Fire alarm system integration. Where a building fire alarm system or combination fire alarm system, as defined in NFPA 72, is provided, fuel-gas detection shall be provided by connecting fuel-gas detectors to the fire alarm system.

918.3.2.2 Listings. Fuel-gas detectors shall be listed in accordance with UL 2075.

918.3.2.3 Alarm notification. Activation of a fuel-gas detector shall initiate audible and visible alarm notification throughout the building and annunciate the alarm signal at the control unit.

Exception: Notification shall be permitted to be limited to the area where the fuel-gas alarm signal originated and other signaling zones specified in an approved fire safety plan, provided that an approved on-site or off-site location is automatically notified.

918.4 Maintenance. Fuel-gas alarms and fuel-gas detection systems shall be maintained in accordance with NFPA 715 and the manufacturer's instructions.

Add new standard(s) as follows:

NFPA

National Fire Protection Association
1 Batterymarch Park
Quincy, MA 02169-7471

715-2023 Standard for the Installation of Fuel Gases Detection and Warning Equipment

UL

Underwriters Laboratories LLC
333 Pfingsten Road
Northbrook, IL 60062

1484-2022 Residential Gas Detectors

2024 International Building Code

Add new definition as follows:

[F] FUEL GAS ALARM. A single- or multiple-station alarm intended to detect fuel gas and alert occupants by a distinct audible signal. It incorporates a sensor, control components and an alarm notification appliance in a single unit.

[F] FUEL GAS DETECTOR. A device with an integral sensor to detect fuel gas and transmit an alarm signal to a connected alarm control unit and is part of a fuel gas detection system.

[F] FUEL GAS DETECTION SYSTEM. A system or portion of a combination system consisting of components and circuits arranged to monitor and annunciate the status of fuel gas detectors and to initiate the appropriate response to those signals.

[F] FUEL-GAS SOURCE. Any combustion equipment that utilizes a gas that, when combined with an oxidizer (typically air or oxygen), could be burned to produce thermal energy. Examples of fuel gases include, but are not limited to, natural gas, methane, or liquefied petroleum gases (LP-Gas) such as propane and butane.

Add new text as follows:

SECTION 918
FUEL-GAS DETECTION

[F] 918.1 General. New and existing buildings shall be provided with fuel-gas detection in accordance with Section 918.

[F] 918.2 Where required. Fuel-gas detection shall be provided in Group R occupancies that are served by a fuel-gas source.

[F] 918.2.1 Dwelling units and sleeping units. Fuel-gas detection for *dwelling units* and *sleeping units* shall comply with Sections 918.2.1.2 and 918.2.1.3.

[F] 918.2.1.2 Fuel-Gas source. Where a *fuel-gas source* is located outside of a bedroom or sleeping room, fuel-gas detection shall be installed in *dwelling units* and *sleeping units* either outside of each separate sleeping area in the immediate vicinity of the bedrooms or sleeping room or within each bedroom or sleeping room. Where a fuel-gas source is located within a bedroom or sleeping room, or a bathroom attached to either, fuel-gas detection shall be installed within the bedroom or sleeping room.

[F] 918.2.1.3 Environmental limitations for detection devices. Where environmental conditions in an enclosed room or space are incompatible with fuel-gas detection devices, fuel-gas detection shall be provided in an approved adjacent location.

[F] 918.3 Detection devices. Fuel-gas detection shall be provided by fuel-gas alarms complying with Section 918.3.1 or a fuel-gas detection system complying with Section 918.3.2.

[F] 918.3.1 Fuel-gas alarms. Fuel-gas alarms complying with Sections 918.3.1 through 918.3.1.3 and installed in accordance with NFPA 715 and the manufacturer's instructions shall be provided in either of the following:

1. In dwelling units and sleeping units in accordance with 918.2.1.
2. In normally occupied locations other than dwelling units or sleeping units, where approved by the fire code official and the manufacturer's instructions, fuel-gas alarms shall be annunciated by an audible and visual signal in an approved location.

[F] 918.3.1.1 Power source. Fuel-gas alarms shall receive their primary power from the building wiring where such wiring is served from a commercial source and shall be provided with a battery backup. Wiring shall be permanent and without a disconnecting switch other than that required for overcurrent protection.

Exception: Fuel-gas alarms shall be permitted to be battery powered in buildings without a power source.

[F] 918.3.1.2 Listings. Fuel-gas alarms shall be listed in accordance with UL 1484.

[F] 918.3.1.3 Interconnection. Where more than one fuel-gas alarm is installed, actuation of any alarm shall cause all alarms to signal an alarm condition.

[F] 918.3.2 Fuel-gas detection systems. Fuel-gas detection systems shall be installed in accordance with NFPA 715 and the manufacturer’s instructions.

[F] 918.3.2.1 Fire alarm system integration. Where a building fire alarm system or combination fire alarm system, as defined in NFPA 72, is provided, fuel-gas detection shall be provided by connecting fuel-gas detectors to the fire alarm system.

[F] 918.3.2.2 Listings. Fuel-gas detectors shall be listed in accordance with UL 2075.

[F] 918.3.2.3 Alarm notification. Activation of a fuel-gas detector shall initiate audible and visible alarm notification throughout the building and annunciate the alarm signal at the control unit.

> **Exception:** Notification shall be permitted to be limited to the area where the fuel-gas alarm signal originated and other signaling zones specified in an approved fire safety plan, provided that an approved on-site or off-site location is automatically notified.

[F] 918.4 Maintenance. Fuel-gas alarms and fuel-gas detection systems shall be maintained in accordance with NFPA 715 and the manufacturer's instructions.

Add new standard(s) as follows:

NFPA

National Fire Protection Association
1 Batterymarch Park
Quincy, MA 02169-7471

715-2023 Standard for the Installation of Fuel Gases Detection and Warning Equipment

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062

1484-2022 Residential Gas Detectors

Staff Analysis: A review of the following standards proposed for inclusion in the code regarding some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024:

- ***Standard for the Installation of Fuel Gases Detection and Warning Equipment (NFPA 715-2023)***
- ***Residential Gas Detectors (UL 1484-2022)***

Reason: This Proposal seeks to protect occupants in Group-R occupancies from fires caused by natural gas or propane explosions or leaks. The proposal is in response to recommendation by the National Transportation Safety Board (NTSB) in NTSB Report NTSB/PAR-19/01 PB2019-100722 *Building Explosion and Fire Silver Spring, Maryland* that the ICC “….. requires methane detection systems for all types of residential occupancies with gas service.” The recommendation by the NTSB is supported by a 2018 NFPA report, *Natural Gas and Propane Fires, Explosions and Leaks Estimates and Incidents - Marty Ahrens and Ben Evarts October 2018:*

- Between 2012 and 2016 an estimated average of 4,200 U.S. home structure fires per year started with the ignition of natural gas that caused an average of 40 deaths per year. The report classifies homes as one- and two-family homes, including manufactured homes, and apartments and other multi-family housing.
- Natural gas or LP-Gas leaks have generally been increasing since 2007

The requirements in this proposal are based on the 2023 edition of NFPA 715 standard, *Installation for Fuel Gas Detection and Warning Equipment*. The technical requirements in NFPA 715 were based on the Fire Protection Research Foundation (FPRF) report, *Combustible Gas Dispersion in Residential Occupancies and Detector Location Analysis.* The report studied combustible gas leaks and dispersion in residential buildings, as well as an analysis of combustible gas detector placement.

Con Edison recognizes the life-saving benefit of fuel gas detection devices and as such is installing gas detection devices in every building served with natural gas with over 275,000 devices in service to date of a program that will install about 375,000 devices. The in-service devices report all detection alarms wirelessly to the Company. The program is the US largest case study for safety benefit of fuel gas detection devices and has demonstrated the reliability of the technology and the safety benefit. The Company devices have detected multiple atmospheric natural gas readings that posed a risk of fire/explosion, which was avoided by an immediate action by first responders that arrive in under 5 minutes of first detection. New York City through its Local Law 157 requires natural gas detection devices in residential occupancies served with natural gas.

Additionally, this proposal is adding new definitions for fuel gas alarm, fuel gas detector and fuel gas detection system to clarify what is intended by these terms.

Cost Impact: Increase

Estimated Immediate Cost Impact:

The installation of fuel gas detection as part of building construction is estimated to be approximately $500.

Estimated Immediate Cost Impact Justification (methodology and variables):

Estimated detector unit cost: $50 ea.

Estimated electric box/wiring installation cost based on NYC licensed electrical contractor cost when being installed as part of new construction or renovation: $120 ea.

Estimate based on three (3) wired detectors: One (1) unit by cooking appliances; one (1) unit by heating/clothes drying equipment; one (1) outside sleeping area as required in proposal.

Estimated cost of 3 units installed in 3 wired boxes: Approximately $500

F152-24

F153-24

IFC: SECTION 1032, 1032.1, 1032.2 (New), 1032.3 (New)

Proponents: Jonathan Flannery, Pandemic Task Force Code Development Working Group, PTF CDWG (jflannery@aha.org)

2024 International Fire Code

SECTION 1032
MAINTENANCE OF THE MEANS OF EGRESS

1032.1 General. The *means of egress* for buildings or portions thereof shall be maintained in accordance with this section.

Add new text as follows:

1032.2 Maximum Occupant Load. For temporary events, where the occupant load for for a building or space is greater than that specified by Section 1004, the fire code official shall be authorized to allow a higher occupant load, provided health, life, and safety requirements are maintained. The fire code official is authorized to require a public safety plan in accordance with Section 403.11.2.

1032.3 Reduced Occupant Load. For declared public emergencies, where the occupant load for a building or space is required to be less than that specified by Section 1004 the means of egress shall be maintained. Any alterations to the means of egress shall be *approved* by the *building official* or *fire code official*.

Reason: This added section would accomplish two things: under normal circumstances, the occupant load shall not be exceeded; and where circumstance dictate, an occupant loads greater than, or in some circumstances less than, would only be allowed to be modified by the fire code official.

A search for a requirement in the fire code that the occupant load cannot be exceeded did not appear readily available. Under normal operations, without any special considerations for public safety, the occupancy load should not be exceeded.

Where special considerations are provided, such as outlined in this section of the fire code, and where approved by the fire code official, occupant loads may be exceeded with provision such as a fire watch, a public safety plan for gatherings, and/or crowd managers as noted in this section. When approved by the fire code official implies other hazards or risks to both occupants and first responder not readily obvious would be addressed by the approval.

Also, as discovered during the COVID-19 pandemic, public health officials declared reduced occupancy as a function of “social distancing” or by a percentage that occupancy would need be limited to protect public health and safety. The code provides no ability to enforce a limited occupancy in such cases. Although a smaller overall occupant load represents a lower risk to egress components and other compliance issues, in some cases exits were compromised that may affect code compliance and public safety.

As examples, in certain applications doors that serve both ingress and egress were modified to ingress only without consideration of the overall egress requirements of the building. Portions of buildings were closed off, possibly altering total travel distance and/or common path of travel. Where egress travel is modified existing exit signage may cause confusion in emergency scenarios delaying egress of occupants to the public way.

In other cases, building owners created alternative arrangements to provide full services without consideration to public safety, including using sidewalks, parking lots, and other areas that may impede egress to the public way and/or the ability for first responders to provide emergency services in a manner intended by the codes.

In this scenario, the fire code official may employ one or more of the provisions of 403.11 to ensure compliance or evaluate any other hazards to improve the code compliance in circumstance where reduced occupant load may impose alternative risks to occupants, first responders, and provide overall safety in the built environment.

The ICC/NEHA Pandemic Task Force (PTF) was organized and tasked with researching the effects of the COVID-19 pandemic on the built environment and developing a roadmap and proposing needed resources – including guidelines, recommended practices, publications and updates to the International Codes® (I-Codes®) – that are necessary to overcome the numerous challenges that may be faced during future pandemics and to construct and manage safe, sustainable and affordable occupancy of the built environment. The ICC Pandemic Task Force Code Development Work Group (PTF CDWG) has conducted a comprehensive review of current code requirements as they relate to the prevention of the transmission of diseases and other serious health concerns and suggested revisions to current code requirements based on this assessment.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This new section will not impact construction and therefore will not increase the cost of construction.

F153-24

F154-24

IFC: 1032.10, 1032.10.1, 1032.10.2

Proponents: Chad Sievers, NYS, NYS DOS (chad.sievers@dos.ny.gov); Jeanne Rice, NYSDOS (jeanne.rice@dos.ny.gov); Kevin Duerr-Clark, NYS DOS, NYS DOS (kevin.duerr-clark@dos.ny.gov); China Clarke, New York State Dept of State, Manager Technical Support Unit (china.clarke@dos.ny.gov); John R Addario - NYS Department of State, NEW YORK STATE CODES DIVISION, New York State Department of State Division of Building Standards and Codes (john.addario@dos.ny.gov)

2024 International Fire Code

Revise as follows:

1032.10 Emergency lighting equipment inspection and testing.
Emergency lighting shall be maintained in accordance with Section 110 and shall be inspected and tested in accordance with Sections 1032.10.1 and 1032.10.2. <u>Records of inspections, Power testing, Activation Testing, and maintenance shall be maintained in accordance with Section 110.3.</u>

1032.10.1 Activation test. Emergency lighting equipment shall be tested monthly for a duration of not less than 30 seconds. The test shall be performed manually or by an automated self-testing and self-diagnostic routine. Where testing is performed by self-testing and self-diagnostics, a visual inspection of the emergency lighting equipment shall be conducted monthly to identify any equipment displaying a trouble indicator or that has become damaged or otherwise impaired.

1032.10.2 Power test. Battery-powered emergency lighting equipment shall be tested annually by operating the equipment on battery power for not less than 90 minutes.

Reason: Although this appears to be a new requirement, this is not because section 110.3 already requires that records be maintained this is simply providing a direct reminder for the code user.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is only editorial as it is pointing to another code section which is required.

F154-24

F155-24

IFC: 1032.7

Proponents: Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org); Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Fire Code

Revise as follows:

1032.7 Emergency escape and rescue openings.
Required *emergency escape and rescue openings* shall be maintained in accordance with the code in effect at the time of construction, and both of the following:

1. Required *emergency escape and rescue openings* shall be operational from the inside of the room without the use of keys or tools. Window-opening control devices complying with ASTM F2090 shall be permitted for use on windows serving as a required *emergency escape and rescue opening*.
2. Bars, grilles, grates or similar devices are permitted to be placed over *emergency escape and rescue openings* or area well that serve such openings provided that the minimum net clear opening size complies with the code that was in effect at the time of construction and the unit is equipped with smoke alarms installed in accordance with Section 907.2.11. Such devices shall be releasable or removable from the inside without the use of a key, tool or force greater than that which is required for normal operation of the *emergency escape and rescue opening*.

Reason: The EERO’s have been extensively coordinated between the IBC and IRC over the last couple of cycles. It is suggested that this section be revised to not repeat items that are addressed in Section 1031.2.1 and 1031.6.This proposal is submitted by the ICC Building Code Action Committee (BCAC) and the ICC Fire Code Action Committee (FCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC webpage.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This provides clarification for requirements and meets the original intent.

F155-24

F156-24

IFC: SECTION 1101, 1101.1, 1101.2, 1101.3, 1101.4, 1101.4.1, 1101.4.2, 1101.4.3, 1101.4.3 (New)

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Fire Code

SECTION 1101
GENERAL

1101.1 Scope. The provisions of this chapter shall apply to existing buildings constructed prior to the adoption of this code.

Revise as follows:

1101.2 Intent.
The intent of this chapter is to provide a minimum degree of fire and life safety to persons occupying existing buildings by providing minimum construction requirements where of Sections 1103 through 1106 of the *International Building Code*. Noncompliance with this chapter shall not, in itself, be a basis for causing a building to be deemed as an unsafe building.

1101.3 Permits.
Permits shall be required as set forth in Sections 105.5 and 105.6 and the *International Building Code*.

Revise as follows:

~~1101.4~~ 1101.3 Owner notification. When a building is found to be in noncompliance with this chapter, the *fire code official* shall duly notify the *owner* of the building. Upon receipt of such notice, the *owner* shall notify the fire official within sixty days of receiving the written notice of the, ~~subject to the following time limits, take~~ necessary actions to comply with the provisions of this chapter.

~~1101.3~~ 1101.4 Permits and construction documents.
~~Permits shall be required as set forth in Sections 105.5 and 105.6 and the *International Building Code*.~~ Permits and construction documents necessary to comply with this chapter shall be completed and submitted within a time schedule approved by the fire code official.

Delete without substitution:

~~**1101.4.1 Construction documents.** *Construction documents* necessary to comply with this chapter shall be completed and submitted within a time schedule *approved* by the *fire code official*.~~

Revise as follows:

~~1101.4.2~~ 1101.4.1 Completion of work. Work necessary to comply with this chapter shall be completed within a time schedule *approved* by the *fire code official*.

~~1101.4.3~~ 1101.4.2 Extension of time. The *fire code official* is authorized to grant necessary extensions of time where it can be shown that the specified time periods are not physically practical or pose an undue hardship. The granting of an extension of time for compliance shall be based on the showing of good cause and subject to the filing of an acceptable systematic plan of correction with the *fire code official*.

Add new text as follows:

1101.4.3 Compliance. Once compliance with this chapter is achieved, the building shall not be subject to the same provision(s) of this chapter, including future changes to the technical referenced standard requirements associated with of Sections 1103 through 1106, unless new requirements in the code or standard are specifically added in future editions of this chapter.

Reason: Several previous attempts to improve the code after though there was consensus that Chapter 11 enforcement was problematic were unsuccessful. At the request of Building Owners and Managers Association, International the issue was brought to FCAC with a request for assistance for the 2027 code development process. FCAC established a specific workgroup within Workgroup 3 to study the issue and develop consensus provisions. The adjustments proposed reached consensus within FCAC.

Section 1101.2 clarifies that Chapter 11 is intended to make previously constructed buildings safer through code requirements added after initial construction. Section 1101.2 provides clarifications that buildings not in compliance with Chapter 11 are not to be deemed unsafe buildings. The exception would be if violations of the unsafe provisions of Chapter 1 were found in addition to the Chapter 11 compliance issues.

Section 1101.3 addresses issue identified with short compliance notices for items that require planning, budgeting, building disruption issues, and designer and contractor availability. This provides that the building owner must address the planning portion of compliance with the fire official in 60 days after receiving a notice to comply. Establishing the 60-day period will stop the short notice, and in a very few cases, no notices situations that have arisen around the country.

Section 1101.4 consolidated two sections that dealt with permits and construction documents. permitting and documents are addressed in the Chapter 1 Administrative provisions in the IFC, IBC, and IEBC.

Section 1101.4.3 prohibits the interpretation by a fire code official that a technical change to one of the broader categories' technical standards for something later added, from reciting a building that was subjected to and complied with Chapter 11, to meet the latest technical requirements. Should a "Fatal Flaw" be found in the current standard used to conduct the the work, a future edition of the IFC, Chapter 11 would need to adopt the "fix". Otherwise, changes to the technical requirements in and of themselves are not a basis for reciting a compliant building.

Table 1103.1 - The group recommended that a column be added in table 1103.1 with the code edition a technical provision made its way into chapter 11. It would then make it easier to determine if new provisions have been added since a building was inspected for compliance with this chapter. Example: A is being inspecting that was built in 2007. There have been no new provisions added to Chapter 11 since it's construction except the high-rise sprinkler requirements. The building is fully sprinklered. An inspector and the building owner would then know that there are no Chapter 11 issues to comply with.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Bibliography: None

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

There is no cost impact as nothing has been added or deleted from the technical provisions found in Chapter 11. This will better clarify how the retroactive building construction related provisions should be enforced.

F156-24

F157-24

IFC: 1103.1.2 (New), 80 NFPA

Proponents: Ken Brouillette, Seattle Fire Department, Seattle Fire Department (ken.brouillette@seattle.gov)

2024 International Fire Code

Add new text as follows:

1103.1.2 Animal housing facilities.. Existing animal housing facilities as defined in NFPA 150 shall comply with the applicable provisions in NFPA 150**.**

Staff Analysis: A review of the standard proposed for inclusion in the code, ***Fire and Life Safety in Animal Housing Facilities Code (NFPA 150-22)***, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: The IBC and IFC need to set requirements for these types of facilities due to past incidents.

Cost Impact: Increase

Estimated Immediate Cost Impact:

There will be a cost increase associated with adding a smoke/fire alarm system of approximately $1 to $5 per square foot and the fire sprinkler system of the range of $1 to $2 per square foot.

Estimated Immediate Cost Impact Justification (methodology and variables):

Increased cost for the addition of fire sprinkler and fire alarm systems.
New businesses will need to be located in buildings that meet NFPA 150 or provide improvements.

Various web sites suggested the quoted price ranges and obviously will vary based on location and associated conditions as well as specific installation requirements

F157-24

F158-24

IFC: TABLE 1104.18

Proponents: Kevin Scott, KH Scott & Associates LLC, self (khscottassoc@gmail.com)

2024 International Fire Code

Revise as follows:

TABLE 1104.18 COMMON PATH, DEAD-END AND TRAVEL DISTANCE LIMITS (by occupancy)

OCCUPANCY	COMMON PATH OF EGRESS TRAVEL LIMIT		DEAD-END LIMIT		EGRESS ACCESS TRAVEL DISTANCE LIMIT	
	Unsprinklered (feet)	Sprinklered (feet)	Unsprinklered (feet)	Sprinklered (feet)[j]	Unsprinklered (feet)	Sprinklered (feet)
Group H-1	25	25[~~l~~l]	0	0	75	75[j,~~l~~]
Group H-2	50	100[~~l~~l]	0	0	75	100[j,~~l~~]
Group H-3	50	100[~~l~~l]	20	20	100	150[j,~~l~~]
Group H-4	75	75[~~l~~l]	20	20	150	175[j,~~l~~]
Group H-5	75	75[j, l]	20	50	150	200[j, l]

NR = No Requirements.

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m^2.

a. See Section 1030.9.5 for dead-end *aisles* in Group A occupancies.

b. This dimension is for the total travel distance, assuming incremental portions have fully utilized their allowable maximums. For travel distance within the room, and from the room exit access door to the exit, see the appropriate occupancy chapter.

c. See Section 412 of the International Building Code for special requirements on spacing of doors in aircraft hangars.

d. Separation of exit access doors within a care recipient sleeping room, or any suite that includes care recipient sleeping rooms, shall comply with Section 1105.5.6.

e. In *smoke compartments* containing care recipient sleeping rooms and treatment rooms, dead-end *corridors* shall comply with Section ~~1105.6.5~~1105.6.7.

f. In Group I-2, Condition 2, care recipient sleeping rooms or any suite that includes care recipient sleeping rooms shall comply with Section ~~1105.7~~1105.6.6.

g. Where a tenant space in Group B, S and U occupancies has an occupant load of not more than 30, the length of a common path of egress travel shall be not more than 100 feet.

h. Where the building, or portion of the building, is limited to one story and the height from the finished floor to the bottom of the ceiling or roof slab or deck is 24 feet or more, the exit access travel distance is increased to 400 feet.

i. For covered and open malls, the exit access travel distance is increased to 400 feet.

j. Buildings equipped with an *approved* automatic sprinkler system in accordance with Section 903.3.1.1.

k. Buildings equipped with an *approved* automatic sprinkler system in accordance with Section 903.3.1.2.

l. Group H occupancies equipped with an *approved* automatic sprinkler system in accordance with Section 903.2.5.

Reason: This proposal makes several revisions to Table 1104.18 which are essentially editorial. There are no technical intended with this code change.

Footnote d is revised to reference the correct section for separation of exit access doors in Group I-2.

Footnote e is revised to reference the correct section for dead-end corridors in Group I-2.

Footnote j refers to Section 903.3.1.1 for sprinkler design under NFPA 13. The sprinkler system design in Group H-1 through H-4 occupancies is Footnote j. Therefore, Footnote j is added to Group H-1, H-2, H-3 and H-4.

Footnote l refers to Section 903.2.5 which specifies fire sprinkler design for Group H-5 occupancies, so it is not appropriate for other Group H occupancies. Therefore, Footnote l is removed in all locations except Group H-5.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal corrects editorial items in the 2024 IFC.

F158-24

F159-24

IFC: TABLE 1105.4; IBC: [F] TABLE 509.1

Proponents: Kevin Scott, KH Scott & Associates LLC, self (khscottassoc@gmail.com)

2024 International Fire Code

Revise as follows:

TABLE 1105.4 INCIDENTAL USES IN EXISTING GROUP I-2 OCCUPANCIES

Portions of table not shown remain unchanged.

ROOM OR AREA	SEPARATION AND/OR PROTECTION
~~Paint shops~~Spray rooms not classified as Group H	2 hours; or 1 hour and provide an automatic sprinkler system

For SI: 1 square foot = 0.0929 m^2, 1 pound per square inch (psi) = 6.9 kPa, 1 British thermal unit (Btu) per hour = 0.293 watts, 1 horsepower = 746 watts, 1 gallon = 3.785 L.

2024 International Building Code

Revise as follows:

[F] TABLE 509.1 INCIDENTAL USES

Portions of table not shown remain unchanged.

ROOM OR AREA	SEPARATION AND/OR PROTECTION
~~Paint shops, not classified as Group H, located in occupancies other than Group F~~Spray rooms	2 hours and provide an automatic sprinkler system[a]

a. In a building equipped throughout with an automatic sprinkler system, the fire separation can be reduced to 1-hour.

For SI: 1 square foot = 0.0929 m^2, 1 pound per square inch (psi) = 6.9 kPa, 1 British thermal unit (Btu) per hour = 0.293 watts, 1 horsepower = 746 watts, 1 gallon = 3.785 L, 1 cubic foot = 0.0283 m^3.

Reason: This proposal is designed to correlate requirements in the IFC Chapter 24, IBC Section 307.1.1, IBC Section 416 and IBC Table 509.1.

Table 509.1 allows an incidental use area to contain a “paint shop” provided it is separated by 2-hour construction. Table 509.1 only requires sprinklers where a 1-hour separation is provided. Other code sections read as follows:

1. IBC Section 307.1.1 Item 1 states that the application of flammable finishes is not classified as a Group H occupancy provided that the operation and use comply with the IFC and IBC.
2. IFC Section 2404.2 states that spray rooms shall be constructed under the IBC and shall have a minimum 1-hour separation.
3. IBC Section 416.2 states that spray rooms shall have a minimum 1-hour separation.
4. IFC Section 2404.4 states that spray rooms shall be protected with sprinklers or a fire-extinguishing system.
5. IBC Section 2404.4 states that spray rooms shall be protected with sprinklers or a fire-extinguishing system.

The inconsistency occurs in Table 509.1 which allows an incidental use area to have 2-hour separation without sprinklers or a fire-extinguishing system. Since the spray room is not a Group H, then it would be classified as Group F-1. The only time a 2-hour separation is required is when the spray room is located in an unsprinklered building according to IBC Table 508.4. But even when the spray room is located within an unsprinklered building, the spray room is required to be protected with sprinklers or a fire-extinguishing system.

Table 509.1 implies that an spray room is acceptable if it is separated by 2-hour construction without any type of fire-extinguishing system.

The term “paint shop” is not used anywhere else in the IBC, and only appears once in IFC Table 1105.4, and does not appear at all in NFPA 33 or NFPA 34. It is an outdated term and is not appropriate. This term will be replaced with spray room in IFC Table 1105.4 and IBC Table 509.1. IFC Table 1105.4 retains the language of “not classified as Group H” to address existing facilities that may have been designed as a Group H occupancy.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal simply clarifies the text and correlates the terminology.

F159-24

F160-24

IFC: 1105.12 (New)

Proponents: Jeff O'Neil, Chair, Committee on Healthcare (ahc@iccsafe.org)

2024 International Fire Code

Add new text as follows:

1105.12 Group I-2 Electrical Systems. In Group I-2 Condition 2 occupancies, existing electrical systems shall comply with the requirements for existing electrical systems in NFPA 99.

Reason: There are only very small sections of Chapter 6 that are applicable to existing buildings. It does cover items such as routine testing of both normal and emergency power, testing of electrical systems, defining surgery operating rooms as wet locations unless approved risk assessment determines otherwise. Cover plates on life safety and critical branch receptacles are a distinct color. Requiring tamperproof receptacles in designated pediatric locations.

This change is a part of a series of changes that assure the IFC, IBC and IEBC align with the requirements of CMS facilities regulations. The changes are designed to improve the safety of existing facilities regardless of year constructed. This change aligns with existing federal requirements for the healthcare industry.

Adding reference to NFPA 99 reinforces to local design teams and code officials the need modify healthcare facilities electrical system to conform with both NFPA 99 and NFPA 70. The patients and staff are depending upon a reliable electric system to support delivery of care and their lives may depend upon this. Without having designers, code officials and owners aligned on this expectation, facilities may face compliance challenges from Center for Medicare and Medicaid during inspection.

This proposal is submitted by the ICC Committee for Healthcare (CHC).
The Committee on Healthcare (CHC) was established by the ICC Board of Directors in 2011 to pursue opportunities to study and develop effective and efficient provisions for Hospital, Nursing Homes, Assisted Living and Ambulatory Care Facilities. This committee was formed in cooperation with the American Society for Healthcare Engineering (ASHE). In July of 2017, the ICC Board made CHC a standing committee. In 2023 the CHC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the CHC website at CHC webpage.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is a current requirement for hospitals in the United States, so while this is a change to IFC, it is not a change in overall cost for hospitals.

F160-24

F161-24

IFC: SECTION 1107, 1107.1, 1107.1.1, 1107.1.2

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Robert J Davidson, Davidson Code Concepts LLC, Self (rjd@davidsoncodeconcepts.com)

2024 International Fire Code

Delete without substitution:

~~SECTION 1107~~
~~ENERGY STORAGE SYSTEMS~~

Revise as follows:

~~1107.1~~ 1207.12 Pre-existing Lithium-ion technology energy storage systems. The owner of an energy storage system (ESS) utilizing lithium-ion battery technology having capacities exceeding the values in Table 1207.1.3 and ~~installed prior to the jurisdiction's adoption of the 2018 or later edition of the *International Fire Code*~~ that are not listed to UL 9540 shall provide the *fire code official* a ~~failure modes and effects analysis (FMEA) or other *approved* hazard mitigation analysis~~ technical report in accordance with Section 104.2.2 for review and approval.

> ~~**Exception:** Detached one- and two-family *dwellings* and *townhouses*.~~

~~1107.1.1~~ 1207.12.1 Early detection.
In addition to ~~the requirements of Sections 1207.1.8.1 and 1207.1.8.2~~ identifying potential failure events, the ~~analysis~~ report shall include an assessment of the ability of the installed protection systems to provide for early detection and notification of ~~a thermal runaway event in relation to the ability of~~ emergency responders ~~to safely mitigate the size and impact of a thermal runaway event~~.

~~1107.1.2~~ 1207.12.2 Corrective action plan.
Where hazards are identified by the analysis, a plan that includes a timetable for corrective action shall be submitted to the *fire code official* for review and approval. The plan shall include actions and system improvements necessary for eliminating or mitigating any identified hazards, including listed methods for early detection and notification of a thermal runaway event.

Reason: FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

The main purpose of this proposal is to move the language from Chapter 11 over to Section 1207. The issue is not a building feature retrofit topic, it is one of ongoing operation and maintenance of energy storage systems which requires an operational permit from the fire code official. As an operational issue the language belongs in Section 1207 for application to the existing systems before operational permits are issued or renewed.

If the Committee approves the proposal to have 1207 point to NFPA 855, the reference to Table 1207.1.3 would be changed to a reference to the thresholds Table in NFPA 855, Chapter 1.

The exception for one- and two-family dwelling and townhouses has been deleted. The exception conflicts with over all application of the IFC pursuant to Chapter 1, the IFC generally applies to all occupancies, any exceptions are based upon the adopting authority. The hazards presented by unlisted ESS are similar and the AHJ needs the flexibility to rely on this requirement if they have an active program for these occupancies, and more importantly, when they become aware of a potential problem with an existing installation.

In Section 1207.12 The use of the IFC edition date has been eliminated and replaced with the lack of a UL 9540 listing as the more accurate trigger relative to system safety. The language referring to an FMEA or other approved HMA has been replaced with "Technical

Report, with what is to be covered by the technical report provided in the following subsections.

In Section 1207.12.1 The reference to Sections 1207.1.6.1 and 1207.1.8.2 have been deleted to eliminate a conflict, both sections are geared to assessing new installations and Section 1207.1.6.1 could lead one to believe if none of those listed items apply, they are done. Replacing the language with “identifying potential failure events” provides clearer instruction within the section itself. The language referring to the emergency responders' abilities has been removed as subjective and unpredictable in many cases. The intent of the requirements is to assess potential hazards and take action to correct the hazards preventing an event.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The change proposed is to move an existing requirement addressing operational activities subject to an annual permit from Chapter 11 to Section 1207 for ESS. The additional changes made clarifies the language and eliminated a conflict. The end result of application has not changed.

F161-24

F162-24

IFC: SECTION 1108 (New), 1108.1 (New)

Proponents: Jeffrey Shapiro, International Code Consultants, Lake Travis Fire Rescue (jshapiro@ltfr.org)

2024 International Fire Code

Add new text as follows:

SECTION 1108
FIRE PROTECTION FOR POST-FIRE REPAIR OR RECONSTRUCTION

1108.1 Institutional and residential occupancies. Where an unsprinklered Group I, Group R-1, Group R-2 or Group R-4 Occupancy is repaired or reconstructed following a fire incident that caused more than 25-percent of a *fire area* to remain unoccupiable for a period of 60 or more days, an automatic sprinkler system complying with Section 903.3 shall be installed throughout such *fire area* or *fire areas* as part of the repair or reconstruction.

Reason: This proposal reflects the progress of a FCAC task group on the topic of retrofitting certain occupancies that have suffered a catastrophic fire. There was insufficient time to further discussion and consideration that might have yielded a consensus proposal, so I am submitting this as a basis for continued discussion.

Although I serve as a consultant to the National Fire Sprinkler Association, this proposal has not been reviewed or endorsed by NFSA, and I am not representing NFSA on this issue. My motivation comes from many years in the fire service observing reconstruction of unsprinklered buildings without sprinklers following a catastrophic fire, which has always struck me as illogical. If a newly built occupancy requires sprinklers, repair or reconstruction of a previously existing occupancy that suffered a catastrophic fire, particularly residential and institutional uses where occupants will be sleeping, should not be permitted by code.

During task group discussions, there was broad agreement that something could be done to address this concern in the code, but reaching agreement on code text was challenging. Essentially, the questions are, 1) what should be the trigger, or level of loss, warranting the addition of fire sprinklers in repair or reconstruction, and 2) what portion of a building should be required to be sprinklered?

Discussion explored the possibility of using fire fatalities as a Step 1 trigger, but consensus on a number of fatalities could not be reached. Some believed that a single fire fatality should be enough, while others looked at two or more or didn't support the concept. Also, defining a "fire fatality" in the code is challenging as an enforcement tool because the term might refer to individuals who were deceased at the scene, or it might also include individuals who are injured and later die as a result of such injuries. And, severe injuries might be regarded by those who deal with burn injuries as an equally sufficient justification vs. a fatality. For these reasons, the life-loss and injury triggers were abandoned in this proposal, in favor of trying to define a level of property damage that could be reasonably associated with a catastrophic fire.

Another Step 1 trigger that was considered was "multiple offender" buildings, or buildings that experience repeated fire incidents. This approach was also abandoned because consensus could not be reached on the number of fires over a time period, the damage level that should be considered as a contributing fire, or how a jurisdiction would keep track of a repeating fire incident history over time.

The approach that did gain sufficient traction was looking at a "fire area" as defined in the code to require a minimum 2-hour separation from other portions of a building, and a level of damage to a fire area that should be considered as sufficient to warrant requiring sprinklers as part of repair or reconstruction. There is not a scientific basis for establishing a threshold of this nature, so the threshold must ultimately be decided by a consensus of stakeholders. The suggested 25% of a fire area being unhabitable for a period of 90 or more days seems sufficient to serve as a benchmark. It was pointed out during discussion that, due to permitting delays, 30 days could be a very short timeframe for construction to be completed. However, it's difficult to argue that a fire wasn't a major incident if 25% of a fire area remains uninhabitable for 60 days. For example, an 8-unit fire area in an apartment building would require 3 or more units to be vacated for 60 days to trigger this section. A 40-room hotel would require 11 rooms to be vacated for more than 60 days to trigger this section. True, this might encourage a rapid pace of reconstruction by some to avoid the sprinkler requirement, but so be it. It's better to have this requirement as a starting point in the code, and if someone can beat the clock, that should not be a reason to do nothing in the code.

With regard to Step 2, the portion of a building that should be required to be sprinklered where Step 1 has been satisfied, there were two discussion paths, either the entire building or only a sufficiently damaged fire area. This proposal suggests the latter based on feedback from the task group. Considering that a fire area might be a floor or section of a large building, much of which might not have been affected by the fire incident, some would regard it as excessive to require retrofitting sprinklers in those unaffected areas since such areas would not otherwise undergo repair or reconstruction. Hence, the suggested path of only requiring sufficiently impacted fire areas to be sprinklered. Such areas would probably experience substantial removal of drywall due to smoke and water damage, allowing for sprinkler system installation when the structure is exposed.

Cost Impact: Increase

Estimated Immediate Cost Impact:

There is no way to competently assign a cost value to this proposal.

Estimated Immediate Cost Impact Justification (methodology and variables):

Cost will vary depending on the extent of damage and repair or reconstruction to be done after a particular incident. Also, existing water supply and standpipe piping have an impact on the extent of work required to accomplish an installation. In addition, sprinkler installation costs may be offset by taking advantage of sprinkler incentives associated with other aspects of construction that reduce overall costs.

F162-24

F163-24

IFC: 1203.1.3, 1203.4, 1203.4.1, 1203.5, 1203.5.1; IBC: [F] 2702.1.3

Proponents: Jeff O'Neil, Chair, Committee on Healthcare (ahc@iccsafe.org)

2024 International Fire Code

Revise as follows:

1203.1.3 Installation.
Microgrids, Emergency power systems and standby power systems shall be installed in accordance with the *International Building Code*, NFPA 70, and where applicable, NFPA 99, NFPA 110 and NFPA 111.

1203.4 Maintenance.
Emergency and standby power systems shall be maintained in accordance with NFPA 110 and NFPA 111 such that the system is capable of supplying service within the time specified for the type and duration required.

Revise as follows:

1203.4.1 Group I-2 and ambulatory care facilities.
In Group I-2 occupancies and ambulatory care facilities, microgrids, emergency and standby power systems shall be maintained in accordance with NFPA 99.

1203.5 Operational inspection and testing.
Emergency power systems, including all appurtenant components, shall be inspected and tested under load in accordance with NFPA 110 and NFPA 111.

> **Exception:** Where the emergency power system is used for standby power or peak load shaving, such use shall be recorded and shall be allowed to be substituted for scheduled testing of the generator set, provided that appropriate records are maintained.

Revise as follows:

1203.5.1 Group I-2 and ambulatory care facilities.
In Group I-2 occupancies and ambulatory care facilities, microgrids, emergency and standby power systems shall be inspected and tested under load in accordance with NFPA 99.

2024 International Building Code

Revise as follows:

[F] 2702.1.3 Installation.
Microgrids,*Emergency power systems* and *standby power systems* required by this code or the *International Fire Code* shall be installed in accordance with the *International Fire Code* , NFPA 70, and where applicable, NFPA 99, NFPA 110 and NFPA 111.

Reason: Memorandum Summary excerpts from Centers for Medicare and Medicaid Services

• 2021 edition of the NFPA 99 permits emergency power for an EES to be supplied by sources other than a generator or battery system, including a health care microgrid system (HCMS)

• HCMSs are small-scale electrical grids where the sources of electricity can be provided by clean energy technologies (e.g., fuel cells, solar, wind, energy storage, etc.).

• Except as noted below, CMS is issuing a categorical waiver permitting new and existing health care facilities subject to CMS requirements to utilize alternate sources of power other than a generator set or battery system only if in accordance with the 2021 edition of the NFPA 99, 2023 edition of the National Electric Code (NFPA 70), and associated references.

• The categorical waiver excludes long-term care (LTC) facilities that provide life support as the LTC requirements at 42 CFR 483.90(c)(2) requires these facilities to have an emergency generator without exception.

Health care facilities are required to have a normal electrical power source and an alternate emergency power source provided to certain patient care rooms, equipment, and systems by an essential electric system (EES), where the loss of normal power is likely to result in injury or death. The 2012 edition of the NFPA 99 requires this emergency power source to be supplied by

a generator set or battery system. The large electrical loads and power duration required by most health care facilities traditionally demanded the use of a generator.

The 2021 edition of NFPA 99 now permits normal and emergency power to be supplied by sources other than a generator or battery system, including a health care microgrid system (HCMS). HCMSs are small-scale personalized electrical networks with intelligent controls that can operate independently, or in tandem with a large-scale electric grid. The power sources for an HCMS can be provided or supplemented by a combination of clean energy technologies such as fuel cells, solar panels, wind turbines, energy storage systems, and other alternate energy sources.

This proposal is submitted by the ICC Committee for Healthcare (CHC).
The Committee on Healthcare (CHC) was established by the ICC Board of Directors in 2011 to pursue opportunities to study and develop effective and efficient provisions for Hospital, Nursing Homes, Assisted Living and Ambulatory Care Facilities. This committee was formed in cooperation with the American Society for Healthcare Engineering (ASHE). In July of 2017, the ICC Board made CHC a standing committee. In 2023 the CHC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the CHC website at CHC webpage.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This change does not increase costs but provides additional options for facilities needing or wanting to reduce their emissions.

F163-24

F164-24

IFC: 1203.1.8, 1203.1.9 (New); IBC: [F] 2702.1.8, 2702.1.9 (New)

Proponents: Gregory Wilson, Federal Emergency Management Agency, FEMA (gregory.wilson2@fema.dhs.gov); Rebecca Quinn, RCQuinn Consulting, Inc., FEMA Building Science (rebecca@rcquinnconsulting.com)

2024 International Fire Code

1203.1.8 Group I-2 occupancies.
In Group I-2 occupancies located in flood hazard areas established in Section 1612.3 of the International Building Code where new essential electrical systems are installed, and where new essential electrical system generators are installed, the systems and generators shall be located and installed in accordance with ASCE 24. Where connections for hook up of temporary generators are provided, the connections shall be located at or above the elevation required in ASCE 24.

Add new text as follows:

1203.1.9 **Risk Category IV.** In buildings and structures classified as Risk Category IV that are located in flood hazard areas established in Section 1612.3 of the *International Building Code*, where new essential electrical systems are installed, and where new essential electrical system generators are installed, the systems and generators shall be located and installed in accordance with ASCE 24. Where connections for hookup of temporary generators are provided, the connections shall be located at or above the elevation required in ASCE 24.

2024 International Building Code

[F] 2702.1.8 Group I-2 occupancies.
In Group I-2 occupancies located in *flood hazard areas* established in Section 1612.3, where new essential electrical systems are installed, and where new essential electrical system generators are installed, the systems and generators shall be located and installed in accordance with ASCE 24. Where connections for hookup of temporary generators are provided, the connections shall be located at or above the elevation required in ASCE 24.

Add new text as follows:

2702.1.9 **Risk Category IV.** In buildings and structures classified as Risk Category IV that are located in *flood hazard areas* established in Section 1612.3, where new essential electrical systems are installed, and where new essential electrical system generators are installed, the systems and generators shall be located and installed in accordance with ASCE 24. Where connections for hookup of temporary generators are provided, the connections shall be located at or above the elevation required in ASCE 24.

Reason: Risk Category IV is defined in the IBC Table 1604.5 as "Buildings and other structures designated as essential facilities and buildings where loss of function represents a substantial hazard to occupants or users." Essential facilities are further defined in the IBC as "*Buildings* and other *structures* that are intended to remain operational in the event of extreme environmental loading from *flood,* wind, snow or earthquakes."

Risk Category IV buildings and structures located in flood hazard areas must remain operational during flooding because their services are necessary for emergency response and recovery, and disruption or failure poses not only a substantial hazard to the occupants or users, but the community at large as well.

An essential facility cannot remain operational in the event of flooding if its essential electrical systems and/or standby generators are flooded. For example, a hospital that loses all utility and backup power would lose use of onsite potable water and medical equipment and would not be able to provide complete medical services. Similarly, a fire station that loses power may lose communication systems and not be able to adequately provide residents throughout the affected area with fire and rescue services. FEMA's Mitigation Assessment Teams deployed after some flood events have repeatedly observed impacts to essential facility operations due to loss of power, including as a result of flooded generators. For critical facilities to continue to operate during the loss of services provided by utilities, measures must be in place to accommodate those losses of service. The measures must have the capacity to provide the necessary services for the duration of the outages.

This proposal does not create a new requirement for Risk Category IV buildings and structures. It simply provides a reference to existing requirements for the location and installation of utilities and equipment in flood hazard areas, which are required by the IBC by reference to ASCE 24, *Flood-Resistant Design and Construction*. This proposal also provides specificity to the requirements of NFPA 110, Standard for Emergency and Standby Power Systems, Section 7.2.4 which states: "The rooms, enclosures, or separate buildings housing Level 1 or Level 2 EPSS equipment shall be designed and located to minimize damage from flooding" and Section 7.2.5 which states: "Minimizing the possibility of damage resulting from interruptions of the emergency source shall be a design consideration for EPSS equipment." The best way to minimize damage and interruptions from flooding is to follow the established reference standard, ASCE 24. ASCE 24 requires utility equipment to resist flood loads and be elevated, inherently watertight, or protected by dry floodproofing.

This proposal is similar in nature to the successful code change in the 2015 IBC and IFC proposed by the Ad Hoc Committee on Healthcare, which initially established IFC Section 1203.1.8 and IBC Section 2702.1.8. The Ad hoc committee on healthcare identified this section as necessary to correct a coordination oversight as it has been identified in healthcare facilities and that generators are being installed in areas subject to flooding, and although they were designed to meet the structural loads for the flooding, they would operationally fail."

The proposal aims to ensure that essential electrical systems and generators in Risk Category IV structures remain operational during conditions of flooding, given the substantial risk posed to occupants and users should these structures endure a service interruption due to failure of backup power. FEMA's Mitigation Assessment Teams have observed disruption of operations during and after flooding for a variety of community services including hospitals, police stations, fire stations, and wastewater treatment plants. For example, after Hurricane Sandy FEMA documented the following for first responder facilities: In facilities that were flooded, all equipment in basements or un-elevated on the first floor was damaged. Damaged elements included electrical service equipment, distribution panels, generators, transfer switches, boilers/furnaces, and hot water heaters. When these vulnerable critical elements failed, the systems were rendered inoperative, and the functionality of the critical facilities suffered as a result. At facilities where emergency power was not available or generators failed as a result of inundation, mechanical, electrical, and communications systems became partially or completely unusable. At some locations, generators were elevated but still failed because components of the emergency power system —transfer switches or pumps—were located below flood levels. After flooding in the mid-west FEMA noted emergency generators for several law enforcement facilities were destroyed. In contrast, several successes after Hurricanes Sandy and Harvey were observed where municipal power was lost, but emergency power kept the essential facilities operational due to elevated emergency power systems/generators. However, FEMA continues to observe generator damage after flooding: as recently as Hurricane Ian in 2022, FEMA observed "The loss of utility service, and in some cases standby generators, severely impacted the ability of critical facilities to operate as intended."

Bibliography: *Flood Resistant Design and Construction,* ASCE/SEI 24-14

FEMA P-765, Mitigation Assessment Team Report: Midwest Floods of 2008 in Iowa and Wisconsin (2009)

FEMA P-942, Mitigation Assessment Team Report: Hurricane Sandy in New Jersey and New York (2013)

FEMA P-2022, Mitigation Assessment Team Report: Hurricane Harvey in Texas (2019)

FEMA DR-4673-FL RA 2, Reducing "Loss of Utility" Impacts to Critical Facilities (2023)

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal does not increase or decrease the initial construction costs or life-cycle costs because it does not change any requirements; it only points out and reinforces existing requirements for development in flood hazard areas.

F164-24

F165-24

IFC: 1205.2, 1205.3, 1205.3.1, 1205.3.2, 1205.3.3

Proponents: William Koffel, Koffel Associates, Inc., California Solar and Storage Association (CALSSA) (wkoffel@koffel.com)

2024 International Fire Code

Revise as follows:

1205.2 Access and pathways.
Roof access, pathways and spacing requirements shall be provided in accordance with Sections 1205.2.1 through 1205.3.3. Pathways shall be over areas capable of supporting firefighters accessing the roof. ~~Pathways shall be located in areas with minimal obstructions, such as vent pipes, conduit or mechanical equipment.~~Small obstructions, such as vent pipes, roof drains, conduit or mechanical equipment shall be permitted within the pathway, provided they do not impede access during fire fighting or smoke ventilation operations.

Exceptions:

1. Detached, nonhabitable Group U structures including, but not limited to, detached garages serving Group R-3 buildings, parking shade structures, carports, solar trellises and similar structures.
2. Roof access, pathways and spacing requirements need not be provided where the *fire code official* has determined that rooftop operations will not be employed.
3. Building-integrated photovoltaic (BIPV) systems where the BIPV systems are *approved*, integrated into the finished roof surface and are *listed* in accordance with UL 3741. The removal or cutting away of portions of the BIPV system during firefighting operations shall not expose a firefighter to electrical shock hazards.

1205.3 Other than Group R-3 buildings.
Access to systems for buildings, other than those containing Group R-3 occupancies, shall be provided in accordance with Sections 1205.3.1 through 1205.3.3.

Exception: Where it is determined by the *fire code official* that the roof configuration is similar to that of a Group R-3 occupancy, the residential access and ventilation requirements in Sections 1205.2.1.1 through 1205.2.1.3 are a suitable alternative.

Revise as follows:

1205.3.1 Perimeter pathways. There shall be a minimum 6-foot-wide (1829 mm) clear perimeter around the edges of each contiguous ~~the~~ roof area. A roof area shall be considered contiguous if there is no unimpeded access to firefighters between roof sections.

Exception: Where either axis of the building is 250 feet (76 200 mm) or less, the clear perimeter around the edges of the roof shall be permitted to be reduced to a minimum width of 4 feet (1219 mm).

1205.3.2 Interior pathways. Interior pathways shall be provided as follows, and as required by Section 1205.3.3 Item 3 ~~between array sections to meet the following requirements~~:

1. ~~Pathways shall be provided at intervals not greater than 150 feet (45 720 mm) throughout the length and width of the roof.~~

~~2~~. A pathway not less than 4 feet (1219 mm) wide in a straight line to roof standpipes or ventilation hatches.

~~3~~2. A pathway not less than 4 feet (1219 mm) wide around roof access hatches, with not fewer than one such pathway to a parapet or roof edge.

1205.3.3 Smoke ventilation.
The solar installation shall be designed to meet the following requirements:

1. Where nongravity-operated smoke and heat vents occur, a pathway not less than 4 feet (1219 mm) wide shall be provided bordering all sides.

2. Where gravity-operated dropout smoke and heat vents occur, a pathway not less than 4 feet (1219 mm) wide on not fewer than one side.
3. ~~Smoke ventilation options between array sections shall be one of the following~~Interior pathways shall be provided for smoke ventilation at intervals not greater than 150 feet (45 720 mm) throughout the length and width of the roof. Interior smoke ventilation pathways shall be one or a combination of the following options:
   3.1. A pathway not less than 8 feet (2438 mm) wide.
   3.2. A pathway not less than 4 feet (1219 mm) wide bordering 4-foot by 8-foot (1219 mm by 2438 mm) venting cutouts every 20 feet (6096 mm) on alternating sides of the pathway. Smoke and heat vents are allowed in the venting cutout areas.
   3.3 A pathway not less than 4 feet (1219 mm) wide bordering an existing line of heat and smoke vents in the roof.
   3.4 Two perimeter pathways, per Section 1205.3.1, on each side of a wall or parapet separating roof or building sections.

Exception: Where the building is 150 feet (76 200 mm) or less in either axis, interior pathways will not be required in the directions where the building is less than 150 feet.

Reason: For 1205.2, The proposed code language intends to clarify the existing intent of the code, and is not intended to change the code. Some AHJs have miss-interpreted the existing language which has negative cost and schedule impacts on projects.

Since the existing code language does not specifically say obstructions are allowed in the pathway itself, some AHJs have interpreted 1205.2 to mean pathways need to be located in areas of the roof with few obstructions (presumably so the pathways don't zig-zag around obstructions too much), but those obstructions still cannot be in the pathway itself. However, the intent of the code was to allow small obstructions in the pathway as long as they did not hinder rooftop fire operations. The inconsistency of enforcement causes significant system design changes and project delays. This proposed language intends to clarify smaller obstructions are allowed to be located in the fire pathway as long as they do not impede rooftop fire operations based on AHJ interpretation and judgment.

The proposed language in 1205.3.3 clarifies that interior pathways are only needed at intervals greater than 150' in either the length or width direction of the roof. The proposed language also clarifies the type of pathways between array sections can utilize either section 1205.3.3 items 3.1, 3.2, 3.3, 3.4 or a combination of any of these options.

Smoke and heat vents are, by definition, intended to be used to vent smoke and heat, and therefore are accepted by AHJ's as venting locations. The proposed language in 1205.3.3 item 2 clarifies this by allowing smoke and heat vents to be located in the required 'venting cutout' areas.

Additionally, many large buildings include lines or arrays of heat and smoke vents (often as shrink out skylights). Providing a continuous 4' pathway bordering these existing venting locations should provide sufficient venting access for fire fighting purposes. Requiring additional 'venting cutout' areas every 20' on alternating sides is unnecessarily redundant as firefighters would simply use the existing vents, rather than cutting additional holes in the roof. In situations where an 8' pathway is utilized, 1205.3.3 item 3.4 clarifies that two 4' or 6' pathways on the opposite sides of a parapet is an acceptable option to satisfy the ventilation requirements.

The exception clarifies that no interior fire pathways are needed for any building axis that is less than 150' in length. AHJ's sometimes interpret the existing language to mandate interior pathways even when the building is very small. (less than 150'x150'), if the array was not contiguous, or just because the code called for an interior pathway. This exception clarifies that smaller buildings smaller than 150'x150' do not require interior pathways.

The suggested commentary below will be useful to PV system designers (and some permitting authorities) to understand what a heat and smoke vent is.

Suggested Commentary: Smoke and heat vents referred to in section 1205.3.3 are openings through the building roof that are opened during a fire emergency only. These smoke and heat vents intended for emergency purposes are not typically connected to any interior ducting or other equipment. That is: these vents do not operate regularly to vent heat and smoke from HVAC, combustion equipment or other processes. Gravity-operated dropout smoke and heat vents are often installed in the form of “shrink out” acrylic dome skylights.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The change proposal is editorial in nature or a clarification and has the potential to reduce cost by mitigating miss-interpretation of the code. Additionally the change to 1205.3.3 item 3.3 will reduce cost by reducing unnecessary, redundant venting options, reducing array irregularity, reduced attachment or ballast counts, and increase space available for PV arrays..

F165-24

F166-24

IFC: 1205.2.1

Proponents: Joseph H. Cain, P.E., Solar Energy Industries Association (SEIA) (joecainpe@gmail.com); Paul Armstrong, SEIA (paul@7arms.com)

2024 International Fire Code

Revise as follows:

1205.2.1 Solar photovoltaic (PV) systems for Group R-3 buildings.
Solar photovoltaic (PV) systems for Group R-3 buildings shall comply with Sections 1205.2.1.1 through 1205.2.3.

Exceptions:

1. These requirements shall not apply to PV systems installed on structures designed and constructed in accordance with the *International Residential Code*.
2. These requirements shall not apply to PV systems installed on roofs with slopes ~~of~~ less than 2 units vertical in 12 units horizontal (16.7-percent slope)~~ or less~~.

Reason: This proposal includes editorial changes to both exceptions under IFC 1205.2.1, to clarify that IFC Section 1205.2.1 applies to the PV systems themselves and not to the structures or roofs on which the PV systems are installed.

For Exception 2, further changes are made to correlate the language with the new definition of "low-slope" in the 2024 IBC, where "low-slope" is not inclusive of a roof slope of 2 units vertical in 12 units horizontal.

2024 IBC Section 202 Definitions:

LOW-SLOPE. A roof slope less than 2 units vertical in 12 units horizontal (17-percent slope).

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal includes editorial changes only. It does not increase nor decrease cost of construction. See reason statement.

F166-24

F167-24

IFC: 1205.4, 1205.4.1, FIGURE 1205.4.1(1), FIGURE 1205.4.1(2), 1205.4.1.1, 1205.4.1.2, 1205.4.2, 1205.4.3

Proponents: Joseph H. Cain, P.E., Solar Energy Industries Association (SEIA) (joecainpe@gmail.com); Paul Armstrong, SEIA (paul@7arms.com)

2024 International Fire Code

Revise as follows:

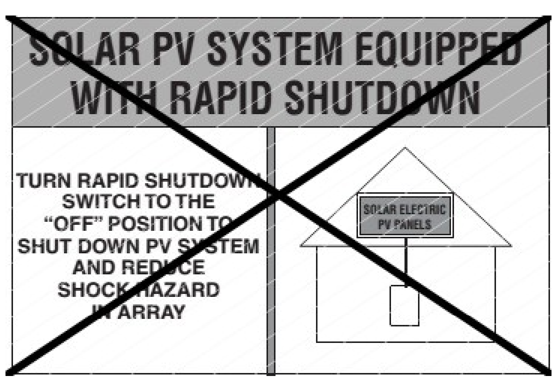
1205.4 Buildings with rapid shutdown.
Buildings with rapid shutdown solar photovoltaic systems shall have permanent labels in accordance with ~~Sections 1205.4.1 through 1205.4.3.~~ NFPA 70.

Delete without substitution:

~~**1205.4.1 Rapid shutdown type.**~~
~~The type of solar photovoltaic system rapid shutdown shall be labeled with one of the following:~~

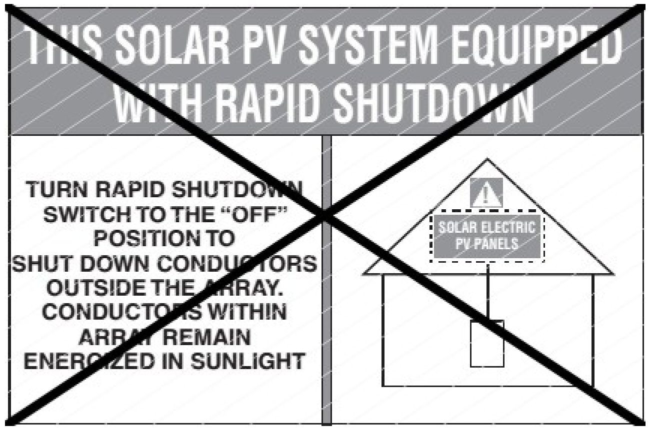
1. ~~For solar photovoltaic systems that shut down the array and the conductors leaving the array, a label shall be provided. The first two lines of the label shall be uppercase characters with a minimum height of $^{3}/_{8}$ inch (10 mm) in black on a yellow background. The remaining characters shall be uppercase with a minimum height of $^{3}/_{16}$ inch (5 mm) in black on a white background. The label shall be in accordance with Figure 1205.4.1(1) and state the following:~~
   ~~SOLAR PV SYSTEM EQUIPPED WITH~~
   ~~RAPID SHUTDOWN. TURN RAPID~~
   ~~SHUTDOWN SWITCH TO THE “OFF”~~
   ~~POSITION TO SHUT DOWN PV SYSTEM~~
   ~~AND REDUCE SHOCK HAZARD IN ARRAY.~~

2. ~~For photovoltaic systems that only shut down conductors leaving the array, a label shall be provided. The first two lines of the label shall be uppercase characters with a minimum height of $^{3}/_{8}$ inch (10 mm) in white on a red background and the remaining characters shall be capitalized with a minimum height of $^{3}/_{16}$ inch (5 mm) in black on a white background. The label shall be in accordance with Figure 1205.4.1(2) and state the following:~~
   ~~THIS SOLAR PV SYSTEM EQUIPPED~~
   ~~WITH RAPID SHUTDOWN. TURN RAPID~~
   ~~SHUTDOWN SWITCH TO THE “OFF”~~
   ~~POSITION TO SHUT DOWN CONDUCTORS~~
   ~~OUTSIDE THE ARRAY. CONDUCTORS~~
   ~~WITHIN ARRAY REMAIN ENERGIZED IN SUNLIGHT.~~



~~**FIGURE 1205.4.1(1) LABEL FOR SOLAR PV SYSTEMS THAT REDUCE SHOCK HAZARD WITHIN ARRAY AND SHUT DOWN**~~

~~**CONDUCTORS LEAVING ARRAY**~~



~~**FIGURE 1205.4.1(2) LABEL FOR SOLAR PV SYSTEMS THAT ONLY SHUT DOWN CONDUCTORS LEAVING THE ARRAY**~~

~~1205.4.1.1 Diagram~~.

~~The labels in Section 1205.4.1 shall include a simple diagram of a building with a roof. Diagram sections in red signify sections of the solar photovoltaic system that are not shut down when the rapid shutdown switch is turned off.~~

~~1205.4.1.2 Location~~.

~~The rapid shutdown label in Section 1205.4.1 shall be located not greater than 3 feet (914 mm) from the service disconnecting means to which the photovoltaic systems are connected, and shall indicate the location of all identified rapid shutdown switches if not at the same location.~~

~~1205.4.2 Buildings with more than one rapid shutdown type~~.

~~Solar photovoltaic systems that contain rapid shutdown in accordance with both Items 1 and 2 of Section 1205.4.1 or solar photovoltaic systems where only portions of the systems on the building contain rapid shutdown, shall provide a detailed plan view diagram of the roof showing each different photovoltaic system and a dotted line around areas that remain energized after the rapid shutdown switch is operated.~~

Revise as follows:

~~1205.4.3~~ <u>1205.4.1</u> **Rapid shutdown switch.** A rapid shutdown switch shall have a label located not greater than 3 feet (914 mm) from the switch that states the following:

RAPID SHUTDOWN SWITCH
FOR SOLAR PV SYSTEM

Reason: The intent of this proposal is to remove duplication from the IFC of language and graphics that appear in NFPA 70 National Electrical Code.

Requirements in the NEC for Rapid Shutdown / PV Hazard Control have evolved over several cycles of development. These graphics were included in the IFC a few cycles ago as a way to distinguish between more-recent PV systems that included enhancements to hazard reduction versus those PV systems that have earlier versions of "rapid shutdown."

The overall goal of this proposal is to provide flexibility to the Code Council (through FCAC) and the fire service to take another look at what is needed for fire safety and to avoid conflict. The proponent is open to suggestions for modifications to this proposal.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The intent of this proposal is to remove duplication between the IFC and NFPA 70. It is editorial in nature, and does not increase nor decrease the cost of construction.

F167-24

F168-24 Part I

PART I - IFC: SECTION 1205.6 (NEW)

PART II - IMC: SECTION 805.9 (NEW), 806.2 (NEW)

Proponents: Ali Fattah, City of San Diego Development Services Department, San Diego Area Chapter of ICC (afattah@sandiego.gov)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE INTERNATIONAL FIRE CODE COMMITTEE AND PART II WILL BE HEARD BY THE INTERNATIONAL MECHANICAL CODE.

2024 International Fire Code

Add new text as follows:

1205.6 Pathways adjacent to chimneys. Where a solar photovoltaic (PV) system located adjacent to a chimney that is constructed to comply with Section 2113 of the *International Building Code*, or Section 805 or 806 of the *International Mechanical Code*, a 36-inch-wide (914 mm) pathway shall be provided between the chimney and a solar photovoltaic (PV) system. The pathway adjacent to a chimney shall continue and access other pathways.

F168-24 Part I

F168-24 Part II

PART II - IMC: SECTION 805.9 (NEW), 806.2 (NEW)

Proponents: Ali Fattah, City of San Diego Development Services Department, San Diego Area Chapter of ICC (afattah@sandiego.gov)

2024 International Mechanical Code

Add new text as follows:

805.9 Spark arrestor required. Factory-built *chimneys* serving solid fuel-burning *appliances* shall be protected with a spark arrestor complying with Section 2113.9.2 of the *International Building Code* where solar photovoltaic (PV) systems are located within 10 feet (3048 mm) of a chimney.

806.2 Spark arrestor required. Metal *chimneys* serving solid fuel-burning *appliances* shall be protected with a spark arrestor complying with Section 2113.9.2 of the *International Building Code* where solar photovoltaic (PV) systems are located within 10 feet (3048 mm) of a chimney.

Attached Files

- **Chimney 2.jpg**
  https://www.cdpaccess.com/proposal/10739/30945/files/download/4782/
- **Chimney 1.png**
  https://www.cdpaccess.com/proposal/10739/30945/files/download/4781/
- **Prefab chimney fire.pdf**
  https://www.cdpaccess.com/proposal/10739/30945/files/download/4724/
- **PV near Chimney.pdf**
  https://www.cdpaccess.com/proposal/10739/30945/files/download/4725/

Reason: The proposed code changes address a regulatory gap in the IBC, IRC and IMC where the interaction of rooftop solar PV systems with chimneys serving solid fuel-burning fireplaces and appliances is not addressed. Chimneys convey heat and products of combustion that include glowing sparks, which can land on solar PV systems and pose a fire hazard. The IBC, IRC and IMC do not require spark arrestors; however, the IBC addresses the construction of spark arrestors when added atop a chimney primarily to address possible interference with drafting a chimney.

The IBC, IRC and IMC also do not address working clearance around chimneys since it was not envisioned that structures occupying large portions of the roof area would be placed on the roof near chimneys. Solar photovoltaic systems are becoming very common, and the proposed code changes address clearances adjacent to the chimney necessary for firefighting access and for servicing a chimney.

The proposed code change will be processed in three parts since the IBC Structural Committee and the IRC Building Committee convene in the Group B cycle in 2025. The International Fire Code Committee and the International Mechanical Code Committee in Group A will consider the first two parts during 2024. In an effort to show participants in Group A the totality of the proposal, the following two bullet points show proposed Group B code changes.

- IBC Ch 21 is proposed to be amended in Group B and considered by the IBC Structural Committee as follows.

  2113.9.4 Spark Arrestor Required. Chimneys shall be protected with a spark arrestor complying with Section 2113.9.2 of the International Building Code when solar photovoltaic (PV) systems are located within 10 feet (3048 mm) of a chimney.

  IRC Ch 10 is proposed to be amended in Group B and considered by the IBC Structural Committee as follows. Note that prior to the submittal deadline for Group A, the 2024 IRC was not available for review through ICC’s digital codes premium service, so text from the 2021 IRC is shown below.R1003.9.4 Spark Arrestor Required. Chimneys shall be protected with a spark arrestor complying with Section R1003.9.2 of the International Residential Code when solar photovoltaic (PV) systems are located within 10 feet (3048 mm) of a chimney.

Code change RB285-22 was submitted for the 2024 IRC, and the submitted public comment, similar to this proposed code change, was not considered during the PCH since insufficient votes were available to overturn the Committee. Several IRC Building Committee members were receptive to the issue, which in the initial submittal focused on treating the solar PV installation as a part of the building and, therefore, requiring the chimney to extend 2 ft higher than solar PV within 10 ft the chimney. The report of the CAH states in part, " When you add the roof-mounted photovoltaic system to a building, it becomes a portion of the building.", which styles the initial issue.

This code change addresses another problem identified during the CAH: firefighting and maintenance access to a Chimney. Plumbing vents and mechanical equipment had been the most common roof projections until the popularity of solar PV systems, with the latter occupying large areas of the roof when compared to discreet items that the plumbing code and mechanical regulates in proximity to product conveying ducts.

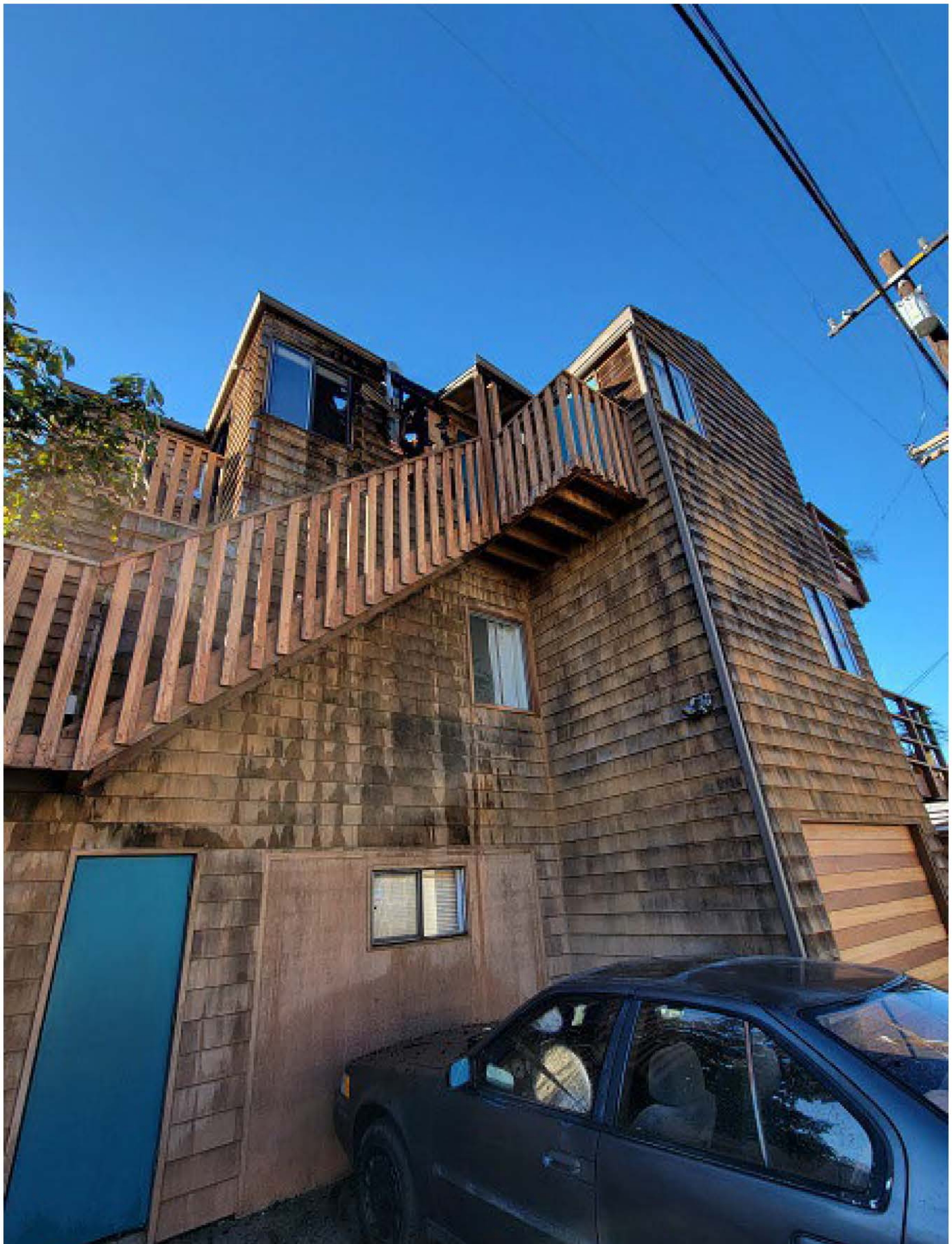
The proposed code change addresses the fire hazards and roof access issues the two independently regulated rooftop components pose. It is worth noting that the IBC, IRC, and IMC do not require spark arrestors and that the two building codes only address the construction of spark arrestors; the proposed code changes will address this regulatory gap. Additionally, chimney requirements have not changed for decades, and documentation regarding their functioning is not available or proprietary.

The proposal includes photos showing three cases (photos 3 to 5 spark arrestors would be required as well as 3 ft pathways) of what could happen when solar PV installations adjacent to the chimney are not regulated. Two photos (1 and 2) of a chimney fire to highlight why roof clearance should be required.

https://www.cdpaccess.com/proposal/9918/30619/files/download/4135/

https://www.cdpaccess.com/proposal/9918/30619/files/download/4780/

Chimney Fire




Bibliography:

- Rockfort Chimney Supply
- Forbes

Cost Impact: Increase

Estimated Immediate Cost Impact:

The average cost of a spark arrestor is approximately $300, and it can easily be installed by a solar contractor unable to set back rooftop-mounted photovoltaic panel systems. Additionally, the average cost of a rooftop solar system is approximately $11,278 after solar tax credits.

Estimated Immediate Cost Impact Justification (methodology and variables):

I went online to search the cost of spark arrestors at Rockfort Chimney Supply and went to Forbes for the cost of solar systems in California.

F169-24

IFC: SECTION 1207, 1203.2.5, 1203.2.7, 907.2.23; IBC: [F] 907.2.23

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Robert J Davidson, Davidson Code Concepts LLC, Self (rjd@davidsoncodeconcepts.com)

2024 International Fire Code

SECTION 1207
ELECTRICAL ENERGY STORAGE SYSTEMS (ESS)

Revise as follows:

1207.1 General.
The provisions in this section are applicable to stationary, portable, and mobile electrical energy storage systems (ESS).

> ~~**Exception:** ESS in Group R-3 and R-4 occupancies shall only be required to comply with Section 1207.11 except where Section 1207.11.4 requires compliance with Sections 1207.1 through 1207.9~~.

Delete without substitution:

~~**1207.1.1 Utilities and industrial applications**~~**.**
~~This section shall not apply to capacitors and capacitor equipment for electric utilities and industrial facilities used in applications such as flexible AC transmission (FACTS) devices, filter capacitor banks, power factor correction, and standalone capacitor banks for voltage correction and stabilization. [material based on NFPA 855 (2023)]~~

~~**1207.1.2 Mobile ESS**~~ **.**
~~Mobile ESS deployed at an electric utility substation or generation facility for 90 days or less shall not add to the threshold values in Table 1207.1.3 for the stationary ESS installation if both of the following conditions apply:~~

1. ~~The mobile ESS complies with Section 1207.10.~~
2. ~~The mobile ESS is being used only during periods in which the facility's stationary ESS is being tested, repaired, retrofitted or replaced.~~

~~[material based on NFPA 855 (2023)]~~

Revise as follows:

~~1207.1.3~~ 1207.1.1 Scope.
ESS having capacities exceeding the values shown in ~~Table 1207.1.3~~ Table 1.3 of NFPA 855 shall comply with this section. ~~[material based on NFPA 855 (2023)]~~

Delete without substitution:

~~TABLE 1207.1.3 ENERGY STORAGE SYSTEM (ESS) THRESHOLD QUANTITIES~~

TECHNOLOGY	ENERGY CAPACITY[a]
Capacitor ESS	3 kWh
Flow batteries[b]	20 kWh
Lead-acid batteries, all types	70 kWh[c]

Lithium-ion batteries	20 kWh
Nickel-cadmium (Ni-Cd), nickel metal hydride (Ni-MH) and nickel zinc (Ni-Zn) batteries	70 kWh
Nonelectrochemical ESS[d]	70 kWh
Other battery technologies	10 kWh
Other electrochemical ESS technologies	3 kWh
Sodium nickel chloride batteries	70 kWh
Zinc manganese dioxide batteries ($Zn\text{-}MnO_2$)	70 kWh

~~For SI: 1 kilowatt hour = 3.6 megajoules.~~

~~a. Energy capacity is the total energy capable of being stored (nameplate rating), not the usable energy rating. For units rated in amp-hours, kWh shall equal rated voltage times amp-hour rating divided by 1,000.~~

~~b. Shall include vanadium, zinc-bromine, polysulfide-bromide and other flowing electrolyte-type technologies.~~

~~c. Fifty gallons of lead-acid battery electrolyte shall be considered equivalent to 70 kWh.~~

~~d. Covers nonelectrochemical technologies such as flywheel and thermal ESS.~~

Revise as follows:

~~1207.1.4~~ 1207.2 Permits.
Permits shall be obtained for ESS as follows:

1. Construction permits shall be obtained for stationary ESS installations and for mobile ESS charging and storage installations ~~covered by Section 1207.10.1~~. Permits shall be obtained in accordance with Section 105.6.6.
2. Operational permits shall be obtained for stationary ESS installations and for mobile ESS deployment operations ~~covered by Section 1207.10.3~~. Permits shall be obtained in accordance with Section 105.5.14.

~~1207.1.4.1~~ 1207.2.1 Communication utilities.
Operational permits shall not be required for lead-acid and nickel-cadmium battery systems at facilities under the exclusive control of communications utilities that comply with NFPA 76 and operate at less than 50 voltage alternating current (VAC) and 60 voltage direct current (VDC).

Add new text as follows:

1207.2.2 Detached one- and two-family dwellings and townhouses. Operational permits shall not be required for ESS located at detached one- and two-family dwellings and townhouses, other than Group R-4.

Revise as follows:

1207.3 Installation. Stationary, mobile and portable electrical energy storage systems (ESS). shall be designed, constructed, installed, commissioned, operated, maintained, and decommissioned in accordance with NFPA 855, the required listings and the manufacturer's installation instructions, and the applicable requirements in this section.

Add new text as follows:

1207.4 Fire safety and evacuation plan. A fire safety and evacuation plan complying with NFPA 855 and Section 404 shall be provided for review and approval.

Revise as follows:

~~1207.4.5~~ 1207.5 Vehicle impact protection.
Where ESS are subject to impact by a motor vehicle, including forklifts, vehicle impact protection shall be provided in accordance with Section 312.

Add new text as follows:

1207.6 Fire detection. Where fire detection is required by NFPA 855, fire detection shall be installed in accordance with Section 907.

1207.7 Fire suppression systems.. Where automatic fire sprinkler system protection is required by NFPA 855, the automatic fire sprinkler system shall be installed in accordance with Chapter 9.

Revise as follows:

~~1207.6.3~~ 1207.8 Explosion control.
Where explosion control is required by ~~Table 1207.6~~ NFPA 855, ~~or elsewhere in this code,~~ an NFPA 69 explosion control system complying with Section 911 shall be provided for rooms, areas, ESS cabinets or ESS walk-in units containing the electrochemical ESS technologies. Where an ESS cabinet or ESS walk-in unit is installed within a room or building the design of the explosion control system shall include the cabinet, walk-in unit and the room it is installed within.

~~**Exceptions:** [material based on NFPA 855 (2023)]~~

1. ~~Where *approved*, explosion control is permitted to be waived by the *fire code official* based on large-scale fire testing complying with Section 1207.1.7 that demonstrates that *flammable gases* are not liberated from electrochemical ESS cells or modules.~~
2. ~~Where *approved*, explosion control is permitted to be waived by the *fire code official* based on documentation provided in accordance with Section 104.2.2 that demonstrates that the electrochemical ESS technology to be used does not have the potential to release *flammable gas* concentrations in excess of 25 percent of the LFL anywhere in the room, area, walk-in unit or structure under thermal runaway or other fault conditions.~~
3. ~~Where *approved*, ESS cabinets that have no debris, shrapnel or enclosure pieces ejected during large-scale fire testing complying with Section 1207.1.5 shall be permitted in lieu of providing explosion control complying with Section 911.~~
4. ~~Explosion control is not required for lead-acid and nickel-cadmium battery systems less than 50 VAC, 60 VDC in telecommunication facilities under the exclusive control of communications utilities located in building spaces or walk-in units used exclusively for such installations.~~
5. ~~Explosion control is not required for lead-acid and nickel-cadmium systems used for DC power for control of substations and control or safe shutdown of generating stations under the exclusive control of the electric utility, located in building spaces or walk-in units used exclusively for such installations.~~
6. ~~Explosion control is not required for lead-acid battery systems in uninterruptable power supplies *listed* and *labeled* in accordance with UL 1778, utilized for standby power applications, and housed in a single cabinet in a single *fire area* in buildings or walk-in units.~~

Add new text as follows:

1207.9 Mechanical exhaust system. Where a mechanical exhaust system is required by NFPA 855, the mechanical exhaust system shall be installed in accordance with the International Mechanical Code.

1207.10 Gas detection system. Where a gas detection system is installed to comply with the requirements of NFPA 855, the gas detection system shall comply with Section 916.

1207.11 Fire-resistance rated separations. Where fire-resistance-rated separation is required by NFPA 855, the fire-resistance-rated-separations shall be provided by fire barriers constructed in accordance with Section 707 of the International Building Code and horizontal assemblies constructed in accordance with Section 711 of the International Building Code.

1207.12 Dedicated use buildings. Where ESS are installed within dedicated-use ESS buildings they shall be classified as Group F-1 occupancies in accordance with the *International Building Code*.

1207.13 Fire apparatus access roads. Fire apparatus access roads shall be provided in accordance with Section 503.

1207.14 Fire protection water supplies.. Fire protection water supplies shall be provided in accordance with Section 507.

Delete without substitution:

~~**1207.1.5 Construction documents**~~**.**

~~The following information shall be provided with the permit application:~~

1. ~~Location and layout diagram of the room or area in which the ESS is to be installed.~~
2. ~~Details on the hourly *fire-resistance ratings* of assemblies enclosing the ESS.~~
3. ~~The quantities and types of ESS to be installed.~~
4. ~~Manufacturer's specifications, ratings and listings of each ESS.~~
5. ~~Description of energy (battery) management systems and their operation.~~
6. ~~Location and content of required signage.~~
7. ~~Details on fire suppression, smoke or fire detection, thermal management, ventilation, exhaust and *deflagration* venting systems, if provided.~~
8. ~~Support arrangement associated with the installation, including any required seismic restraint.~~
9. ~~A commissioning plan complying with Section 1207.2.1.~~
10. ~~A decommissioning plan complying with Section 1207.2.3.~~
11. ~~A fire safety and evacuation plan in accordance with Section 404.~~

~~**1207.1.5.1 Utilities applicability**~~ **.**

~~Plans and specifications associated with ESS owned and operated by electric utilities as a component of the electric grid that are considered critical infrastructure documents in accordance with the provisions of the North American Electric Reliability Corporation and other applicable governmental laws and regulations shall be made available to the *fire code official* for viewing based on the requirements of the applicable governmental laws and regulations. [material based on NFPA 855 (2023)]~~

~~**1207.1.6 Hazard mitigation analysis**~~**.**

~~A failure modes and effects analysis (FMEA) or other *approved* hazard mitigation analysis shall be provided in accordance with Section 104.2.2 under any of the following conditions:~~

1. ~~Where ESS technologies not specifically identified in Table 1207.1.3 are provided.~~
2. ~~More than one ESS technology is provided in a single fire area where there is a potential for adverse interaction between technologies.~~
3. ~~Where allowed as a basis for increasing maximum allowable quantities. See Section 1207.5.2.~~
4. ~~Where required by the *fire code official* to address a potential hazard with an ESS installation that is not addressed by existing requirements.~~

~~**1207.1.6.1 Fault condition.**~~
~~The hazard mitigation analysis shall evaluate the consequences of the following failure modes. Only single failure modes shall be considered.~~

1. ~~A thermal runaway condition in a single electrochemical ESS unit.~~
2. ~~A mechanical failure of a nonelectrochemical ESS unit.~~
3. ~~Failure of any battery (energy) management system or fire protection system within the ESS equipment that is not covered by the product listing failure mode effects analysis (FMEA).~~
4. ~~Failure of any required protection system external to the ESS, including but not limited to ventilation (HVAC), exhaust ventilation, smoke detection, fire detection, gas detection or fire suppression system. [material based on NFPA 855 (2023)]~~

~~**1207.1.6.2 Analysis approval.**~~
~~The *fire code official* is authorized to approve the hazardous mitigation analysis provided that the consequences of the hazard mitigation analysis demonstrate:~~

1. ~~Fires will be contained within unoccupied ESS rooms or areas for the minimum duration of the fire-resistance-rated separations identified in Section 1207.7.4.~~
2. ~~Fires involving the ESS will allow occupants or the general public to evacuate to a safe location. [material based on NFPA 855 (2023)]~~

~~**1207.1.6.3 Additional protection measures.**~~
~~Construction, equipment and systems that are required for the ESS to comply with the hazardous mitigation analysis, including but not limited to those specifically described in Section 1207, shall be installed, maintained and tested in accordance with nationally recognized standards and specified design parameters.~~

~~**1207.1.7 Large-scale fire test.**~~
~~Where required elsewhere in Section 1207, large-scale fire testing shall be conducted on a representative ESS in accordance with UL 9540A. The testing shall be conducted or witnessed and reported by an *approved* testing laboratory and show that a fire involving one ESS will not propagate to an adjacent ESS, and where installed within buildings, enclosed areas and walk-in units will be contained within the room, enclosed area or walk-in unit for the duration of the test. The test report shall be provided to the *fire code official* for review and approval in accordance with Section 104.2.2. [material based on NFPA 855 (2023)]~~

~~**1207.1.8 Fire remediation.** Where a fire or other event has damaged the ESS and ignition or re-ignition of the ESS is possible, the system *owner*, agent or lessee shall take the following actions, at their expense, to mitigate the hazard or remove damaged equipment from the premises to a safe location.~~

~~**1207.1.8.1 Fire mitigation personnel.**~~
~~Where, in the opinion of the *fire code official*, it is essential for public safety that trained personnel be on-site to respond to possible ignition or re-ignition of a damaged ESS, the system owner, agent or lessee shall dispatch within 15 minutes one or more fire mitigation personnel to the premise, as required and *approved*, at their expense. These personnel shall remain on duty continuously after the fire department leaves the premise until the damaged energy storage equipment is removed from the premises, or earlier if the *fire code official* indicates the public safety hazard has been abated. [material based on NFPA 855 (2023)]~~

~~**1207.1.8.2 Duties.**~~
~~On-duty fire mitigation personnel shall have the following responsibilities:~~

1. ~~Keep a diligent watch for fires, obstructions to *means of egress* and other hazards.~~

2. ~~Immediately contact the fire department if their assistance is needed to mitigate any hazards or extinguish fires.~~
3. ~~Take prompt measures for remediation of hazards in accordance with the decommissioning plan per Section 1207.2.3.~~
4. ~~Take prompt measures to assist in the evacuation of the public from the structures. [material based on NFPA 855 (2023)]~~

~~**1207.2 Commissioning, decommissioning, operation and maintenance.** Commissioning, decommissioning, operation and maintenance shall be conducted in accordance with this section.~~

~~**1207.2.1 Commissioning**~~**.**

~~Commissioning of newly installed ESS and existing ESS that have been retrofitted, replaced or previously decommissioned and are returning to service shall be conducted prior to the ESS being placed in service in accordance with a commissioning plan that has been *approved* prior to initiating commissioning. The commissioning plan shall include the following:~~

1. ~~A narrative description of the activities that will be accomplished during each phase of commissioning, including the personnel intended to accomplish each of the activities.~~
2. ~~A listing of the specific ESS and associated components, controls and safety-related devices to be tested, a description of the tests to be performed and the functions to be tested.~~
3. ~~Conditions under which all testing will be performed, which are representative of the conditions during normal operation of the system.~~
4. ~~Documentation of the owner's project requirements and the basis of design necessary to understand the installation and operation of the ESS.~~
5. ~~Verification that required equipment and systems are installed in accordance with the *approved* plans and specifications.~~
6. ~~Integrated testing for all fire and safety systems.~~
7. ~~Testing for any required thermal management, ventilation or exhaust systems associated with the ESS installation.~~
8. ~~Preparation and delivery of operation and maintenance documentation.~~
9. ~~Training of facility operating and maintenance staff.~~
10. ~~Identification and documentation of the requirements for maintaining system performance to meet the original design intent during the operation phase.~~
11. ~~Identification and documentation of personnel who are qualified to service, maintain and decommission the ESS, and respond to incidents involving the ESS, including documentation that such service has been contracted for./p>~~
12. ~~A decommissioning plan for removing the ESS from service, and from the facility in which it is located. The plan shall include details on providing a safe, orderly shutdown of energy storage and safety systems with notification to the code officials prior to the actual decommissioning of the system. The decommissioning plan shall include contingencies for removing an intact operational ESS from service, and for removing an ESS from service that has been damaged by a fire or other event.~~

~~**Exception s:**~~

1. ~~Commissioning shall not be required for lead-acid and nickel-cadmium battery systems at facilities under the exclusive control of communications utilities that comply with NFPA 76 and operate at less than 50 VAC and 60 VDC. A decommissioning plan shall be provided and maintained where required by the *fire code official*.~~
2. ~~Lead-acid and nickel-cadmium battery systems less than 50 VAC, 60 VDC that are in telecommunications facilities for installations of communications equipment under the exclusive control of communications utilities, and are located outdoors or in building spaces or walk-in units used exclusively for such installations that are in compliance with NFPA 76, shall be permitted to have a commissioning plan in compliance with recognized industry practices in lieu of complying with Section 1207.2.1.~~

3. ~~Lead-acid and nickel-cadmium battery systems that are used for DC power for control of substations and control or safe shutdown of generating stations under the exclusive control of the electric utilities, and are located in building spaces or walk-in units used exclusively for such installations, shall be permitted to have a commissioning plan in compliance with applicable governmental laws and regulations in lieu of developing a commissioning plan in accordance with Section 1207.2.1. [material based on NFPA 855 (2023)]~~

~~**1207.2.1.1 Initial acceptance testing.** During the commissioning process an ESS shall be evaluated for proper operation in accordance with the manufacturer's instructions and the commissioning plan prior to final approval.~~

~~**1207.2.1.2 Commissioning report.**~~
~~A report describing the results of the system commissioning, including the results of the initial acceptance testing required in Section 1207.2.1.1, shall be provided to the *fire code official* prior to final inspection and approval and maintained at an *approved* on-site location. [material based on NFPA 855 (2023)]~~

~~**1207.2.2 Operation and maintenance.**~~
~~An operation and maintenance manual shall be provided to both the ESS *owner* or their authorized agent and the ESS operator before the ESS is put into operation and shall include the following:~~

1. ~~Manufacturer's operation manuals and maintenance manuals for the entire ESS, or for each component of the system requiring maintenance, that clearly identify the required routine maintenance actions.~~
2. ~~Name, address and phone number of a service agency that has been contracted to service the ESS and its associated safety systems.~~
3. ~~Maintenance and calibration information, including wiring diagrams, control drawings, schematics, system programming instructions and control sequence descriptions, for all energy storage control systems.~~
4. ~~Desired or field-determined control set points that are permanently recorded on control drawings at control devices or, for digital control systems, in system programming instructions.~~
5. ~~A schedule for inspecting and recalibrating all ESS controls.~~
6. ~~A service record log form that lists the schedule for all required servicing and maintenance actions and space for logging such actions that are completed over time and retained on-site.~~

~~The ESS shall be operated and maintained in accordance with the manual and a copy of the manual shall be retained at an approved on-site location.~~

~~**1207.2.2.1 Ongoing inspection and testing.** Systems that monitor and protect the ESS installation shall be inspected and tested in accordance with the manufacturer's instructions and the operation and maintenance manual. Inspection and testing records shall be maintained in the operation and maintenance manual.~~

~~**1207.2.3 Decommissioning.**~~
~~The code official shall be notified prior to the decommissioning of an ESS. Decommissioning shall be performed in accordance with the decommissioning plan that includes the following:~~

1. ~~A narrative description of the activities to be accomplished for removing the ESS from service, and from the facility in which it is located.~~
2. ~~A listing of any contingencies for removing an intact operational ESS from service, and for removing an ESS from service that has been damaged by a fire or other event. [material based on NFPA 855 (2023)]~~

~~1207.3 Equipment~~.

~~ESS equipment shall be in accordance with Sections 1207.3.1 through 1207.3.9.~~

~~1207.3.1 Energy storage system listings~~.

~~ESS shall be *listed* in accordance with UL 9540.~~

~~Exception s:~~

1. ~~Lead-acid and nickel-cadmium battery systems less than 50 VAC, 60 VDC in telecommunications facilities for installations of communications equipment under the exclusive control of communications utilities located outdoors or in building spaces used exclusively for such installations that are in compliance with NFPA 76.~~
2. ~~Lead-acid and nickel-cadmium battery systems that are used for DC power for control of substations and control or safe shutdown of generating stations under the exclusive control of the electric utility, and located outdoors or in building spaces used exclusively for such installations.~~
3. ~~Lead-acid battery systems in uninterruptable power supplies listed and *labeled* in accordance with UL 1778 and utilized for standby power applications.~~

~~[material based on NFPA 855 (2023)]~~

~~1207.3.2 Equipment listing~~.

~~Chargers, inverters and energy storage management systems shall be covered as part of the UL 9540 listing or shall be *listed* separately.~~

~~1207.3.3 Utility-interactive systems~~.

~~Inverters shall be *listed* and *labeled* in accordance with UL 1741. Only inverters *listed* and *labeled* for utility interactive system use and identified as interactive shall be allowed to operate in parallel with the electric utility power system to supply power to common loads.~~

~~1207.3.4 Energy storage management system~~.

~~Where required by the ESS listing, an *approved* energy storage management system that monitors and balances cell voltages, currents and temperatures within the manufacturer's specifications shall be provided . The system shall disconnect electrical connections to the ESS or otherwise place it in a safe condition if potentially hazardous temperatures or other conditions such as short circuits, over voltage or under voltage are detected. [material based on NFPA 855 (2023)]~~

~~1207.3.5 Enclosures~~.

~~Enclosures of ESS shall be of noncombustible construction. [material based on NFPA 855 (2023)]~~

~~1207.3.6 Repairs~~.

~~Repairs of ESS shall only be done by qualified personnel. Repairs with other than identical parts shall be considered retrofitting and comply with Section 1207.3.7. Repairs shall be documented in the service records log. [material based on NFPA 855 (2023)]~~

~~1207.3.7 Retrofits~~.

~~Retrofitting of an existing ESS shall comply with the following:~~

1. ~~A construction permit shall be obtained in accordance with Section 105.6.6.~~
2. ~~New batteries, battery modules, capacitors and similar ESS components shall be *listed*.~~
3. ~~Battery management and other monitoring systems shall be connected and installed in accordance with the manufacturer's instructions.~~

4. ~~The overall installation shall continue to comply with UL 9540 listing requirements, where applicable.~~
5. ~~Systems that have been retrofitted shall be commissioned in accordance with Section 1207.2.1.~~
6. ~~Retrofits shall be documented in the service records log. [material based on NFPA 855 (2023)]~~

~~1207.3.7.1~~ ~~Retrofitting lead acid and nickel cadmium~~.

~~Changing out or retrofitting of lead-acid and nickel-cadmium batteries with other lead-acid and nickel-cadmium batteries in the following applications shall be considered repairs where there is no increase in system size or energy capacity greater than 10 percent of the original design.~~

1. ~~At facilities under the exclusive control of communications utilities that comply with NFPA 76 and operate at less than 50 VAC and 60 VDC.~~
2. ~~Battery systems used for DC power for control of substations and control or safe shutdown of generating stations under the exclusive control of the electric utility, and located outdoors or in building spaces used exclusively for such installations.~~
3. ~~Batteries in uninterruptible power supplies *listed* and *labeled* in accordance with UL 1778 and used for standby power applications only.~~

~~[material based on NFPA 855 (2023)]~~

~~1207.3.8~~ ~~Replacements~~.

~~Replacements of ESS shall be considered new ESS installations and shall comply with the provisions of Section 1207 as applicable to new ESS. The ESS being replaced shall be decommissioned in accordance with Section 1207.2.3. [material based on NFPA 855 (2023)]~~

~~1207.3.9~~ ~~Reused and repurposed equipment~~.

~~Equipment and materials shall only be reused or reinstalled as permitted in Section 104.9.1. Storage batteries previously used in other applications, such as electric vehicle propulsion, shall not be reused in applications regulated by Chapter 12 unless *approved* by the *fire code official* and unless the equipment is refurbished by a battery refurbishing company *approved* in accordance with UL 1974. [material based on NFPA 855 (2023)]~~

~~1207.4~~ ~~General installations requirements~~.

~~Stationary and mobile ESS shall comply with the requirements of Sections 1207.4.1 through 1207.4.12.~~

~~1207.4.1~~ ~~Electrical disconnects~~.

~~Where the ESS disconnecting means is not within sight of the main electrical service disconnecting means, placards or directories shall be installed at the location of the main electrical service disconnecting means indicating the location of stationary storage battery system disconnecting means in accordance with NFPA 70.~~

> **Exception:** ~~Electrical disconnects for lead-acid and nickel-cadmium battery systems at facilities under the exclusive control of communications utilities and operating at less than 50 VAC and 60 VDC shall be permitted to have electrical disconnects signage in accordance with NFPA 76.~~

~~1207.4.2~~ ~~Working clearances~~.

~~Access and working space shall be provided and maintained about all electrical equipment to permit ready and safe operation and maintenance of such equipment in accordance with NFPA 70 and the manufacturer's instructions.~~

~~1207.4.3~~ ~~Fire-resistance-rated separations~~.

~~Rooms and other indoor areas containing ESS shall be separated from other areas of the building in accordance with Section 1207.7.4. ESS shall be permitted to be in the same room with the equipment they support.~~

~~1207.4.4 Seismic and structural design~~.

~~Stationary ESS shall comply with the seismic design requirements in Chapter 16 of the *International Building Code*, and shall not exceed the floor loading limitation of the building.~~

~~1207.4.6 Combustible storage~~.

~~Combustible materials shall not be stored in ESS rooms, areas or walk-in units. Combustible materials in occupied work centers covered by Section 1207.4.10 shall be stored at least 3 feet (914 mm) from ESS cabinets.~~

~~1207.4.7 Toxic and highly toxic gases~~.

~~ESS that have the potential to release toxic and highly toxic gas during charging, discharging and normal use conditions shall be provided with a hazardous exhaust system in accordance with Section 502.8 of the *International Mechanical Code*.~~

~~1207.4.8 Signage~~.

~~*Approved* signs shall be provided on or adjacent to all entry doors for ESS rooms or areas and on enclosures of ESS cabinets and walk-in units located outdoors, on rooftops or in open parking garages. Signs designed to meet both the requirements of this section and NFPA 70 shall be permitted. The signage shall include the following or equivalent:~~

1. ~~"ENERGY STORAGE SYSTEM," "BATTERY STORAGE SYSTEM," "CAPACITOR ENERGY STORAGE SYSTEM" or the equivalent.~~
2. ~~The identification of the electrochemical ESS technology present.~~
3. ~~"ENERGIZED ELECTRICAL CIRCUITS."~~
4. ~~Where water-reactive electrochemical ESS are present, the signage shall include "APPLY NO WATER."~~
5. ~~Current contact information, including phone number, for personnel authorized to service the equipment and for fire mitigation personnel required by Section 1207.1.8.1.~~

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~~Exception:~~ ~~Existing electrochemical ESS shall be permitted to include the signage required at the time they were installed. [material based on NFPA 855 (2023)]~~

~~1207.4.9 Security of installations~~.

~~Rooms, areas and walk-in units in which electrochemical ESS are located shall be secured against unauthorized entry and safeguarded in an *approved* manner. Security barriers, fences, landscaping and other enclosures shall not inhibit the required air flow to or exhaust from the el ectrochemical ESS and its components. [material based on NFPA 855 (2023)]~~

~~1207.4.10 Occupied work centers~~.

~~Electrochemical ESS located in rooms or areas occupied by personnel not directly involved with maintenance, service and testing of the systems shall comply with the following:~~

1. ~~Electrochemical ESS located in occupied work centers shall be housed in locked noncombustible cabinets or other enclosures to prevent access by unauthorized personnel.~~
2. ~~Where electrochemical ESS are contained in cabinets in occupied work centers, the cabinets shall be located within 10 feet (3048 mm) of the equipment that they support.~~

3. ~~Cabinets shall include signage complying with Section 1207.4.8. [material based on NFPA 855 (2023)]~~

~~1207.4.11 Open rack installations.~~
~~Where electrochemical ESS are installed in a separate equipment room and only authorized personnel have access to the room, they shall be permitted to be installed on an open rack for ease of maintenance. [material based on NFPA 855 (2023)]~~

~~1207.4.12 Walk-in units.~~ ~~Walk-in units shall be entered only for inspection, maintenance and repair of ESS units and ancillary equipment, and shall not be occupied for other purposes.~~

~~1207.5 Electrochemical ESS protection.~~
~~The protection of electrochemical ESS shall be in accordance with Sections 1207.5.1 through 1207.5.8 where required by Sections 1207.7 through 1207.10. [material based on NFPA 855 (2023)]~~

~~TABLE 1207.5 MAXIMUM ALLOWABLE QUANTITIES OF ELECTROCHEMICAL ESS~~

TECHNOLOGY	MAXIMUM ALLOWABLE QUANTITIES [a]
STORAGE BATTERIES	
Flow batteries[b]	600 kWh
Lead-acid, all types	Unlimited
Lithium-ion	600 kWh
Nickel-cadmium (Ni-Cd), nickel-metal hydride (NI-MH) and nickel zinc (Ni-Zn)	Unlimited
Sodium nickel chloride	600 kWh
Zinc-manganese dioxide (Zn-MnO_2)	Unlimited
Other battery technologies	200 kWh
CAPACITORS	
All types	20 kWh
OTHER ELECTROCHEMICAL ESS	
All types	20 kWh

~~For SI: 1 kilowatt hour = 3.6 megajoules.~~

a. ~~For electrochemical ESS units rated in amp-hours, kWh shall equal rated voltage times the amp-hour rating divided by 1,000.~~

b. ~~Shall include vanadium, zinc bromine, polysulfide-bromide and other flowing electrolyte-type technologies.~~

~~1207.5.1 Size and separation.~~
~~Electrochemical ESS shall be segregated into groups not exceeding 50 kWh (180 megajoules). Each group shall be separated a minimum of 3 feet (914 mm) from other groups and from walls in the storage room or area. The storage arrangements shall comply with Chapter 10.~~

~~Exceptions:~~ ~~[material based on NFPA 855 (2023)]~~

1. ~~Lead-acid and nickel-cadmium battery systems in facilities under the exclusive control of communications utilities and operating at less than 50 VAC and 60 VDC in accordance with NFPA 76.~~
2. ~~Lead-acid and nickel-cadmium systems that are used for DC power for control of substations and control or safe shutdown of generating stations under the exclusive control of the electric utility, and located outdoors or in building spaces used exclusively for such installations.~~
3. ~~Lead-acid battery systems in uninterruptable power supplies *listed* and *labeled* in accordance with UL 1778, utilized for standby power applications, and limited to not more than 10 percent of the floor area on the floor on which the ESS is located.~~
4. ~~The *fire code official* is authorized to approve larger capacities or smaller separation distances based on large-scale fire testing complying with Section 1207.1.5.~~

~~1207.5.2 Maximum allowable quantities.~~
~~*Fire areas* within rooms, areas and walk-in units containing electrochemical ESS shall not exceed the maximum allowable quantities in Table 1207.5.~~

~~Exceptions:~~ ~~[material based on NFPA 855 (2023)]~~

1. ~~Where *approved* by the *fire code official*, rooms, areas and walk-in units containing electrochemical ESS that exceed the amounts in Table 1207.5 shall be permitted based on a hazardous mitigation analysis in accordance with Section 1207.1.6 and large-scale fire testing complying with Section 1207.1.7.~~
2. ~~Lead-acid and nickel-cadmium battery systems installed in facilities under the exclusive control of communications utilities, and operating at less than 50 VAC and 60 VDC in accordance with NFPA 76.~~
3. ~~Dedicated-use buildings in compliance with Section 1207.7.1.~~

~~1207.5.2.1 Mixed electrochemical energy systems.~~ ~~Where rooms, areas and walk-in units contain different types of electrochemical energy technologies, the total aggregate quantities of the systems shall be determined based on the sum of percentages of each technology type quantity divided by the maximum allowable quantity of each technology type. The sum of the percentages shall not exceed 100 percent of the maximum allowable quantity.~~

~~1207.5.3 Elevation.~~
~~Electrochemical ESS shall not be located in the following areas:~~

1. ~~Where the floor is located more than 75 feet (22 860 mm) above the lowest level of fire department vehicle access.~~
2. ~~Where the floor is located below the lowest *level of exit discharge*.~~

~~Exceptions:~~ ~~[material based on NFPA 855 (2023)]~~

1. ~~Lead-acid and nickel-cadmium battery systems less than 50 VAC and 60 VDC installed in facilities under the exclusive control of communications utilities in accordance with NFPA 76.~~
2. ~~Lead-acid and nickel-cadmium systems that are used for DC power for control of substations and control or safe shutdown of generating stations under the exclusive control of the electric utility, and located outdoors or in building spaces used exclusively for such installations.~~
3. ~~Lead-acid battery systems in uninterruptable power supplies *listed* and *labeled* in accordance with UL 1778, utilized for standby power applications, which is limited to not more than 10 percent of the floor area on the floor on which the ESS is located.~~
4. ~~Where *approved*, installations shall be permitted in underground vaults complying with NFPA 70, Article 450, Part III.~~
5. ~~Where *approved* by the *fire code official,* installations shall be permitted on higher and lower floors.~~

~~**1207.5.4 Fire detection.**~~

~~An *approved automatic smoke detection system* or radiant energy-sensing fire detection system complying with Section 907.2 shall be installed in rooms, indoor areas and walk-in units containing electrochemical ESS. An *approved* radiant energy-sensing fire detection system shall be installed to protect open parking garage and rooftop installations. Alarm signals from detection systems shall be transmitted to a central station, proprietary or remote station service in accordance with NFPA 72, or where *approved* to a constantly attended location.~~

> ~~**Exception:** Normally unoccupied, remote stand-alone telecommunications structures with a gross floor area of less than 1,500 square feet (139 m^2) utilizing lead-acid or nickel-cadmium batteries shall not be required to have a fire detection system installed. [material based on NFPA 855 (2023)]~~

~~**1207.5.4.1 System status.**~~

~~Lead-acid and nickel-cadmium battery systems that are used for DC power for control of substations and control or safe shutdown of generating stations under the exclusive control of the electric utility, and located outdoors or in building spaces used exclusively for such installations, shall be allowed to use the process control system to monitor the smoke or radiant energy-sensing fire detectors required in Section 1207.5.4. [material based on NFPA 855 (2023)]~~

~~**1207.5.5 Fire suppression systems.**~~

~~Rooms and areas within buildings and walk-in units containing electrochemical ESS shall be protected by an automatic fire suppression system designed and installed in accordance with one of the following:~~

1. ~~*Automatic sprinkler systems* designed and installed in accordance with Section 903.3.1.1 for ESS units (groups) with a maximum stored energy capacity of 50 kWh, as described in Section 1207.5.1, shall be designed with a minimum density of 0.3 gpm/ft^2 (1.14 L/min) based over the area of the room or 2,500 square-foot (232 m^2) design area, whichever is smaller, unless a lower density is approved based on large-scale fire testing in accordance with Section 1207.1.7.~~
2. ~~*Automatic sprinkler systems* designed and installed in accordance with Section 903.3.1.1 for ESS units (groups) exceeding 50 kWh shall use a density based on large-scale fire testing complying with Section 1207.1.7.~~
3. ~~The following alternative *automatic fire-extinguishing systems* designed and installed in accordance with Section 904, provided that the installation is *approved* by the *fire code official* based on large-scale fire testing complying with Section 1207.1.7:~~
   - ~~3.1. NFPA 12, *Standard on Carbon Dioxide Extinguishing Systems.*~~
   - ~~3.2. NFPA 15, *Standard for Water Spray Fixed Systems for Fire Protection.*~~
   - ~~3.3. NFPA 750, *Standard on Water Mist Fire Protection Systems.*~~
   - ~~3.4. NFPA 2001, *Standard on Clean Agent Fire-Extinguishing Systems.*~~
   - ~~3.5. NFPA 2010, *Standard for Fixed Aerosol Fire-Extinguishing Systems.*~~

~~**Exceptions:**~~

1. ~~Fire suppression systems for lead-acid and nickel-cadmium battery systems at facilities under the exclusive control of communications utilities that operate at less than 50 VAC and 60 VDC shall be provided where required by NFPA 76.~~
2. ~~Lead-acid and nickel-cadmium systems that are used for DC power for control of substations and control or safe shutdown of generating stations under the exclusive control of the electric utility, and located outdoors or in building spaces used exclusively for such installations, shall not be required to have a fire suppression system installed.~~
3. ~~Lead-acid battery systems in uninterruptable power supplies *listed* and *labeled* in accordance with UL 1778, utilized for standby power applications, which is limited to not more than 10 percent of the floor area on the floor on which the ESS is located, shall not be required to have a fire suppression system. [material based on NFPA 855 (2023)]~~

~~**1207.5.5.1 Water-reactive systems.**~~

~~Electrochemical ESS that utilize water-reactive materials shall be protected by an *approved* alternative *automatic fire-extinguishing system* in accordance with Section 904, where the installation is *approved* by the *fire code official* based on large-scale fire testing complying with Section 1207.1.7.~~

~~**1207.5.6 Maximum enclosure size.**~~

~~Outdoor walk-in units housing ESS shall not exceed 53 feet by 8 feet by 9.5 feet high (16 154 mm × 2438 mm × 2896 mm), not including bolt-on HVAC and related equipment, as *approved*. Outdoor walk-in units exceeding these limitations shall be considered indoor installations and comply with the requirements in Section 1207.7. [material based on NFPA 855 (2023)]~~

~~**1207.5.7 Vegetation control.**~~

~~Areas within 10 feet (3048 mm) on each side of outdoor ESS shall be cleared of combustible vegetation and other combustible growth. Single specimens of trees, shrubbery or cultivated ground cover such as green grass, ivy, succulents or similar plants used as ground cover shall be permitted to be exempt provided that they do not form a means of readily transmitting fire. [material based on NFPA 855 (2023)]~~

~~**1207.5.8 Means of egress separation.**~~

~~ESS located outdoors and in open parking garages shall be separated from any *means of egress* as required by the *fire code official* to ensure safe egress under fire conditions, but in no case less than 10 feet (3048 mm).~~

~~**Exception:** The *fire code official* is authorized to approve a reduced separation distance if large-scale fire testing complying with Section 1207.1.7 is provided that shows that a fire involving the ESS will not adversely impact occupant egress.~~

~~**1207.6 Electrochemical ESS technology-specific protection.**~~

~~Electrochemical ESS installations shall comply with the requirements of this section in accordance with the applicable requirements of Table 1207.6. [material based on NFPA 855 (2023)]~~

~~**TABLE 1207.6 ELECTROCHEMICAL ESS TECHNOLOGY-SPECIFIC REQUIREMENTS**~~

COMPLIANCE REQUIRED[b]		BATTERY TECHNOLOGY						OTHER ESS AND BATTERY TECHNOLOGIES[b]	CAPACITOR ESS[b]
Feature	Section	Lead-acid	Nickel cadmium (Ni-Cd) , nickel-metal hydride (Ni-MH) and nickel zinc (Ni-Zn)	Zinc-manganese dioxide (Zn-MnO_2)	Lithium-ion	Flow	Sodium nickel chloride		
Exhaust ventilation	1207.6.1	Yes	Yes	Yes	No	Yes	No	Yes	Yes
Explosion control	1207.6.3	Yes[a]	Yes[a]	Yes	Yes	No	Yes	Yes	Yes
Safety caps	1207.6.4	Yes	Yes	No	No	No	No	Yes	Yes
Spill control and neutralization	1207.6.2	Yes[c]	Yes[c]	Yes[f]	No	Yes	No	Yes	Yes
Thermal runaway	1207.6.5	Yes[d]	Yes	Yes[e]	Yes[e]	No	Yes	Yes[e]	Yes

a. ~~Not required for lead-acid and nickel-cadmium batteries at facilities under the exclusive control of communications utilities that comply with NFPA 76 and operate at less than 50 VAC and 60 VDC.~~

b. ~~Protection shall be provided unless documentation acceptable to the fire code official is provided in accordance with Section 104.2.2 that provides justification why the protection is not necessary based on the technology used.~~

c. ~~Applicable to vented-type (i.e., flooded) nickel-cadmium and lead-acid batteries.~~

d. ~~Not required for vented-type (i.e., flooded) batteries.~~

e. ~~The thermal runaway protection is permitted to be part of a battery management system that has been evaluated with the battery as part of the evaluation to UL 1973.~~

f. ~~Not required for batteries with jelled electrolyte.~~

~~**1207.6.1 Exhaust ventilation.**~~
~~Where required by Table 1207.6 or elsewhere in this code, exhaust ventilation of rooms, areas and walk-in units containing electrochemical ESS shall be provided in accordance with the *International Mechanical Code* and Section 1207.6.1.1 or 1207.6.1.2.~~

~~**1207.6.1.1 Ventilation based on LFL.** The exhaust ventilation system shall be designed to limit the maximum concentration of *flammable gas* to 25 percent of the lower flammable limit (LFL) of the total volume of the room, area or walk-in unit during the worst-case event of simultaneous charging of batteries at the maximum charge rate, in accordance with nationally recognized standards.~~

~~**1207.6.1.2 Ventilation based on exhaust rate.**~~
~~Mechanical exhaust ventilation shall be provided at a rate of not less than 1 ft^3/min/ft^2 (5.1 L/sec/m^2) of floor area of the room, area or walk-in unit. The ventilation shall be either continuous or shall be activated by a *gas detection system* in accordance with Section 1207.6.1.2.4.~~

~~**1207.6.1.2.1 Standby power.**~~
~~Mechanical exhaust ventilation shall be provided with a minimum of 2 hours of standby power in accordance with Section 1203.2.5.~~

~~**1207.6.1.2.2 Installation instructions.**~~
~~Required mechanical exhaust ventilation systems shall be installed in accordance with the manufacturer's installation instructions and the *International Mechanical Code*.~~

~~**1207.6.1.2.3 Supervision.**~~
~~Required mechanical exhaust ventilation systems shall be supervised by an *approved* central station, proprietary or remote station service in accordance with NFPA 72, or shall initiate an audible and visible signal at an *approved* constantly attended on-site location.~~

~~**1207.6.1.2.4 Gas detection system.**~~
~~Where required by Section 1207.6.1.2, rooms, areas and walk-in units containing ESS shall be protected by an *approved* continuous *gas detection system* that complies with Section 916 and with the following:~~

1. ~~The *gas detection system* shall be designed to activate the mechanical ventilation system when the level of *flammable gas* in the room, area or walk-in unit exceeds 25 percent of the LFL.~~
2. ~~The mechanical ventilation system shall remain on until the *flammable gas* detected is less than 25 percent of the LFL.~~

3. ~~The *gas detection system* shall be provided with a minimum of 2 hours of standby power in accordance with Section 1203.2.5.~~
4. ~~Failure of the *gas detection system* shall annunciate a trouble signal at an *approved* central station, proprietary or remote station service in accordance with NFPA 72, or shall initiate an audible and visible trouble signal at an *approved* constantly attended on-site location. [material based on NFPA 855 (2023)]~~

~~1207.6.2 Spill control and neutralization~~.

~~Where required by Table 1207.6 or elsewhere in this code, areas containing free-flowing liquid electrolyte or hazardous materials shall be provided with spill control and neutralization in accordance with this section. [material based on NFPA 855 (2023)]~~

~~1207.6.2.1 Spill control~~.

~~Spill control shall be provided to prevent the flow of liquid electrolyte or hazardous materials to adjoining rooms or areas. The method shall be capable of containing a spill from the single largest battery or vessel. [material based on NFPA 855 (2023)]~~

~~1207.6.2.2 Neutralization~~.

~~An *approved* method that is capable of neutralizing spilled liquid electrolyte from the largest battery or vessel to a pH between 5.0 and 9.0 shall be provided. [material based on NFPA 855 (2023)]~~

~~1207.6.2.3 Communications utilities~~.

~~The requirements of Section 1207.6.2 shall apply only when the aggregate capacity of multiple vessels exceeds 1,000 gallons (3785 L) for lead-acid and nickel-cadmium battery systems operating at less than 50 VAC and 60 VDC that are located at facilities under the exclusive control of communications utilities, and those facilities comply with NFPA 76 in addition to applicable requirements of this code.~~

~~1207.6.4 Safety caps~~.

~~Where required by Table 1207.6 or elsewhere in this code, vented batteries and other ESS shall be provided with flame-arresting safety caps.~~

~~1207.6.5 Thermal runaway~~.

~~Where required by Table 1207.6 or elsewhere in this code, batteries and other ESS shall be provided with a *listed* device or other *approved* method to prevent, detect and minimize the impact of thermal runaway.~~

~~1207.7 Indoor installations~~.

~~Indoor ESS installations shall be in accordance with Sections 1207.7.1 through 1207.7.4. [material based on NFPA 855 (2023)]~~

~~TABLE 1207.7 INDOOR ESS INSTALLATIONS~~

COMPLIANCE REQUIRED		DEDICATED-USE BUILDINGS[a]	NONDEDICATED-USE BUILDINGS[b]
Feature	Section		
Dwelling units and sleeping units	1207.7.3	NA	Yes
Elevation	1207.5.3	Yes	Yes
Fire suppression systems	1207.5.5	Yes[c]	Yes

Fire-resistance-rated separations	1207.7.4	Yes	Yes
General installation requirements	1207.4	Yes	Yes
Maximum allowable quantities	1207.5.2	No	Yes
Size and separation	1207.5.1	Yes	Yes
Smoke and automatic fire detection[e]	1207.5.4	Yes[d]	Yes
Technology specific protection	1207.6	Yes	Yes

~~NA = Not Allowed.~~

a. ~~See Section 1207.7.1.~~

b. ~~See Section 1207.7.2.~~

c. ~~Where *approved* by the fire code official, fire suppression systems are permitted to be omitted in dedicated-use buildings located more than 100 feet (30.5 m) from buildings, lot lines, public ways, stored combustible materials, hazardous materials, high-piled stock and other exposure hazards.~~

d. ~~Where *approved* by the fire code official, alarm signals are not required to be transmitted to a central station, proprietary or remote station service in accordance with NFPA 72, or a constantly attended location where local fire alarm annunciation is provided and trained personnel are always present.~~

e. ~~Lead-acid and nickel-cadmium battery systems installed in Group U buildings and structures less than 1,500 square feet (139 m^2) under the exclusive control of communications utilities, and operating at less than 50 VAC and 60 VDC in accordance with NFPA 76, are not required to have an *approved* automatic smoke or fire detection system.~~

~~1207.7.1 Dedicated-use buildings~~.

~~For the purpose of Table 1207.7, dedicated-use ESS buildings shall be classified as Group F-1 occupancies and comply with all the following:~~

1. ~~The building shall only be used for ESS, electrical energy generation and other electrical grid-related operations.~~
2. ~~Occupants in the rooms and areas containing ESS are limited to personnel that operate, maintain, service, test and repair the ESS and other energy systems.~~
3. ~~No other occupancy types shall be permitted in the building.~~
4. ~~Administrative and support personnel shall be permitted in areas within the buildings that do not contain ESS, provided that:~~
   4.1. ~~The areas do not occupy more than 10 percent of the *building area* of the story in which they are located.~~

   4.2. ~~A *means of egress* is provided from the incidental use areas to the *public way* that does not require occupants to traverse through areas containing ESS or other energy system equipment. [material based on NFPA 855 (2023)]~~

~~1207.7.2 Nondedicated-use buildings~~.

~~For the purpose of Table 1207.7, nondedicated-use buildings include all buildings that contain ESS and do not comply with Section 1207.7.1 dedicated-use building requirements. [material based on NFPA 855 (2023)]~~

~~1207.7.3 Dwelling units and sleeping units~~.

~~ESS shall not be installed in *sleeping units* or in *habitable spaces* of *dwelling units*. [material based on NFPA 855 (2023)]~~

~~**1207.7.4 Fire-resistance-rated separations.**~~

~~Rooms and areas containing ESS shall include *fire-resistance-rated* separations as follows:~~

1. ~~In dedicated-use buildings, rooms and areas containing ESS shall be separated from areas in which administrative and support personnel are located.~~
2. ~~In nondedicated-use buildings, rooms and areas containing ESS shall be separated from other areas in the building.~~

~~Separation shall be provided by 2-hour *fire barriers* constructed in accordance with Section 707 of the *International Building Code* and 2-hour *horizontal assemblies* constructed in accordance with Section 711 of the *International Building Code*, as appropriate. [material based on NFPA 855 (2023)]~~

~~**1207.8 Outdoor installations.**~~

~~Outdoor installations shall be in accordance with Sections 1207.8.1 through 1207.8.3. *Exterior wall* installations for individual ESS units not exceeding 20 kWh shall be in accordance with Section 1207.8.4. [material based on NFPA 855 (2023)]~~

~~**TABLE 1207.8 OUTDOOR ESS INSTALLATIONS[a]**~~

COMPLIANCE REQUIRED		REMOTE INSTALLATIONS[a]	INSTALLATIONS NEAR EXPOSURES[b]
Feature	**Section**		
All ESS installations	1207.4	Yes	Yes
Clearance to exposures	1207.8.3	Yes	Yes
Fire suppression systems	1207.5.5	Yes[c]	Yes
Maximum allowable quantities	1207.5.2	No	Yes
Maximum enclosure size	1207.5.6	Yes	Yes
Means of egress separation	1207.5.8	Yes	Yes
Size and separation	1207.5.1	No	Yes[d]
Smoke and automatic fire detection	1207.5.4	Yes	Yes
Technology-specific protection	1207.6	Yes	Yes
Vegetation control	1207.5.7	Yes	Yes

a. ~~See Section 1207.8.1.~~

b. ~~See Section 1207.8.2.~~

c. ~~Where approved by the fire code official, fire suppression systems are permitted to be omitted.~~

d. ~~In outdoor walk-in units, spacing is not required between ESS units and the walls of the enclosure.~~

~~**1207.8.1 Remote outdoor installations.**~~

~~For the purpose of Table 1207.8, remote outdoor installations include ESS located more than 100 feet (30 480 mm) from buildings, lot lines, public ways, stored combustible materials, hazardous materials, high-piled stock and other exposure hazards. [material based on NFPA 855 (2023)]~~

~~1207.8.2 Installations near exposures.~~

~~For the purpose of Table 1207.8, installations near exposures include all outdoor ESS installations that do not comply with Section 1207.8.1 remote outdoor location requirements. [material based on NFPA 855 (2023)]~~

~~1207.8.3 Clearance to exposures.~~

~~ESS located outdoors shall be separated by a minimum of 10 feet (3048 mm) from the following exposures:~~

1. ~~Lot lines.~~
2. ~~Public ways.~~
3. ~~Buildings.~~
4. ~~Stored combustible materials.~~
5. ~~Hazardous materials.~~
6. ~~High-piled stock.~~
7. ~~Other exposure hazards.~~

~~Exceptions:~~ ~~[material based on NFPA 855 (2023)]~~

1. ~~Clearances are permitted to be reduced to 3 feet (914 mm) where a 1-hour free-standing *fire barrier* suitable for exterior use and extending 5 feet (1524 mm) above and 5 feet (1524 mm) beyond the physical boundary of the ESS installation is provided to protect the exposure.~~
2. ~~Clearances to buildings are permitted to be reduced to 3 feet (914 mm) where noncombustible *exterior walls* with no openings or combustible overhangs are provided on the wall adjacent to the ESS and the *fire-resistance rating* of the *exterior wall* is a minimum of 2 hours.~~
3. ~~Clearances to buildings are permitted to be reduced to 3 feet (914 mm) where a weatherproof enclosure constructed of noncombustible materials is provided over the ESS, and it has been demonstrated that a fire within the enclosure will not ignite combustible materials outside the enclosure based on large-scale fire testing complying with Section 1207.1.7.~~

~~1207.8.4 Exterior wall installations.~~

~~ESS shall be permitted to be installed outdoors on *exterior walls* of buildings when all of the following conditions are met:~~

1. ~~The maximum energy capacity of individual ESS units shall not exceed 20 kWh.~~
2. ~~The ESS shall comply with applicable requirements in Section 1207.~~
3. ~~The ESS shall be installed in accordance with the manufacturer's instructions and their listing.~~
4. ~~Individual ESS units shall be separated from each other by at least 3 feet (914 mm).~~
5. ~~The ESS shall be separated from doors, windows, operable openings into buildings or HVAC inlets by at least 5 feet (1524 mm).~~

~~Exception:~~ ~~Where *approved*, smaller separation distances in Items 4 and 5 shall be permitted based on large-scale fire testing complying with Section 1207.1.7. [material based on NFPA 855 (2023)]~~

~~1207.9 Special installations.~~

~~Rooftop and open parking garage ESS installations shall comply with Sections 1207.9.1 through 1207.9.6. [material based on NFPA 855 (2023)]~~

~~TABLE 1207.9 SPECIAL ESS INSTALLATIONS~~

COMPLIANCE REQUIRED		ROOFTOPS[a]	OPEN PARKING GARAGES[b]
Feature	Section		
All ESS installations	1207.4	Yes	Yes
Clearance to exposures	1207.9.3	Yes	Yes
Fire suppression systems	1207.9.4	Yes	Yes
Maximum allowable quantities	1207.5.2	Yes	Yes
Maximum enclosure size	1207.5.6	Yes	Yes
Means of egress separation	1207.5.8	Yes	Yes
Open parking garage installations	1207.9.6	No	Yes
Rooftop installations	1207.9.5	Yes	No
Size and separation	1207.5.1	Yes	Yes
Smoke and automatic fire detection	1207.5.4	Yes	Yes
Technology-specific protection	1207.6	Yes	Yes

a. ~~See Section 1207.9.1.~~

b. ~~See Section 1207.9.2.~~

~~1207.9.1 Rooftop installations~~.

~~For the purpose of Table 1207.9, rooftop ESS installations are those located on the roofs of buildings. [material based on NFPA 855 (2023)]~~

~~1207.9.2 Open parking garage installations~~.

~~For the purpose of Table 1207.9, open parking garage ESS installations are those located in a structure or portion of a structure that complies with Section 406.5 of the *International Building Code*. [material based on NFPA 855 (2023)]~~

~~1207.9.3 Clearance to exposures~~.

~~ESS located on rooftops and in open parking garages shall be separated by a minimum of 10 feet (3048 mm) from the following exposures:~~

1. ~~Buildings, except the building on which rooftop ESS is mounted.~~
2. ~~Any portion of the building on which a rooftop system is mounted that is elevated above the rooftop on which the system is installed.~~
3. ~~Lot lines.~~
4. ~~Public ways.~~
5. ~~Stored combustible materials.~~
6. ~~Locations where motor vehicles can be parked.~~
7. ~~Hazardous materials.~~
8. ~~Other exposure hazards.~~

~~**Exceptions:**~~

1. ~~Clearances are permitted to be reduced to 3 feet (914 mm) where a 1-hour free-standing *fire barrier* suitable for exterior use and extending 5 feet (1524 mm) above and 5 feet (1524 mm) beyond the physical boundary of the ESS installation is provided to protect the exposure.~~
2. ~~Clearances are permitted to be reduced to 3 feet (914 mm) where a weatherproof enclosure constructed of noncombustible materials is provided over the ESS, and it has been demonstrated that a fire within the enclosure will not ignite combustible materials outside the enclosure based on large-scale fire testing complying with Section 1207.1.7. [material based on NFPA 855 (2023)]~~

~~**1207.9.4 Fire suppression systems.**~~

~~ESS located in walk-in units on rooftops or in walk-in units in open parking garages shall be provided with automatic fire suppression systems within the ESS enclosure in accordance with Section 1207.5.5. Areas containing ESS other than walk-in units in open parking structures on levels not open above to the sky shall be provided with an automatic fire suppression system complying with Section 1207.5.5.~~

~~**Exception:** A fire suppression system is not required in open parking garages if large-scale fire testing complying with Section 1207.1.7 is provided that shows that a fire will not impact the exposures in Section 1207.9.3. [material based on NFPA 855 (2023)]~~

~~**1207.9.5 Rooftop installations.**~~

~~ESS and associated equipment that are located on rooftops and not enclosed by building construction shall comply with the following:~~

1. ~~Stairway access to the roof for emergency response and fire department personnel shall be provided either through a bulkhead from the interior of the building or a stairway on the exterior of the building.~~
2. ~~Service walkways at least 5 feet (1524 mm) in width shall be provided for service and emergency personnel from the point of access to the roof to the system.~~
3. ~~ESS and associated equipment shall be located from the edge of the roof a distance equal to at least the height of the system, equipment or component but not less than 5 feet (1524 mm).~~
4. ~~The roofing materials under and within 5 feet (1524 mm) horizontally from an ESS or associated equipment shall be noncombustible or shall have a Class A rating when tested in accordance with ASTM E108 or UL 790.~~
5. ~~A Class I standpipe outlet shall be installed at an *approved* location on the roof level of the building or in the stairway bulkhead at the top level.~~
6. ~~The ESS shall be the minimum of 10 feet (3048 mm) from the fire service access point on the rooftop. [material based on NFPA 855 (2023)]~~

~~**1207.9.6 Open parking garages.**~~

~~ESS and associated equipment that are located in open parking garages shall comply with all of the following:~~

1. ~~ESS shall not be located within 50 feet (15 240 mm) of air inlets for building HVAC systems.~~

   ~~**Exception:** This distance shall be permitted to be reduced to 25 feet (7620 mm) if the automatic *fire alarm system* monitoring the radiant-energy sensing detectors de-energizes the ventilation system connected to the air intakes upon detection of fire.~~

2. ~~ESS shall not be located within 25 feet (7620 mm) of *exits* leading from the attached building where located on a covered level of the parking structure not directly open to the sky above.~~
3. ~~An *approved* fence with a locked gate or other *approved* barrier shall be provided to keep the general public at least 5 feet (1524 mm) from the outer enclosure of the ESS. [material based on NFPA 855 (2023)]~~

~~**1207.10 Mobile ESS equipment and operations.**~~

~~Mobile ESS equipment and operations shall comply with Sections 1207.10.1 through 1207.10.7.7. [material based on NFPA 855 (2023)]~~

~~TABLE 1207.10 MOBILE ENERGY STORAGE SYSTEMS (ESS)~~

COMPLIANCE REQUIRED		DEPLOYMENT[a]
Feature	Section	
All ESS installations	1207.4	Yes[b]
Fire suppression systems	1207.5.5	Yes[c]
Maximum allowable quantities	1207.5.2	Yes
Maximum enclosure size	1207.5.6	Yes
Means of egress separation	1207.5.8	Yes
Size and separation	1207.5.1	Yes[d]
Smoke and automatic fire detection	1207.5.4	Yes[e]
Technology-specific protection	1207.6	Yes
Vegetation control	1207.5.7	Yes

a. ~~See Section 1207.10.2.~~

b. ~~Mobile operations on wheeled vehicles and trailers shall not be required to comply with Section 1207.4.4 seismic and structural load requirements.~~

c. ~~Fire suppression system connections to the water supply shall be permitted to use *approved* temporary connections.~~

d. ~~In walk-in units, spacing is not required between ESS units and the walls of the enclosure.~~

e. ~~Alarm signals are not required to be transmitted to an *approved* location for mobile ESS deployed 30 days or less.~~

~~1207.10.1 Charging and storage~~.

~~For the purpose of Section 1207.10, charging and storage covers the operation where mobile ESS are charged and stored so they are ready for deployment to another site, and where they are charged and stored after a deployment.~~

> **~~Exception:~~** ~~Mobile ESS used to temporarily provide power to lead-acid and nickel-cadmium systems that are used for DC power for control of substations and control or safe shutdown of generating stations under the exclusive control of the electric utility, and located outdoors or in building spaces used exclusively for such installations. [material based on NFPA 855 (2023)]~~

~~1207.10.2 Deployment~~.

~~For the purpose of Section 1207.10, deployment covers operations where mobile ESS are located at a site other than the charging and storage site and are being used to provide power.~~

> **~~Exception:~~** ~~Mobile ESS used to temporarily provide power to lead-acid and nickel-cadmium systems that are used for DC power for control of substations and control or safe shutdown of generating stations under the exclusive control of the electric utility, and located outdoors or in building spaces used exclusively for such installations. [material based on NFPA 855 (2023)]~~

~~1207.10.3 Permits~~.

~~Construction and operational permits shall be provided for charging and storage of mobile ESS and operational permits shall be provided for deployment of mobile ESS as required by Section 1207.1.4.~~

~~1207.10.4 Construction documents~~.
~~*Construction documents* complying with Section 1207.1.5 shall be provided with the construction permit application for mobile ESS charging and storage locations.~~

~~1207.10.4.1 Deployment documents.~~
~~The following information shall be provided with the operation permit applications for mobile ESS deployments:~~

1. ~~Relevant information for the mobile ESS equipment and protection measures in the *construction documents* required by Section 1207.1.5.~~
2. ~~Location and layout diagram of the area in which the mobile ESS is to be deployed, including a scale diagram of all nearby exposures.~~
3. ~~Location and content of signage, including no smoking signs.~~
4. ~~Description of fencing to be provided around the ESS, including locking methods.~~
5. ~~Details on fire suppression, smoke and automatic fire detection, system monitoring, thermal management, exhaust ventilation and explosion control, if provided.~~
6. ~~For deployment, the intended duration of operation, including anticipated connection and disconnection times and dates.~~
7. ~~Location and description of local staging stops during transit to the deployment site. See Section 1207.10.7.5.~~
8. ~~Description of the temporary wiring, including connection methods, conductor type and size, and circuit overcurrent protection to be provided.~~
9. ~~Description of how fire suppression system connections to water supplies or extinguishing agents are to be provided.~~
10. ~~Contact information for personnel who are responsible for maintaining and servicing the equipment, and responding to emergencies as required by Section 1207.1.8.1. [material based on NFPA 855 (2023)]~~

~~1207.10.5 Approved locations~~.
~~Locations where mobile ESS are charged, stored and deployed shall be restricted to the locations established on the construction and operational permits. [material based on NFPA 855 (2023)]~~

~~1207.10.6 Charging and storage~~.
~~Installations where mobile ESS are charged and stored shall be treated as permanent ESS indoor or outdoor installations, and shall comply with the following sections, as applicable:~~

1. ~~Indoor charging and storage shall comply with Section 1207.7.~~
2. ~~Outdoor charging and storage shall comply with Section 1207.8.~~
3. ~~Charging and storage on rooftops and in open parking garages shall comply with Section 1207.9.~~

~~Exceptions:~~

1. ~~Electrical connections shall be permitted to be made using temporary wiring complying with the manufacturer's instructions, the UL 9540 listing and NFPA 70.~~
2. ~~Fire suppression system connections to the water supply shall be permitted to use *approved* temporary connections. [material based on NFPA 855 (2023)]~~

~~**1207.10.7 Deployed mobile ESS requirements.**~~

~~Deployed mobile ESS equipment and operations shall comply with this section and Table 1207.10. [material based on NFPA 855 (2023)]~~

~~**1207.10.7.1 Duration.**~~

~~The duration of mobile ESS deployment shall not exceed 30 days.~~

~~**Exceptions:**~~

1. ~~Mobile ESS deployments that provide power for durations longer than 30 days shall comply with Section 1207.10.6.~~
2. ~~Mobile ESS deployments shall not exceed 180 days unless additional operational permits are obtained. [material based on NFPA 855 (2023)]~~

~~**1207.10.7.2 Restricted locations.**~~

~~Deployed mobile ESS operations shall not be located indoors, in covered parking garages, on rooftops, below grade or under building overhangs. [material based on NFPA 855 (2023)]~~

~~**1207.10.7.3 Clearance to exposures.**~~

~~Deployed mobile ESS shall be separated by a minimum of 10 feet (3048 mm) from the following exposures:~~

1. ~~Public ways.~~
2. ~~Buildings.~~
3. ~~Stored combustible materials.~~
4. ~~Hazardous materials.~~
5. ~~High-piled storage.~~
6. ~~Other exposure hazards.~~

~~Deployed mobile ESS shall be separated by a minimum of 50 feet (15 240 mm) from public seating areas and from tents, canopies and membrane structures with an *occupant load* of 30 or more. [material based on NFPA 855 (2023)]~~

~~**1207.10.7.4 Electrical connections.**~~

~~Electrical connections shall be made in accordance with the manufacturer's instructions and the UL 9540 listing. Temporary wiring for electrical power connections shall comply with NFPA 70. Fixed electrical wiring shall not be provided. [material based on NFPA 855 (2023)]~~

~~**1207.10.7.5 Local staging.**~~

~~Mobile ESS in transit from the charging and storage location to the deployment location and back shall not be parked within 100 feet (30 480 mm) of an occupied building for more than 1 hour during transit, unless specifically *approved* by the *fire code official* when the permit is issued. [material based on NFPA 855 (2023)]~~

~~**1207.10.7.6 Fencing.**~~

~~An *approved* fence with a locked gate or other *approved* barrier shall be provided to keep the general public at least 5 feet (1524 mm) from the outer enclosure of a deployed mobile ESS. [material based on NFPA 855 (2023)]~~

~~**1207.10.7.7 Smoking.**~~

~~Smoking shall be prohibited within 10 feet (3048 mm) of mobile ESS. Signs shall be posted in accordance with Section 310.~~

~~1207.11 ESS in Group R-3 and R-4 occupancies.~~

~~ESS in Group R-3 and R-4 occupancies shall be in accordance with Sections 1207.11.1 through 1207.11.9.~~

~~Exceptions:~~

1. ~~ESS *listed* and *labeled* in accordance with UL 9540 and marked "For use in residential dwelling units," where installed in accordance with the manufacturer's instructions and NFPA 70.~~
2. ~~ESS rated less than 1 kWh (3.6 megajoules).~~

~~1207.11.1 Equipment listings.~~

~~ESS shall be *listed* and *labeled* in accordance with UL 9540.~~

~~1207.11.2 Installation.~~

~~ESS shall be installed in accordance with the manufacturer's instructions and their listing. [material based on NFPA 855 (2023)]~~

~~1207.11.2.1 Spacing.~~

~~Individual ESS units shall be separated from each other by at least 3 feet (914 mm) except where smaller separation distances are documented to be adequate based on large-scale fire testing complying with Section 1207.1.7.~~

~~1207.11.3 Location.~~

~~ESS shall be installed only in the following locations:~~

1. ~~Detached garages and detached accessory structures.~~
2. ~~Attached garages separated from the *dwelling unit* living space and *sleeping units* in accordance with Section 406.3.2 of the *International Building Code*.~~
3. ~~Outdoors or on the exterior side of exterior walls located a minimum of 3 feet (914 mm) from doors and windows directly entering the *dwelling unit* .~~
4. ~~Enclosed utility closets, *basements* , and storage or utility spaces within *dwelling units* and *sleeping units* with finished or noncombustible walls and ceilings. Walls and ceilings of unfinished wood-framed construction shall be provided with not less than $^{5}/_{8}$-inch Type X gypsum wallboard.~~

~~ESS shall not be installed in sleeping rooms, or in closets or spaces opening directly into sleeping rooms. [material based on NFPA 855 (2023)]~~

~~1207.11.4 Energy ratings.~~

~~Individual ESS units shall have a maximum rating of 20 kWh. The aggregate rating of the ESS shall not exceed:~~

1. ~~40 kWh within utility closets, *basements* , and storage or utility spaces.~~
2. ~~80 kWh in attached or detached garages and detached accessory structures.~~
3. ~~80 kWh on *exterior walls*.~~
4. ~~80 kWh outdoors on the ground.~~

~~ESS installations exceeding the permitted individual or aggregate ratings shall be installed in accordance with Sections 1207.1 through~~

~~1207.9. [material based on NFPA 855 (2023)]~~

~~1207.11.5 Electrical installation~~.

~~ESS shall be installed in accordance with NFPA 70. Inverters shall be *listed* and *labeled* in accordance with UL 1741 or provided as part of the UL 9540 listing. Systems connected to the utility grid shall use inverters *listed* for utility interaction. [material based on NFPA 855 (2023)]~~

~~1207.11.6 Fire detection~~.

~~ESS installed in Group R-3 and R-4 occupancies shall comply with the following:~~

1. ~~Rooms and areas within *dwelling units*, *sleeping units*, *basements* and attached garages in which ESS are installed shall be protected by smoke alarms in accordance with Section 907.2.11.~~
2. ~~A *listed* heat alarm shall be installed in locations where smoke alarms cannot be installed based on their listing.~~

~~1207.11.7 Protection from impact~~.

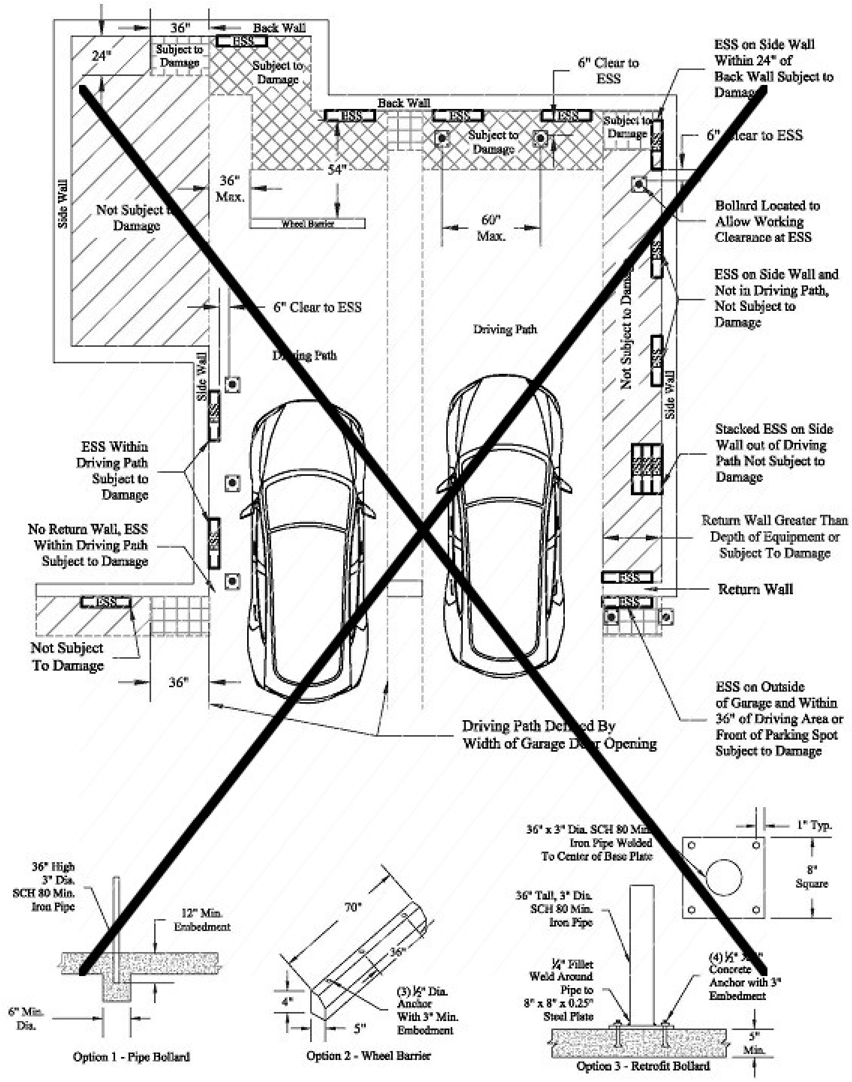
~~ESS installed in a location subject to vehicle damage in accordance with Section 1207.11.7.1 or 1207.11.7.2 shall be provided with impact protection in accordance with Section 1207.11.7.3. .~~

~~1207.11.7.1 Garages~~.

~~Where an ESS is installed in the normal driving path of vehicle travel within a garage, impact protection complying with Section 1207.11.3 shall be provided. The normal driving path is a space between the garage vehicle opening and the interior face of the back wall to a height of 48 inches (1219 mm) above the finished floor. The width of the normal driving path shall be equal to the width of the garage door opening. Impact protection shall also be provided for an ESS installed at either of the following locations (see Figure 1207.11.7.1):~~

1. ~~On the interior face of the back wall and located within 36 inches (914 mm) to the left or to the right of the normal driving path.~~
2. ~~On the interior face of a side wall and located within 24 inches (610 mm) of the back wall and 36 inches (914 mm) of the normal driving path.~~

~~Exception:~~ ~~Where the clear height of the vehicle garage opening is 7 feet 6 inches (2286 mm) or less, ESS installed not less than 36 inches (914 mm) above the finished floor are not subject to vehicle impact protection requirements.~~



~~**FIGURE 1207.11.7.1 ESS VEHICLE IMPACT PROTECTION**~~

~~**1207.11.7.2 Other locations subject to vehicle impact.**~~
~~Where an ESS is installed in a location other than as defined in Section 1207.11.7.1 and is subject to vehicle damage, impact protection shall be provided in accordance with Section 1207.11.7.3.~~

~~**1207.11.7.3 Impact protection options.**~~
~~Where ESS is required to be protected from impact in accordance with Section 1207.11.7.1 or 1207.11.7.2, such protection shall comply with one of the following:~~

1. ~~Bollards constructed in accordance with one of the following:~~
   1.1. ~~Minimum 48 inches (1219 mm) in length by 3 inches (76 mm) in diameter Schedule 80 steel pipe embedded in a concrete pier not less than 12 inches (304 mm) deep and 6 inches (152 mm) in diameter, with at least 36 inches (914 mm) of pipe exposed, filled with concrete and spaced at a maximum interval of 5 feet (1524 mm). Each bollard shall be located not less than 6 inches (152 mm) from an ESS.~~
   1.2. ~~Minimum 36 inches (914 mm) in height by 3 inches (76 mm) in diameter Schedule 80 steel pipe fully welded to a minimum 8 inches (203 mm) by ¼ inch (6.4 mm) thick steel plate and bolted to a concrete floor by means of four ½-inch (13 mm) concrete anchors with 3-inch (76 mm) minimum embedment. Spacing shall be not greater than 60 inches (1524 mm), and each bollard shall be located not less than 6 inches (152 mm) from the ESS.~~
   1.3. ~~Premanufactured steel pipe bollards shall be filled with concrete and anchored in accordance with the manufacturer's installation instructions, with spacing not greater than 60 inches (1524 mm). Each bollard shall be located not less than 6 inches (152 mm) from the ESS.~~

2. ~~Wheel barriers constructed in accordance with one of the following:~~
   2.1. ~~Four inches (102 mm) in height by 5 inches (127 mm) in width by 70 inches (1778 mm) in length wheel barrier made of concrete or polymer, anchored to the concrete floor not less than every 36 inches (914 mm) and located not less than 54 inches (1372 mm) from the ESS. Minimum 3½-inch (89 mm) diameter concrete anchors with 3-inch (76 mm) embedment per barrier shall be used. Spacing between barriers shall be not greater than 36 inches (914 mm).~~
   2.2. ~~Premanufactured wheel barriers shall be anchored in accordance with the manufacturer's installation instructions.~~
3. ~~*Approved* method designed to resist a 2,000-pound-force (8896 N) impact in the direction of travel at 24 inches (610 mm) above grade.~~

~~1207.11.8 Ventilation~~.
~~Indoor installations of ESS that include batteries that produce hydrogen or other *flammable gases* during charging shall be provided with exhaust ventilation in accordance with Section 304.5 of the *International Mechanical Code*. [material based on NFPA 855 (2023)]~~

~~1207.11.9 Electric vehicle use~~.
~~The temporary use of an *owner* or occupant's electric-powered vehicle to power a *dwelling unit* or *sleeping unit* while parked in an attached or detached garage or outdoors shall comply with the vehicle manufacturer's instructions and NFPA 70. [material based on NFPA 855 (2023)]~~

Revise as follows:

1203.2.5 Mechanical Exhaust ~~ventilation~~ Systems.
Standby power shall be provided for mechanical exhaust ~~ventilation~~ systems as required in Section ~~1207.6.1.2.1~~ 1207.9. The system shall be capable of powering the required load for a duration of not less than 2 hours.

1203.2.7 Gas detection systems.
Emergency power shall be provided for *gas detection systems* where required by Sections 1203.2.10 ~~and~~ , 1203.2.17 and 1207.10. Standby power shall be provided for *gas detection systems* where required by Sections 916.5 ~~and 1207.6.1.2.4~~.

907.2.23 Energy storage systems.
An *automatic smoke detection system* , thermal imaging detection system or radiant-energy detection system shall be installed in rooms, areas and walk-in units containing energy storage systems as required in Section ~~1207.5.4~~ 1207.6.

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Revise as follows:

[F] 907.2.23 Energy storage systems.
An *automatic smoke detection system* <u>, thermal imaging detection system,</u> or radiant-energy detection system shall be installed in rooms, areas and walk-in units containing energy storage systems as required in Section ~~1207.5.4~~ <u>1207.6</u> of the *International Fire Code*.

Reason: FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**.

The requirements for energy storage systems in the 2024 IFC are very similar and in many cases identical to the 2023 edition of NFPA 855. The requirements in the two documents are technically consistent. This proposal is intended to accomplish the following:

1. Delete the Section 1207 prescriptive requirements and replace the language with references to NFPA 855. Since the addition of the requirements to the 2018 I-Codes the testimony reflected an intent to delete language in favor of direct use of NFPA 855 once that document was established.
2. Retain cross references to protection requirements in the IFC, IBC, and IMC.
3. Correlates related references in the I-Codes to the new proposed IFC Section 1207.

Properly updating the current IFC language is complicated by the fact that the NFPA 855 process for the next edition has completed its first revision phase with only the formal ballot vote remaining, so the ideas, concepts and technical language necessary for updating the IFC language is already part of that documents process, and the submitters granted the rights to that language to NFPA. As a result, with NFPA 855 well established this cycle is the best time to make the transition to NFPA 855, much as we did with hydrogen technologies and the transition to NFPA 2.

An additional factor is that the IFC now contains a general reference to NFPA 855 in Section 1201.1.

> *"1201.1 Scope. The provisions of this chapter shall apply to the installation, operation, maintenance, repair, retrofitting, testing, commissioning and decommissioning of energy systems used for generating or storing energy, including but not limited to energy storage systems under the exclusive control of an electric utility or lawfully designated agency. It shall not apply to equipment associated with the generation, control, transformation, transmission, or distribution of energy installations that is under the exclusive control of an electric utility or lawfully designated agency. Energy storage systems regulated by Section 1207 shall comply with this chapter, as appropriate, and NFPA 855."*

As a result, the code user must read Section 1207 line by line at the same time they do so with NFPA 855 to pick up on any nuances, eliminating the technical language other than linkage to relevant ICC sections elsewhere assists the designer, installer, and code official.

It is anticipated that others may submit changes to the IFC to reflect new ESS requirements related to the current provisions. The FCAC recommends that these be handled under separate proposals, and that any potential modifications to language addressed by this proposal be limited to IFC/NFPA 855 correlation issues only. During the second round of IFC proposals the FCAC will consider:

1. Potentially referencing the 2026 edition of NFPA 855, assuming it is published in time to be included as a referenced standard in the 2027 IFC. The current schedule for that document could be completed in 2025.
2. Making sure new ESS requirements accepted by the IFC and other committees in other proposals are correlated with this proposal.

The changes to Sections 1203.2.5, 1203.2.7, and 907.2.23 are correlation changes.

In recognition of the difficulty of digging thru the additions and strikeouts as involved as they are in this proposal, following is what Section 1207 would contain if this proposal is approved.

SECTION 1207

ELECTRICAL ENERGY STORAGE SYSTEMS (ESS)

1207.1 General. The provisions in this section are applicable to stationary, portable and mobile electrical energy storage systems (ESS).

1207.1.1 Scope. ESS having capacities exceeding the values shown in Table 1.3 of NFPA 855 shall comply with this section.

1207.2 Permits. Permits shall be obtained for ESS as follows:

1. Construction permits shall be obtained for stationary ESS installations and for mobile ESS charging and storage installations. Permits shall be obtained in accordance with Section 105.6.5.
2. Operational permits shall be obtained for stationary ESS installations and for mobile ESS deployment operations. Permits shall be obtained in accordance with Section 105.5.14.

1207.2.1 Communication utilities. Operational permits shall not be required for lead-acid and nickel-cadmium battery systems at facilities under the exclusive control of communications utilities that comply with NFPA 76 and operate at less than 50 voltage alternating current (VAC) and 60 voltage direct current (VDC).

1207.2.2 Detached one- and two-family dwellings and townhouses. Operational permits shall not be required for ESS located at detached one- and two-family dwellings and townhouses, other than Group R-4.

1207.3 Installation. Stationary, mobile and portable electrical energy storage systems (ESS). shall be designed, constructed, installed, commissioned, operated, maintained, and decommissioned in accordance with NFPA 855, the required listings and the manufacturer's installation instructions, and the applicable requirements of this section.

1207.4 Fire safety and evacuation plan A fire safety and evacuation plan complying with NFPA 855 and Section 404 shall be provided for review and *approval.*

1207.5 Vehicle Impact protection. Where ESS are subject to impact by a motor vehicle, including forklifts, vehicle impact protection shall be provided in accordance with Section 312.

1207.6 Fire detection. Where fire detection is required by NFPA 855, fire detection shall be provided in accordance with Section 907.

1207.7 Fire suppression systems. Where automatic fire sprinkler system protection is required by NFPA 855, the automatic fire sprinkler system shall be installed in accordance with Chapter 9.

1207.8 Explosion control. Where explosion control is required by NFPA 855, an NFPA 69 explosion control system complying with Section 911 shall be provided for rooms, areas, ESS cabinets or ESS walk-in units containing the electromechanical ESS technologies. Where an ESS cabinet or ESS walk-in unit is installed within a room or building the design of the explosion control system shall include the cabinet, walk-in unit and the room it is installed within.

1207.9 Mechanical exhaust ventilation. Where required by NFPA 855, mechanical exhaust ventilation shall be provided in accordance with the International Mechanical Code.

1207.10 Gas detection system. Where a gas detection system is installed to comply with the requirements of NFPA 855, the gas detection system shall comply with Section 916.

1207.11 Fire-resistance-rated separations. Where fire-resistance-rated separation is required by NFPA 855, fire-resistance-rated separations shall be provided by fire barriers constructed in accordance with Section 707 of the International Building Code and horizontal assemblies constructed in accordance with Section 711 of the International Building Code.

1**207.12 Dedicated-use buildings**. Where ESS are installed within Dedicated-use ESS buildings shall be classified as Group F-1 occupancies.

1207.13 Fire apparatus access roads. Fire apparatus access roads shall be provided in accordance with Section 503.

1207.14 Fire protection water supplies. Fire protection water supplies shall be provided in accordance with Section 507.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal does not increase the cost of construction since the overall technical requirements of the IFC and NFPA 855 are similar. The proposal has the potential of reducing design and AHJ review costs by eliminating the need to compare the two documents line by line.

F170-24

IFC: 1207.1

Proponents: Joseph H. Cain, P.E., Solar Energy Industries Association (SEIA) (joecainpe@gmail.com); Paul Armstrong, SEIA (paul@7arms.com)

2024 International Fire Code

Revise as follows:

1207.1 General.
The provisions in this section are applicable to stationary and mobile electrical energy storage systems (ESS).

~~**Exception**~~ **Exceptions**:

1. These requirements shall not apply to ESS in structures designed and constructed in accordance with the *International Residential Code*.
2. ESS in Group R-3 and R-4 occupancies shall only be required to comply with Section 1207.11 except where Section 1207.11.4 requires compliance with Sections 1207.1 through 1207.9.

Reason: This new Exception 1 for IFC Section 1207.1 is modeled after the precedent of Exception 1 in IFC Section 1205.2.1, and is consistent with that intent.

The exception for rooftop-mounted PV for IRC structures first appeared in 2015 IFC Section 605.11.1.2. The intent was to have the IFC cover PV systems for Group R-3 buildings constructed under the IBC, but to exclude PV systems for IRC one- and two-family dwellings and townhouses from the IFC scope. During this same cycle, under Group B, another proposal intended to include parallel provisions in the IRC, but this proposal was not successful for the 2015 IRC. This unfortunate outcome created a gap that was solved during the next development cycle by adding rooftop-mounted PV provisions in the 2018 IRC, as Section R324.6. For the 2018 I-codes and beyond, the IFC covers Group R-3 and the IRC covers one- and two-family dwellings and townhouses.

A similar approach is rational for the 2027 I-codes for ESS -- whether or not prescriptive requirements for ESS are removed from IFC 1207 that exist in NFPA 855. The past few development cycles have revealed that it is very difficult to correlate IFC provisions for residential ESS in Section 1207.11 (developed in Group A under the IFC Committee) correlated with residential ESS provisions in IRC R328 (developed in Group B under the IRC-General Committee).

For ESS in commercial buildings, the provisions in IFC and NFPA 855 are very complex, and similar provisions presently appear in both the IFC and NFPA 855. These very complex provisions are generally applied to a relatively small number of larger commercial projects.

For residential ESS, similar -- but different -- provisions are presently found in three different sources: IFC Section 1207.11, IRC Section R328, and NFPA 855 Chapter 15. Having similar but contradictory language in the IFC and IRC has made it difficult for installers of residential ESS to find consistent implementation, interpretation, and enforcement of the provisions. It seems each individual responsible for interpretation and enforcement of the provisions picks up their favorite code book and wants to apply it to the projects they encounter. For residential ESS, these simplified provisions are applied to a very large number of smaller projects, so consistency is critically important to safe and efficient deployment.

Residential ESS provisions have matured mostly within the IRC. Most plan reviewers and field inspectors have quick and easy access to the IRC. However, many AHJs across the U.S. have not yet even heard of NFPA 855, and some of the larger AHJs are still experiencing a learning curve with NFPA 855. Those of us in the code development community cannot expect AHJs across the U.S. -- especially AHJs outside the major urban areas -- to have quick and easy access to NFPA 855 for residential ESS projects in the immediate future. It is very important to have IRC provisions for ESS within easy access for AHJs.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal clarifies that ESS requirements in the IFC do not apply to IRC one- or two-family dwellings and townhouses or their accessory structures. It neither increases nor decreases the cost of construction.

F171-24

IFC: 1207.3.1, 1207.3.7.1, 1207.5.1, 1207.5.5, 1207.6.3

Proponents: Daniel Nichols, MTA Construction and Development, MTA Construction and Development (dnichols@mnr.org)

2024 International Fire Code

Revise as follows:

1207.3.1 Energy storage system listings.
ESS shall be *listed* in accordance with UL 9540.

Exceptions:

1. Lead-acid and nickel-cadmium battery systems less than 50 VAC, 60 VDC in telecommunications facilities for installations of communications equipment under the exclusive control of communications utilities located outdoors or in building spaces used exclusively for such installations that are in compliance with NFPA 76.
2. Lead-acid and nickel-cadmium battery systems that are used for DC power for control of substations and control or safe shutdown of generating stations under the exclusive control of the electric utility, and located outdoors or in building spaces used exclusively for such installations.
3. Lead-acid battery systems in uninterruptable power supplies listed and *labeled* in accordance with UL 1778 and utilized for standby power applications.
4. <u>Lead-acid and nickel-cadmium battery systems that are used exclusively for fixed guideway transit or passenger rail systems for either the operation of rolling stock or for signaling and communication equipment, and are located outdoors or in building spaces used exclusively for such installations.</u>

[material based on NFPA 855 (2023)]

1207.3.7.1 Retrofitting lead acid and nickel cadmium.
Changing out or retrofitting of lead-acid and nickel-cadmium batteries with other lead-acid and nickel-cadmium batteries in the following applications shall be considered repairs where there is no increase in system size or energy capacity greater than 10 percent of the original design.

1. At facilities under the exclusive control of communications utilities that comply with NFPA 76 and operate at less than 50 VAC and 60 VDC.
2. Battery systems used for DC power for control of substations and control or safe shutdown of generating stations under the exclusive control of the electric utility, and located outdoors or in building spaces used exclusively for such installations.
3. Batteries in uninterruptible power supplies *listed* and *labeled* in accordance with UL 1778 and used for standby power applications only.
4. <u>Lead-acid and nickel-cadmium battery systems that are used exclusively for fixed guideway transit or passenger rail systems for either the operation of rolling stock or for signaling and communication equipment, and are located outdoors or in building spaces used exclusively for such installations.</u>

[material based on NFPA 855 (2023)]

1207.5.1 Size and separation.
Electrochemical ESS shall be segregated into groups not exceeding 50 kWh (180 megajoules). Each group shall be separated a minimum of 3 feet (914 mm) from other groups and from walls in the storage room or area. The storage arrangements shall comply with Chapter 10.

Exceptions: [material based on NFPA 855 (2023)]

1. Lead-acid and nickel-cadmium battery systems in facilities under the exclusive control of communications utilities and operating at less than 50 VAC and 60 VDC in accordance with NFPA 76.

2. Lead-acid and nickel-cadmium systems that are used for DC power for control of substations and control or safe shutdown of generating stations under the exclusive control of the electric utility, and located outdoors or in building spaces used exclusively for such installations.
3. Lead-acid battery systems in uninterruptable power supplies *listed* and *labeled* in accordance with UL 1778, utilized for standby power applications, and limited to not more than 10 percent of the floor area on the floor on which the ESS is located.
4. The *fire code official* is authorized to approve larger capacities or smaller separation distances based on large-scale fire testing complying with Section 1207.1.5.
5. Lead-acid and nickel-cadmium battery systems that are used exclusively for fixed guideway transit or passenger rail systems for either the operation of rolling stock or for signaling and communication equipment, and are located outdoors or in building spaces used exclusively for such installations.

1207.5.5 Fire suppression systems.
Rooms and areas within buildings and walk-in units containing electrochemical ESS shall be protected by an automatic fire suppression system designed and installed in accordance with one of the following:

1. *Automatic sprinkler systems* designed and installed in accordance with Section 903.3.1.1 for ESS units (groups) with a maximum stored energy capacity of 50 kWh, as described in Section 1207.5.1, shall be designed with a minimum density of 0.3 gpm/ft^2 (1.14 L/min) based over the area of the room or 2,500 square-foot (232 m^2) design area, whichever is smaller, unless a lower density is approved based on large-scale fire testing in accordance with Section 1207.1.7.
2. *Automatic sprinkler systems* designed and installed in accordance with Section 903.3.1.1 for ESS units (groups) exceeding 50 kWh shall use a density based on large-scale fire testing complying with Section 1207.1.7.
3. The following alternative *automatic fire-extinguishing systems* designed and installed in accordance with Section 904, provided that the installation is *approved* by the *fire code official* based on large-scale fire testing complying with Section 1207.1.7:
   3.1. NFPA 12, *Standard on Carbon Dioxide Extinguishing Systems*.
   3.2. NFPA 15, *Standard for Water Spray Fixed Systems for Fire Protection*.
   3.3. NFPA 750, *Standard on Water Mist Fire Protection Systems*.
   3.4. NFPA 2001, *Standard on Clean Agent Fire-Extinguishing Systems*.
   3.5. NFPA 2010, *Standard for Fixed Aerosol Fire-Extinguishing Systems*.

Exceptions:
1. Fire suppression systems for lead-acid and nickel-cadmium battery systems at facilities under the exclusive control of communications utilities that operate at less than 50 VAC and 60 VDC shall be provided where required by NFPA 76.
2. Lead-acid and nickel-cadmium systems that are used for DC power for control of substations and control or safe shutdown of generating stations under the exclusive control of the electric utility, and located outdoors or in building spaces used exclusively for such installations, shall not be required to have a fire suppression system installed.
3. Lead-acid battery systems in uninterruptable power supplies *listed* and *labeled* in accordance with UL 1778, utilized for standby power applications, which is limited to not more than 10 percent of the floor area on the floor on which the ESS is located, shall not be required to have a fire suppression system. [material based on NFPA 855 (2023)]
4. Lead-acid and nickel-cadmium battery systems that are used exclusively for fixed guideway transit or passenger rail systems for either the operation of rolling stock or for signaling and communication equipment, and are located outdoors or in building spaces used exclusively for such installations.

1207.6.3 Explosion control.
Where required by Table 1207.6 or elsewhere in this code, explosion control complying with Section 911 shall be provided for rooms,

areas, ESS cabinets or ESS walk-in units containing electrochemical ESS technologies.

Exceptions: [material based on NFPA 855 (2023)]

1. Where *approved*, explosion control is permitted to be waived by the *fire code official* based on large-scale fire testing complying with Section 1207.1.7 that demonstrates that *flammable gases* are not liberated from electrochemical ESS cells or modules.
2. Where *approved*, explosion control is permitted to be waived by the *fire code official* based on documentation provided in accordance with Section 104.2.2 that demonstrates that the electrochemical ESS technology to be used does not have the potential to release *flammable gas* concentrations in excess of 25 percent of the LFL anywhere in the room, area, walk-in unit or structure under thermal runaway or other fault conditions.
3. Where *approved*, ESS cabinets that have no debris, shrapnel or enclosure pieces ejected during large-scale fire testing complying with Section 1207.1.5 shall be permitted in lieu of providing explosion control complying with Section 911.
4. Explosion control is not required for lead-acid and nickel-cadmium battery systems less than 50 VAC, 60 VDC in telecommunication facilities under the exclusive control of communications utilities located in building spaces or walk-in units used exclusively for such installations.
5. Explosion control is not required for lead-acid and nickel-cadmium systems used for DC power for control of substations and control or safe shutdown of generating stations under the exclusive control of the electric utility, located in building spaces or walk-in units used exclusively for such installations.
6. Explosion control is not required for lead-acid battery systems in uninterruptable power supplies *listed* and *labeled* in accordance with UL 1778, utilized for standby power applications, and housed in a single cabinet in a single *fire area* in buildings or walk-in units.
7. <u>Lead-acid and nickel-cadmium battery systems that are used exclusively for fixed guideway transit or passenger rail systems for either the operation of rolling stock or for signaling and communication equipment, and are located outdoors or in building spaces used exclusively for such installations.</u>

Reason: The proposal is to align the hazards that are similar to telecommunication buildings and substations when they are operated by a fixed guideway transit or passenger rail system ("subways", "railways", "railroads", etc.). Currently, the operators of telecommunication systems and public utilities are exempted from certain requirements of this section because of ownership. However, specific entities like transportation companies do not have a synonymous exemption for the same type of equipment. To further support this, NFPA 855- 2023 edition Annex A Section A.4.7.1 expands on the telecommunication exemption by saying "...are not covered by NFPA 70 and need not comply with the requirements of NFPA 70."

The exemption of NFPA 70 for telecommunication and substations is covered in NFPA 70- 90.2(D), items (4) and (5). However, 90.2(D) item (3) is for "Installation of railways for generation, transformation, transmission, energy storage, or distribution of power used exclusively for signaling and communication purposes."

This proposal stays synonymous with the restrictions of spaces and types of batteries that are within the 2024 IFC. It also uses the term fixed guideway transit and passenger rail systems to describe the system and match the undefined term in Chapter 4 of the IBC for such transportation systems.

The facilities that utilize these types of battery systems have operated without losses for many years, including lead-acid battery systems installed to earlier versions of the IFC that didn't require fire suppression.

Bibliography: NFPA 70- 2023 edition

NFPA 855- 2023 edition

Cost Impact: Decrease

Estimated Immediate Cost Impact:

The immediate cost impact will be the ability to not provide a fire suppression system (Latest cost on a 1,500 sf communication building was $82,000) and the ability to replace existing batteries without existing location upgrades (not a quantifable cost due to mutliple variables, but at least a fire suppression system).

Estimated Immediate Cost Impact Justification (methodology and variables):

Cost is from actual pricing for MTA locations within the last 36 months.

Estimated Life Cycle Cost Impact:

Current inspection rate is $550.00 from third-party vendor every 6 months, not including personnel costs for restricted access, service disruption costs, and $3,000 hydrostatic and filling costs every 5 years.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

Actual costs for MTA locations within the last 36 months

F171-24

F172-24

IFC: 1207.3.2.1 (New), UL Chapter 80 (New)

Proponents: Jonathan Roberts, UL Solutions, UL Solutions (jonathan.roberts@ul.com)

2024 International Fire Code

Add new text as follows:

1207.3.2.1 Electric vehicle charging equipment with integral ESS. In lieu of complying with the listing requirements in 1207.3.1, electric vehicle charging systems and supply equipment utilizing integral ESS shall be *listed* in accordance with UL 3202 or approved for use for both electric vehicle charging and for energy storage.

Add new standard(s) as follows:

UL

Underwriters Laboratories LLC
333 Pfingsten Road
Northbrook, IL 60062

3202-2024 Outline of Investigation for EV Charging Equipment Utilizing ESS

Staff Analysis: A review of the standard proposed for inclusion in the code, ***Outline of Investigation for EV Charging Equipment Utilizing ESS (UL 3202-2024)***, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: An increasing number of EV chargers incorporate lithium-ion battery energy storage capability. Listing the ESS component of the equipment to only UL 9540, as required by 1207.3.1, does not address EV charging safety considerations. The UL 3202, Outline of Investigation for EV Charging Equipment Utilizing ESS addresses the safety aspects of both the EV charging and the energy storage.

The proposed terminology is consistent with the requirements in IBC:

IBC 406.2.7 Electric vehicle charging stations and systems. Where provided, electric vehicle charging systems shall be installed in accordance with NFPA 70. Electric vehicle charging system equipment shall be *listed* and *labeled* in accordance with UL 2202. Electric vehicle supply equipment shall be *listed* and *labeled* in accordance with UL 2594. Accessibility to *electric vehicle charging stations* shall be provided in accordance with Section 1107.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The cost for obtaining listed electric vehicle charging equipment with integral ESS equipment may or may not represent increased product costs over obtaining non-listed products that have not been independently investigated to applicable standards for determining product safety and performance.

Obtaining and maintaining a listing for electric vehicle charging equipment with integral ESS equipment involves both product investigation costs and costs for periodic inspection of production, as required by the definition of “listed”. However, the impact of any potential cost increase can be weighed by the code development committee against the user and code official safety benefits derived from requiring listed equipment, as well as the additional benefit of less effort needed to demonstrate or determine compliance.

F172-24

F173-24

IFC: 1207.11

Proponents: William Koffel, Koffel Associates, Inc., California Solar and Storage Association (CALSSA) (wkoffel@koffel.com)

2024 International Fire Code

Revise as follows:

1207.11 ESS in Group R-3 and R-4 occupancies.
ESS in Group R-3 and R-4 occupancies shall be in accordance with Sections 1207.11.1 through 1207.11.9.

Exceptions:

1. ESS *listed* and *labeled* for use in habitable spaces in accordance with UL 9540~~, and marked "For use in residential dwelling units,"~~ and where installed in accordance with the manufacturer's installation instructions and NFPA 70.
2. ESS installed in accordance with Section R328 of the International Residential Code in detached one- and two-family dwellings and townhouses not more than three stories above grade plane in height with a separate means of egress and their accessory structures not more than three stories above grade in height.
3. ESS rated less than 1 kWh (3.6 megajoules).

Reason: The proposed changes to Exception No. 1 correlate the language in the IFC with language in the IRC by deleting "residential occupancies" and replacing it with "habitable spaces." This is consistent with the language in the current edition of UL 9540. Inserting "installation" is consistent with a proposed change to IRC being submitted by CALSSA and also revises the language to be consistent with the defined term.

Proposed Exception No. 2 eliminates confusion and conflicts that current exist between the IFC and the IRC. Section 1207.11 of the IFC and Section R328 of the IRC, although similar in nature, are not harmonized to have identical requirements, primarily related to fire detection requirements. Be sending the user of the IFC to the IRC, the requirements will be consistent. The language in Exception No. 2 intentionally does not include all Group R-3 and R-4 occupancies; but rather, is restricted to buildings that are within the scope of the IRC.

The two exceptions are not the same. Exception No. 1 permits the ESS to be installed in habitable spaces based upon a particular battery technology that should not result in thermal runaway. Exception No. 2 applies to battery technology that is commonly used but is not permitted to be installed in habitable spaces.

It is recognized that another proposal will revise the ESS requirements in the IFC to reference NFPA 855. Both the current requirements of the IRC and the requirements being proposed by CALSSA in a proposal to the IRC are not consistent with NFPA 855. Based upon where NFPA 855 is in the revision process, it is not possible to correlate Chapter 15 of NFPA 855 with either the current IRC requirements or the requirements in the CALSSA proposal to the IRC.

For informational purposes, the current draft of the CALSSA proposal to the IRC reads as follows:

R328.1 General.

Energy storage systems (ESS) shall comply with the provisions of this section.

Exceptions:

1. ESS listed and labeled for use in habitable spaces in accordance with UL 9540 and where installed in accordance with the listing, the manufacturer's installation instructions and NFPA 70.

2. ESS less than 1 kWh (3.6 megajoules).

R328.2 ~~Equipment~~ Energy Storage System Listings.

Energy storage systems (ESS) shall be listed ~~and labeled~~ in accordance with UL 9540.

Exception: Where approved, repurposed unlisted battery systems from electric vehicles are allowed to be installed outdoors or in detached sheds located not less than 5 feet (1524 mm) from exterior walls, property lines and public ways.

R328.3 Manufacturers Installation Instructions.

Energy Storage Systems (ESS) shall be installed in accordance with the manufacturer's installation instructions and the conditions of their listings.

R328.3.1 Unit Separation ~~Spacing~~.

Separation between individual ESS ~~Individual~~ units shall be ~~separated from each other by~~ not less than 3 feet (914 mm) except where ~~smaller~~ other separation distances are ~~documented to be adequate based on large-scale fire testing complying with Section 1207.1.5 of the International Fire Code~~ specified by the ESS listing and the manufacturer's installation instructions .

R328.3.2 Exposures.

Exterior installed Energy Storage Systems shall maintain a minimum separation of 3' from windows and doors directly entering the habitable space) except where other separation distances are specified by the ESS listing and the manufacturer's installation instructions.

R328.4

Remove:

~~**R328.4 Locations.**~~

~~ESS shall be installed only in the following locations:~~

~~1. Detached garages and detached accessory structures.~~

~~2. Attached garages separated from the dwelling unit living space in accordance with Section R302.6.~~

~~3. Outdoors or on the exterior side of exterior walls located not less than 3 feet (914 mm) from doors and windows directly entering the dwelling unit.~~

~~4. Enclosed utility closets, basements, storage or utility spaces within dwelling units with finished or noncombustible walls and ceilings. Walls and ceilings of unfinished wood-framed construction shall be provided with not less than 5/8 -inch (15.9 mm) Type X gypsum wallboard. Openings into the dwelling shall be equipped with solid wood doors not less than 1-3/8 inches (35 mm) in thickness, solid or honeycomb core steel doors not less than 1-3/8 inches (35 mm) thick, or door with a 20-minute fire protection rating. Doors shall be self-latching and equipped with a self-closing or automatic-closing device. Penetrations through the required gypsum wallboard into the dwelling shall be protected as required by Section R302.11, Item 4.~~

~~ESS shall not be installed in sleeping rooms, or closets or spaces opening directly into sleeping rooms.~~

~~**R328.5 Energy ratings.**~~

~~Individual ESS units shall have a maximum rating of 20 kWh. The aggregate rating of the ESS shall not exceed:~~

1. ~~40 kWh within utility closets, basements and storage or utility spaces.~~
2. ~~80 kWh in attached or detached garages and detached accessory structures.~~
3. ~~80 kWh on exterior walls.~~
4. ~~80 kWh outdoors on the ground.~~

~~ESS installations exceeding the permitted individual or aggregate ratings shall be installed in accordance with Section 1207 of the International Fire Code.~~

Replace:

R328.4 Allowable installation locations and allowable aggregate storage capacity

The *ratings* of the ESS *in each location* shall not exceed *the ratings in Table R328.4.* ~~:~~*The total aggregate ratings of ESS on the property shall not exceed 600kWh.* Individual ESS units shall not exceed the conditions of its listing. ESS shall not be installed in sleeping rooms, or closets or spaces opening directly into sleeping rooms. ESS installations exceeding the permitted individual or aggregate ratings shall be installed in accordance with Section 1207 of the International Fire Code.

TABLE R328.4 MAXIMUM AGGREGATE RATINGS AND ALLOWABLE INSTALLATION LOCATIONS OF ESS

LOCATION	*MAXIMUM AGGREGATE RATINGS (kWh)*	*INSTALLATION REQUIREMENTS*
Within utility closets, basements, and storage or utility spaces located within dwellings	*40*	Walls and ceiling of unfinished wood-framed construction shall be provided with not less than 5/8-inch gypsum wall board. 5/8" Type X gypsum board required where not indicated otherwise in manufacturers installation instructions
In attached garages	*100*	Dwelling-Garage separation shall comply with Table R302.6
On or within 3 feet of exterior walls of dwellings and attached garages	*100*	
On or within 3 feet of exterior walls of dwellings and attached garages	*200*	Exterior walls and eaves are constructed with noncombustible surfaces [a]
In detached garages and detached accessory structures	*200*	
In detached garages and detached accessory structures	*600*	Detached garage or detached accessory structure is a minimum 10 feet away from property lines and dwellings.
Outdoors on the ground	*200*	ESS is a minimum 3 feet away from property lines and dwellings.
Outdoors on the ground	*600*	ESS is a minimum 10 feet away from property lines and dwellings.

R328.~~6~~5 ~~Electrical~~ Equipment installation.

ESS shall be installed in accordance with NFPA 70. ~~Inverters shall be listed and labeled in accordance with UL 1741 or provided as part of the UL 9540 listing. Systems connected to the utility grid shall use inverters listed for utility interaction.~~ Grid Interconnected systems shall be listed for such use.

R328.~~7~~6 ~~Fire~~ detection.

Where Energy Storage Systems are installed ~~Rooms and areas within~~ a dwelling unit ~~units~~, basements and attached garages, a heat alarm, heat detector or smoke alarm, complying with NFPA 72, shall be installed with interior annunciation outside all sleeping areas and each level of the dwelling unit. ~~in which ESS are installed shall be protected by smoke alarms in accordance with Section R314. A heat detector, listed and interconnected to the smoke alarms, shall be installed in locations within dwelling units and attached garages where smoke alarms cannot be installed based on their listing.~~

- Interconnection to interior annunciation devices shall comply with R314.4
- Power Source shall comply with R314.6

Dwellings shall have smoke alarms complying with NFPA 72 and Section R314

R328.~~8~~7 Protection from impact.

ESS installed in a location subject to vehicle damage shall be protected by approved barriers in accordance with Section R328.~~8~~7.1 or R328.~~8~~7.2.

R328.~~8~~7.1 Garages. Where an ESS is installed in the normal driving path of vehicle travel within a garage, impact protection complying with Section R32~~8~~7.3 shall be provided. The normal driving path is a space between the garage vehicle opening and the interior face of the back wall to a height of 48 inches (1219 mm) above the finished floor. The width of the normal driving path shall be equal to the width of the garage door opening. Impact protection shall also be provided for an ESS installed at either of the following locations (see Figure R32~~8~~7.1):

1. On the interior face of the back wall and located within 36 inches (914 mm) to the left or to the right of the normal driving path.2. On the

interior face of a side wall and located within 24 inches (610 mm) from the back wall and 36 inches (914 mm) of the normal driving path.

Exception: Where the clear height of the vehicle garage opening is 7 feet 6 inch (2286 mm) or less, ESS installed not less than 36 inches (914mm) above finished floor are not subject to vehicle impact protection requirements.

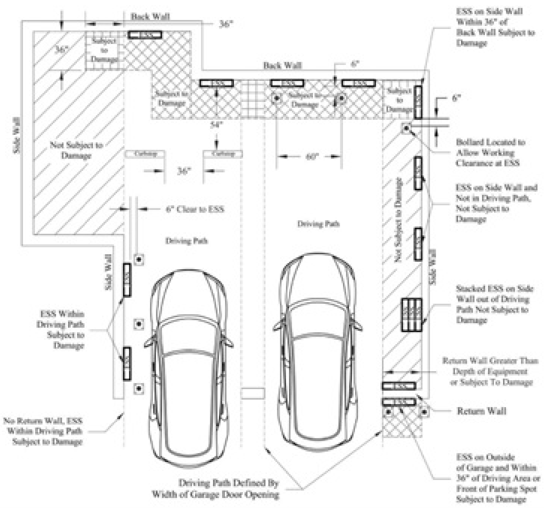

FIGURE R328.~~8~~7.1 ESS VEHICLE IMPACT PROTECTION

R328.~~8~~7.2 Other locations subject to vehicle impact. Where an ESS is installed in a location other than as defined in Section R328.8.1, and is subject to vehicle damage, impact protection shall be provided in accordance with Section R328.~~8~~7.3.

R328.~~8~~7.3 Impact protection options. ESS protection shall comply with one of the following:

1. Bollards constructed in accordance with one of the following:

1.1. Minimum 48 inches (1219 mm) in length by 3 inches (76 mm) in diameter schedule 80 steel pipe embedded in a concrete pier not less than 12 inches (304 mm) deep and 6 inches (152 mm) in diameter, with at least 36 inches (914 mm) of pipe exposed, filled with concrete, and spaced at a maximum interval of 5 feet (1524 mm). Each bollard shall be located not less than 6 inches (152 mm) from an ESS.

1.2. Minimum 36 inches (914 mm) in height by 3 inches (76 mm) in diameter schedule 80 steel pipe fully welded to a minimum 8 inches (203mm) by ¼ inch (6.4 mm) thick steel plate and bolted to a concrete floor by means of 4-1/2 inch (114 mm) concrete anchors with 3 inch (76 mm) minimum embedment. Spacing shall be not greater than 60 inches (1524 mm), and each bollard shall be located not less than 6 inches (152 mm) from the ESS.

1.3. Pre-manufactured steel pipe bollards filled with concrete and anchored in accordance with the manufacturer's installation instructions, with spacing not greater than 60 inches (1524 mm). Each bollard shall be located not less than 6 inches (152 mm) from the ESS.

2. Wheel barriers constructed in accordance with one of the following:

2.1. Four inches (102 mm) in height by 5 inches (127 mm) in width by 70 inches (1778 mm) in length wheel barrier made of concrete or polymer, anchored to the concrete floor not less than every 36 inches (914 mm) and located not less than 54 inches (1372 mm) from the ESS. Minimum 3– ½ inch (90 mm) diameter concrete anchors with 3 inch (76 mm) embedment per barrier shall be used. Spacing between barriers shall be no greater than 36 inches (914 mm).

2.2. Pre-manufactured wheel barriers shall be anchored in accordance with the manufacturer's installation instructions.

3. Approved method designed to resist a 2000 pounds per square foot (8899 Newtons) impact in the direction of travel at 24 inches (608 mm) above grade.

R328.~~9~~8 ~~Ventilation~~ Flammable Gases.

Where the ESS is installed indoors and the ESS ~~Indoor installations of ESS that~~ produces ~~hydrogen or other~~ flammable gases during normal operations mechanical ventilation ~~charging~~ shall be provided in accordance with Section M1307.4

R328.~~10~~9 Electric vehicle Power Export (EVPE)~~use~~.

An electric vehicle shall be permitted to provide ~~The~~ temporary ~~use of an owner or occupant's electric-powered vehicle to~~ power to a dwelling unit where connected to listed equipment installed in accordance with Article 625 of ~~while parked in an attached or detached garage or outdoors shall comply with the vehicle manufacturer's instructions and~~ NFPA 70 and the vehicle's manufacturers instructions.

R328.1~~1~~0 Documentation and labeling.

The following information shall be provided:

1. A copy of the manufacturer's installation, operation, maintenance and decommissioning instructions shall be provided to the owner or placed in a conspicuous location near the ESS equipment.
2. A label on the installed system containing the contact information for the qualified maintenance and service providers.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposal eliminates the confusion and conflicts between the IFC and IRC. In that respect, the proposal has the potential to decrease the cost of construction. The cost impact of the CALSSA proposal to the IRC will be addressed in that code change proposal in the Group B cycle.

F173-24

F174-24

IFC: 1207.11

Proponents: Joseph H. Cain, P.E., Solar Energy Industries Association (SEIA) (joecainpe@gmail.com); Paul Armstrong, SEIA (paul@7arms.com)

2024 International Fire Code

Revise as follows:

1207.11 ESS in Group R-3 and R-4 occupancies.
ESS in Group R-3 and R-4 occupancies shall be in accordance with Sections 1207.11.1 through 1207.11.9.

Exceptions:

1. ESS *listed* and *labeled* for use in habitable spaces in accordance with UL 9540 and ~~marked "For use in residential dwelling units,"~~ where installed in accordance with the *listing*, the manufacturer's instructions and NFPA 70.
2. ESS rated less than 1 kWh (3.6 megajoules).

Reason: This proposal correlates the exception language in the IFC with the corresponding language in 2024 IRC Section R328.1 for the same subject matter. The most-important change is to resolve issues when the marking language from the UL standard is included in quotation marks but then the language in the standard itself is modified, creating conflict. This proposal resolves that correlation conflict by removing the outdated marking language and by removing the quotation marks. That outdated language is then replaced with a clear requirement that listing and labeling must provide for installation within habitable spaces in order to use Exception 1.

See RB158-22 in the 2022 ICC Public Comment Agenda, which was Approved As Modified by Public Comment #1.

R328.1 General. Energy Storage Systems (ESS) shall comply with the provisions of this section.

Exceptions:

1. *ESS* listed and labeled for use in habitable spaces in accordance with UL 9540 and ~~marked "For use in residential dwelling units"~~ where installed in accordance with the listing, the manufacturer's instructions and NFPA 70.

2. ESS less than 1kWh (3.6 megajoules).

The language in the 2024 IBC was modified to resolve confusion caused by the previous language.

Following is text from the Reason Statement for RB158-22, which is still relevant for this correlating proposal for the IFC with minor adjustments since last cycle:

As background, the text for the product marking that is currently in the code is in the current edition of the product standard UL 9540. This was added in the code by Public Comment 1 to RB154-19. That Public Comment was a consensus of all the ESS stakeholders. As noted in the Reason Statement for that Public Comment, the marking proposed in Section R327.1 was intended to exempt a UL 9540 listed ESS that will not go into thermal runaway or produce flammable gas when subjected to the UL 9540A Cell Level Test (for further detail, please also see the reason statement for Proposal RB157-18).

There is currently a proposal to UL 9540 to change the text of that marking, as well as additional clarifications on the testing required for the ability to apply such marking on an ESS. The reason for the proposed change to UL 9540 is because there has been a lot of confusion in the field regarding the current markings in UL 9540A pertaining to residential systems that may or may not employ battery technologies that meet the cell level performance criteria of UL 9540A, which is that thermal runaway was not able to be initiated and there was no venting of flammable gas. This is a very severe criteria, but if met, it would suggest that the battery energy storage system (BESS) does not present any greater fire hazard than another electrical appliance and can be installed anywhere in a residence including the habitable spaces. As of this date, we are not aware of technologies that can meet these criteria. Further, this marking has created considerable confusion in the market.

The [Technical Committee] for UL 9540 is working on improving the markings to clarify what ESS products have been tested to appropriate requirements to determine suitability for use in habitable spaces. UL's Collaborative Standards Development System (CSDS) provides online access to review and submit proposals for UL's Standards development process. General access is available for information on [TC] meetings, submitting proposals, and access to free proposals. For more information, click here, or go to www.ul.com/standards. To address the confusion of the text of the marking currently identified in the IRC, this Public Comment is proposing to identify the intent, which is that this exception applies only where the ESS has been listed and labeled for specific use in habitable spaces, based on specific testing criteria in UL 9540.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is for correlation of IFC language with the corresponding language in the IRC for the same subject matter. The proposal does not increase nor decrease the cost of construction.

F174-24

F175-24

IFC: SECTION 202 (New), SECTION 1208 (New), 1208.1 (New), 1208.2 (New), 1208.3 (New), 1208.4 (New), UL Chapter 80 (New)

Proponents: Jonathan Roberts, UL Solutions, UL Solutions (jonathan.roberts@ul.com)

2024 International Fire Code

Add new definition as follows:

ELECTRIC VEHICLE POWER EXPORT EQUIPMENT (EVPE). The electrical equipment, including the outlet on the vehicle, that is used to provide electrical power at voltages equal to or greater than 30 volts AC or 60 volts DC to an external load(s) from the vehicle, where the vehicle is the source of supply.

Add new text as follows:

SECTION 1208
ELECTRIC VEHICLE POWER EXPORT EQUIPMENT

1208.1 General. The use, operation and maintenance of *electric vehicle power export equipment* shall comply with this section.

1208.2 Listing. *Electric vehicle power export equipment* shall comply with one of the following:

1. *Electric vehicle power export equipment* that performs both functions of an inverter and an electric vehicle charger shall be *listed* and *labeled* in accordance with UL 9741.
2. *Electric vehicle power export equipment*, that monitors and oversees electric vehicles with onboard AC inverter/converters, shall be *listed* and *labeled* in accordance with UL 1741.

1208.3 Installation and use. *Electric vehicle power export equipment* shall be installed and used in accordance with their listing, the manufacturer's installation instructions, and NFPA 70.

1208.4 Utility interactive. *Electric vehicle power export equipment connected* to the electric utility grid shall use inverters listed for utility interaction.

Add new standard(s) as follows:

UL

Underwriters Laboratories LLC
333 Pfingsten Road
Northbrook, IL 60062

9741-2023 Electric Vehicle Power Export Equipment (EVPE)

Staff Analysis: A review of the standard proposed for inclusion in the code, ***Electric Vehicle Power Export Equipment (EVPE) (UL 9741-2023)***, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: Electric vehicle power export equipment (EVPE) is a new trend to use an electric vehicle to provide power to the building. EVPE can be unidirectional or bidirectional. Unidirectional equipment exports power from the vehicle to an offboard load, such as a receptacle bank. Bidirectional equipment provides power to the vehicle for charging of the onboard battery, and exports power to the grid, premise or load, but export and charging do not occur at the same time. There are three manufacturers with listed equipment.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The cost for obtaining listed EV power export equipment may or may not represent increased product costs over obtaining non-listed equipment that have not been independently investigated to applicable standards for determining product safety and performance.

Obtaining and maintaining a listing for EV power export equipment involves both product investigation costs and costs for periodic inspection of production, as required by the definition of "listed". However, the impact of any potential cost increase can be weighed by the code development committee against the user and code official safety benefits derived from requiring listed equipment, as well as the additional benefit of less effort needed to demonstrate or determine compliance.

F175-24

F176-24

IFC: SECTION 202 (New), 1208 (New), 1208.1 (New), 1208.2 (New), 1208.3 (New), UL Chapter 80 (New)

Proponents: Jonathan Roberts, UL Solutions, UL Solutions (jonathan.roberts@ul.com)

2024 International Fire Code

Add new definition as follows:

PORTABLE POWER PACK. A moveable device that contains an integral or removable battery, or batteries, that when charged are intended to provide temporary power to various outputs of the device. This includes hand portable or wheeled devices. Portable power packs are not intended to include devices regulated as mobile or portable *Energy Storage Systems (ESS)*.

Add new text as follows:

1208
SECTION PORTABLE POWER PACKS

1208.1 General. The use, operation and maintenance of *portable power packs* with an energy capacity of 1 kWh or greater shall comply with this section.

Exception: Portable and mobile electrical energy storage systems (ESS) that are regulated by Section 1207

1208.2 Listing. *Portable power packs* shall be *listed* and *labeled* in accordance with UL 2743.

1208.3 Operation and maintenance. *Portable power packs* shall be used and maintained in accordance with the *listing* and the manufacturer's instructions. Units marked for "indoor use only" shall not be used outdoors.

Add new standard(s) as follows:

UL

Underwriters Laboratories LLC
333 Pfingsten Road
Northbrook, IL 60062

2743-2023 Portable Power Packs

Staff Analysis: A review of the standard proposed for inclusion in the code, ***Portable Power Packs (UL 2743-2023)***, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: Portable power packs that typically utilize lithium-ion batteries are used to provide temporary and portable power in applications that often previously used fuel-fired portable generators. This proposal includes safety requirements intended to address hazards associated with the use of these devices. There are currently more than eight manufacturers with listed portable power packs. The threshold of 1 kWh would not impose requirements on small battery storage devices typically used to charge personal electronic devices.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The cost for obtaining listed portable power packs may or may not represent increased product costs over obtaining non-listed equipment that have not been independently investigated to applicable standards for determining product safety and performance.

Obtaining and maintaining a listing for portable power packs involves both product investigation costs and costs for periodic inspection of production, as required by the definition of "listed". However, the impact of any potential cost increase can be weighed by the code development committee against the user and code official safety benefits derived from requiring listed products, as well as the additional benefit of less effort needed to demonstrate or determine compliance.

F177-24

IFC: 2001.1, 2001.2, 2003.5, 2006.14.1, 2006.15

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Fire Code

Revise as follows:

2001.1 Scope. Airports, heliports, helistops, seaplane bases, and aircraft hangars shall comply with ~~be in accordance with~~ this chapter.

2001.2 Regulations not covered. Regulations not specifically contained herein pertaining to airports, seaplane bases, aircraft maintenance, aircraft hangars and appurtenant operations shall be in accordance with nationally recognized standards.

2001.2 Regulations not covered. Regulations not specifically contained herein pertaining to airports, aircraft maintenance, aircraft hangars and appurtenant operations shall be in accordance with nationally recognized standards.

Revise as follows:

2003.5 Dispensing and storage of flammable and combustible liquids.
The dispensing, transferring and storage of *flammable* and *combustible liquids* shall be in accordance with this chapter and Chapter 57. Aircraft motor vehicle fuel-dispensing facilities shall be in accordance with Chapter 23. Seaplane fueling shall be in accordance with Section 2310.

2006.14.1 Other equipment. Electrical or other spark-producing equipment shall not be used within 10 feet (3048 mm) of fueling equipment or near any water surface in a seaplane fueling operation, aircraft fill or vent points, or spill areas unless that equipment is intrinsically safe and *approved* for use in an explosive atmosphere.

2006.15 Open flames. Open flames and open-flame devices are prohibited within 50 feet (15 240 mm) of any aircraft fuel-servicing operation or fueling equipment. Seaplane fueling shall comply with Section 2310.5.5.

Reason: The intent of the code was always to apply to seaplane facilities as well as land based plane facilities. The change clarifies the intent of the code.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal simply clarifies existing intent that seaplanes were intended to be regulated by this code.

F177-24

F178-24

IFC: 2003.8 (New), UL Chapter 80 (New)

Proponents: Jonathan Roberts, UL Solutions, UL Solutions (jonathan.roberts@ul.com)

2024 International Fire Code

Add new text as follows:

2003.8 Battery powered aviation ground support equipment. Lithium battery-powered aviation ground support equipment shall be *listed* and *labeled* in accordance with CAN/UL 5840, and shall be operated and maintained in accordance with the listing and manufacturer's instructions.

Add new standard(s) as follows:

UL

Underwriters Laboratories LLC
333 Pfingsten Road
Northbrook, IL 60062

CAN/UL 5840-2022 Electrical Systems of Battery Powered Aviation Ground Support Equipment

Staff Analysis: A review of the standard proposed for inclusion in the code, ***Electrical Systems of Battery Powered Aviation Ground Support Equipment (CAN/UL 5840-2022)***, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: CAN/UL 5840 was developed to address fire, shock and explosion risks associated with the electrical systems in aviation ground support equipment, including the battery, during charging and use (discharging) of the battery.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The cost for obtaining listed lithium battery-powered aviation ground support equipment may or may not represent increased product costs over obtaining non-listed products that have not been independently investigated to applicable standards for determining product safety and performance.

Obtaining and maintaining a listing for lithium battery-powered aviation ground support equipment involves both product investigation costs and costs for periodic inspection of production, as required by the definition of “listed”. However, the impact of any potential cost increase can be weighed by the code development committee against the user and code official safety benefits derived from requiring listed equipment, as well as the additional benefit of less effort needed to demonstrate or determine compliance.

F178-24

F179-24

IFC: 2005.4, 2006.11.4, 2006.11.5, 2006.13.1

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Fire Code

Revise as follows:

2005.4 On aircraft fuel-servicing tank vehicles. Aircraft fuel-servicing tank vehicles shall be equipped with not less than two *listed* portable fire extinguishers complying with Section 906, each having a minimum rating of 20-B:C. A portable fire extinguisher shall be provided with *ready access* from either side of the vehicle. The engine exhaust on the fueling vehicle shall be directed away from the fueling operation.

2006.11.4 Fuel spill procedures. The fueling-system operator shall establish procedures to follow in the event of a fuel spill. These procedures shall be comprehensive and shall provide for all of the following:

1. Upon observation of a fuel spill, the aircraft-fueling operator shall immediately stop the delivery of fuel by releasing hand pressure from the fuel flow-control valve.
2. Failure of the fuel control valve to stop the continued spillage of fuel shall be cause for the activation of the appropriate emergency fuel shutoff device.
3. A supervisor for the fueling-system operator shall respond to the fuel spill area immediately.
4. Any fuel spill over 10 gallons (38 L) shall be reported to the fire department.
5. Unauthorized releases shall be reported in accordance with Section 5003.3.1.1.

Delete without substitution:

~~**2006.11.5 Notification of the fire department.** The fire department shall be notified of any fuel spill that is considered a hazard to people or property or which meets one or more of the following criteria:~~

1. ~~Any dimension of the spill is greater than 10 feet (3048 mm).~~
2. ~~The spill area is greater than 50 square feet (4.65 m^2).~~
3. ~~The fuel flow is continuous in nature.~~

Revise as follows:

2006.13.1 Overwing fueling. Vehicles or equipment shall not be allowed beneath the trailing edge and fuel tank vapor vent area ~~of the wing~~ when aircraft fueling takes place over the wing. ~~and the aircraft fuel-system vents are located on the upper surface of the wing.~~

Reason: This update recognizes spill reporting requirements and minor updates to other areas in this chapter that are consistent with safe practices.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The change clarifies existing language and better correlates with Chapter 50 and industry practice.

F179-24

F180-24

IFC: SECTION 202 (New), 105.5.48, 1103.6.2, 2001.1, 2002.1, SECTION 2007, 2007.1, 2007.2, 2007.3, 2007.5, 2007.6, 2007.7, 2007.8, NFPA Chapter 80 (New), DOTn Chapter 80 (New), ASTM Chapter 80 (New), 905.3.5; IBC: SECTION 202 (New), [F] 905.3.5, [F] 412.7, [F] 412.7.1, [F] 412.7.2, [BE] 412.7.3, [F] 412.7.4, NFPA Chapter 35 (New), DOTn Chapter 35 (New), ASTM Chapter 35 (New)

Proponents: Rex Alexander, Five-Alpha LLC, Self (rex@five-alpha.com)

2024 International Fire Code

Add new definition as follows:

EMERGENCY HELICOPER LANDING AREA (EHLF). A clear area at ground level or on the roof of a building capable of accommodating helicopters engaged in fire fighting and/or emergency evacuation operations.

VERTIPORT. A generic reference to the area of land, water, or structure used or intended to be used, for the landing and takeoff of vertical takeoff and landing (VTOL) aircraft, together with associated buildings and facilities.

VERTISTOP. A vertiport, where no refueling, recharging, maintenance, repairs, or storage of aircraft is permitted, except for unscheduled maintenance.

Revise as follows:

105.5.48 ~~Rooftop heliports~~ Heliports, helistops, EHLFs, vertiports, and vertistops. An operational permit is required for the operation of a ~~rooftop~~ heliport, helistop, EHLFs, vertiport, or vertistop.

1103.6.2 Existing ~~helistops and~~ heliports, helistops, EHLFs, vertiports, and vertistops.
Existing buildings with a rooftop ~~helistop or~~ heliport, helistop, EHLFs, vertiport, or vertistop located more than 30 feet (9144 mm) above the lowest level of fire department access to the roof level on which the ~~helistop or~~ heliport, helistop, EHLFs, vertiport, or vertistop is located shall be equipped with standpipes in accordance with Section 2007.5.

2001.1 Scope. Airports, heliports, helistops,EHLFs, vertiports, vertistops, and aircraft hangars shall be in accordance with this chapter.

2002.1 Definitions.
The following terms are defined in Chapter 2:
AIRCRAFT OPERATION AREA (AOA).

AIRPORT.

HELIPORT.

HELISTOP.

EMERGENCY HELICOPTER LANDING AREA (EHLF).

VERTIPORT.

VERTISTOP.

SECTION 2007
~~HELISTOPS AND~~ HELIPORTS, ~~AND~~ HELISTOPS, EHLF, VERTIPORTS, AND VERTISTOPS

2007.1 General.
~~Helistops and heliports,~~ Heliports, helistops, EHLFs, vertiports, and vertiports shall be maintained in accordance with Sections 2007.2 through 2007.8. ~~Helistops and heliports,~~ Heliports, helistops, EHLFs, vertiports, and vertistops ~~on buildings~~ shall be constructed in accordance with the *International Building Code*~~.~~, US DOT/FAA AC 150/5390-2D, US DOT/FAA Engineering Brief No. 105, and NFPA

418, ASTM F3423, as applicable.

2007.2 Clearances. ~~The touchdown area shall be surrounded on all sides by a clear area having minimum average width at roof level of 15 feet (4572 mm) and not less than 5 feet (1524 mm) at any point. The clear area shall be maintained.~~ Heliports, helistops, EHLFs, vertiports, and vertistops shall maintain the required clearances as specified in U.S DOT/FAA AC 150/5390-2D and U.S. DOT/FAA Engineering Brief No. 105.

2007.3 Flammable and Class II combustible liquid spillage. Landing areas on structures shall be maintained so as to confine *flammable* or Class II *combustible liquid* spillage to the landing area itself, and provisions shall be made to drain such spillage away from *exits* or *stairways* serving the ~~helicopter~~ aircraft landing area or from a structure housing such *exit* or *stairway*.

2007.5 Standpipe systems. A building with a rooftop ~~helistop or~~ heliport, helistop, EHLF, vertiport, or vertistop shall be provided with a Class I or III standpipe system extended to the roof level on which the ~~helistop or~~ heliport, helistop, EHLF, vertiport or vertistop is located. All portions of the ~~helistop and~~ heliport, helistop, EHLF, vertiport, or vertistop area shall be within 150 feet (45 720 mm) of a $2^1/_2$-inch (63.5 mm) outlet on the standpipe system.

2007.6 Foam protection.
Foam fire-protection capabilities shall be provided for rooftop ~~heliports~~ landing areas that accommodate aircraft with liquid fuel. Such systems shall be designed, installed and maintained in accordance with the applicable provisions of Sections 903, 904 and 905.

2007.7 Fire extinguishers.
~~Not less than one portable fire extinguisher having a minimum 80-B:C rating shall be provided for each permanent takeoff and landing area and for the aircraft parking areas. Installation, inspection and maintenance of these extinguishers shall be in accordance with Section 906.~~ Fire extinguishers at heliports, helistops, EHLFs, vertiports, vertistops, aircraft parking areas, refueling sites, and charging sites shall comply with NFPA 418 and NFPA 10.

2007.8 Federal approval. Before operating helicopters or VTOL aircraft from a ~~helistops and~~ heliport~~s~~, helistop, EHLFs, vertiport, or vertiport ~~approval shall be obtained~~ a favorable airspace determination shall be obtained from the Federal Aviation Administration.

Add new standard(s) as follows:

NFPA

National Fire Protection Association
1 Batterymarch Park
Quincy, MA 02169-7471

418-24	Standard for Heliports and Vertiports

DOTn

U.S. Department of Transportation
Office of Hazardous Material Safety 1200 New Jersey Avenue SE East Building 2nd Floor
Washington, DC 20590

U.S. DOT/FAA AC 150/5390-2D-2023	Heliport Design
US DOT/FAA Engineering Brief No. 105-2022	Vertiport Design

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428-2959

F3423-23	Standard Specification for Vertiport Design

Revise as follows:

905.3.5 ~~Helistops, and heliports~~ Heliports, helistops, EHLF, vertiports, and vertistops.
Buildings with a rooftop ~~*helistop,*~~ *heliport, helistop,* EHLF, *vertiport, or vertistop* shall be equipped with a Class I or III standpipe system extended to the roof level on which the ~~*helistop or*~~ *heliport, helistop,* EHLF, *vertiport, or vertistop* is located in accordance with Section 2007.5.

2024 International Building Code

Add new definition as follows:

EMERGENCY HELICOPER LANDING AREA (EHLF). A clear area at ground level or on the roof of a building capable of accommodating helicopters engaged in fire fighting and/or emergency evacuation operations.

VERTIPORT. A generic reference to the area of land, water, or structure used or intended to be used, for the landing and takeoff of vertical takeoff and landing (VTOL) aircraft, together with associated buildings and facilities.

VERTISTOP. A vertiport, where no refueling, recharging, maintenance, repairs, or storage of aircraft is permitted, except for unscheduled maintenance.

Revise as follows:

[F] 905.3.5 ~~Helistops and heliports~~ Heliports, Helistops, EHLFs, Vertiports, and Vertistops.
Buildings with a rooftop ~~*helistop or*~~ *heliport* , *helistop*, EHLFs, *vertiport, or vertistop* shall be equipped with a Class I or III *standpipe system* extended to the roof level on which the ~~*helistop or*~~ *heliport* , *helistop*, EHLFs, *vertiport, or vertistop* is located in accordance with Section 2007.5 of the *International Fire Code.*

[F] 412.7 Heliports, ~~and~~ helistops, EHLF, vertiports, vertistops.
Heliports, ~~and~~ *helistops*, EHLFs, vertiports *and vertistops* shall be permitted to be erected on *buildings* or other locations where they are constructed in accordance with Sections 412.7.1 through 412.7.5.

[F] 412.7.1 ~~Size~~ Design.
~~The landing area for helicopters less than 3,500 pounds (1588 kg) shall be not less than 20 feet (6096 mm) in length and width. The landing area shall be surrounded on all sides by a clear area having an average width at roof level of 15 feet (4572 mm), and all widths shall be not less than 5 feet (1524 mm).~~Heliport, helistop, EHLF, vertiport, and vertistop landing areas shall be designed in accordance with U.S. DOT/FAA Heliport Design AC 150/5390-2D. Veriports and veristops shall comply with ASTM F3423-23.

[F] 412.7.2 ~~Design~~ Rooftop landing areas.
Helicopter and VTOL landing areas and the supports thereof on the roof of a *building* shall be noncombustible construction. Landing areas shall be designed to confine any *flammable liquid* spillage to the landing area itself and provisions shall be made to drain such spillage away from any *exit* or *stairway* serving the helicopter or VTOL landing area or from a *structure* housing such *exit* or *stairway*. For structural design requirements, see Section 1607.6.

[BE] 412.7.3 Means of egress.
The *means of egress* from *heliports* ~~and~~ , *helistops, EHLFs, vertiports and vertistops* shall comply with the provisions of Chapter 10. Landing areas located on *buildings* or *structures* shall have two or more *exits or access to exits*. For landing areas less than 60 feet (18 288 mm) in length or less than 2,000 square feet (186 m^2) in area, the second *means of egress* is permitted to be a fire escape, *alternating tread device* or ladder leading to the floor below.

[F] 412.7.4 ~~Rooftop heliports~~ Heliports, ~~and~~ helistops, EHLFs, vertiports and vertistops.
~~Rooftop~~ *Heliports*, ~~*heliports* and~~ *helistops, EHLFs, vertiports and vertistops* shall comply with NFPA 418, US DOT/FAA AC 150/5390-2D and FAA Engineering Brief No. 105, ASTM F3423, as applicable.

Add new standard(s) as follows:

NFPA

National Fire Protection Association
1 Batterymarch Park
Quincy, MA 02169-7471

418-24 Standard for Heliports and Vertiports

DOTn

U.S. Department of Transportation
Office of Hazardous Material Safety 1200 New Jersey Avenue, SE East Building, 2nd Floor
Washington, DC 20590

U.S. DOT/FAA AC 150/5390-2D-2023 Heliport Design

US DOT/FAA Engineering Brief No. 105-2022 Vertiport Design

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

F3423-23 Standard Specification for Vertiport Design

Staff Analysis: A review of the following standards proposed for inclusion in the code regarding some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024:

- ***Standard for Heliports and Vertiports (NFPA 418-24)***
- ***Heliport Design (U.S. DOT/FAAAC 150/390-2D-2023)***
- ***Vertiport Design (U.S. DOT/FAA Engineering Brief Number 105-2022)***
- ***Standard Specification for Vertiport Design (ASTM F3423-23)***

Attached Files

- **Heliport Accident Case Study NTSB No. WPR22LA018-c LLR.pdf**
  https://www.cdpaccess.com/proposal/10558/30568/files/download/4825/

- **F77 A Retrospective & Historical Analysis of Vertical Lift Infrastructure Accidents Final-c.pdf**
  https://www.cdpaccess.com/proposal/10558/30568/files/download/4784/

Reason: These recommended changes are to better align and harmonize the IFC and IBC with recognized U.S. Department of Transportation's Federal Aviation Administration (FAA) and the National Fire Protection Association (NFPA) design standards for heliports, helistops, vertiports, and vertistops.

Bibliography:

- U.S. DOT/FAA Heliport Design Advisory Circular, AC 150/5390-2D, 2023.
- NFPA-418, Standards for Heliports and Vertiports, 2024
- Bassey, R., 2022, FAA Engineering Brief No. 105, Vertiport Design.
- **Heliport Accident Case Study NTSB No. WPR22LA018-c LLR.pdf**

  https://www.cdpaccess.com/proposal/10558/30568/files/download/4825/

- **F77 A Retrospective & Historical Analysis of Vertical Lift Infrastructure Accidents Final-c.pdf**

  https://www.cdpaccess.com/proposal/10558/30568/files/download/4784

Cost Impact: Increase

Estimated Immediate Cost Impact:

Minimally $0.00 if currently complying. The cost impact justification provide more detail on possible costs.

Estimated Immediate Cost Impact Justification (methodology and variables):

To calculate the potential cost impact that these recommendations may have, it is first necessary to understand how the ICC references FAA and NFPA standards, then how the NFPA references FAA standards, how FAA referenced NFPA and ICC standards, and finally how long these references have been in place.

ICC 2021 Reference to NFPA-418:

IFC 2021:

2007.1 General. Helistops and heliports shall be maintained in accordance with Sections 2007.2 through 2007.8. Helistops and heliports on buildings **shall** be constructed in accordance with the International Building Code.

IBC 2021:

[F] 412.7.4 Rooftop heliports and helistops. Rooftop heliports and helistops **shall** comply with NFPA 418.

**Based on a review of past ICC standards the above language has not changed since at least the release of the 2012 revisions.*

NFPA-418, Reference to FAA Heliport Standards: *Listed by revision year.

NFPA*418 was first published in 1967.

NFPA-418 (2011):

4.2.2 The design of the heliport, including all the aeronautical components, shall be in accordance with FAA AC 150/5390-2B, Heliport Design Advisory Circular.

NFPA-418 (2016) & (2021): **Updated to reflect FAA AC revision 2C (2021)*

4.2.2 The design of the heliport, including all the aeronautical components, shall be in accordance with FAA AC 150/5390-2C, Heliport Design Advisory Circular.

NFPA-418 (2024): **Updated to reflect FAA AC revision 2D (2024), include the term "Helistop", and add reference to FAA Engineering Brief No. 105 and include the terms "Vertiport" & "Vertistop".*

6.2.2 The design of the heliport or helistop, including all the aeronautical components, shall be in accordance with FAA AC 150/5390-2D, Heliport Design Advisory Circular, or equivalent criteria.

6.2.3 The design of the vertiport or vertistop, including all aeronautical components, shall be in accordance with FAA Engineering Brief No. 105 for Vertiports, or equivalent design criteria.

FAA AC 150/5390 Reference to NFPA and ICC:

First published in 1959 the FAA Heliport Design Advisory Circular AC 150/5390 has referenced NFPA-418 and other NFPA standards since 1977. To date the FAA Heliport Advisory Circulars has not referenced any International Code Council documents. The following statement on code is made in FAA AC 2D (2024):

Applicability

"Other federal agencies, states, or other authorities having jurisdiction over the construction of heliports not funded with AIP, CARES Act, or PFC funds have discretion in establishing the extent to which these standards apply."

1.18 Local Role and Building Code.

"Some communities have enacted zoning laws, building codes, fire regulations, etc., that can affect heliport establishment and operation. Most municipalities have a formal process such as a "Conditional Use Permit" in place for the establishment of a heliport. Check with your local Planning and Zoning Commission for details. Some have or are in the process of developing codes or ordinances regulating environmental issues such as noise and air pollution. A few localities have enacted specific rules governing the establishment of a heliport. Therefore, make early contact with officials or agencies representing the local zoning board, the fire, police, or sheriff's department, and elected personnel who represent the area where the heliport is to be located."

Cost Impact to Rooftop Heliports, Helistops, Vertiports, and Vertistops

Due to current and past referencing, those states and/or municipalities who have adopted and follow ICC Building Code and Fire Code criteria, as written, should see little to no impact in the overall cost associated with rooftop heliports or helistops. Given that the FAA is using the same physical geometry and airspace criteria for vertiports and vertistops as used by heliports and helistops in the development of those standards, it is expected that the inclusion of vertiports and vertistops into the ICC will not have an impact on overall costs associated with these rooftop use cases as well.

Cost Impact to Ground Heliports, Helistops, Vertiports, and Vertistops

Dimensional Standard

The one significant change proposed to the ICC is in deleting the word "rooftop" therefore the standard will encompass ALL heliports, helistops, vertiports, and vertiports. In so doing, the following associated costs for ground-based sites may in fact increase.

The overall size of a heliport designed to FAA standards is based on the overall length of the largest helicopter expected to operate at that site. Current FAA standards dictate that the landing area known as the Touchdown and Liftoff (TLOF), i.e., *"A load-bearing (generally paved) area normally centered in the FATO, on which the helicopter performs a touchdown or liftoff"* should be designed to 0.83 X the overall length (OL) of the largest helicopter that will potentially land at that site. In those case where the heliport is associated with a hospital, which make up approximately 65% of all the heliports in the U.S., the minimum size for a TLOF is 40' X 40'.

Given the average size of a standard Helicopter Air Ambulance has a controlling dimensions between 39.2 feet (Bell-206B) and 45.1 feet (AS-365 Dauphin) respectively, the following cost increases would apply in those cases where the heliport would need to be increased. Provided that the current cost of poured concrete to the standard depth for a heliport range between $6.00./ sq ft to $10.00/ sq ft.

Heliport Size Increase Cost Analysis:

Aircraft	OL	Min TLOF (OL X 0.83)	TLOF ft^2	Increase to 40' X 40'	Est. Increased Cost at $6.00/ ft^2	Est. Increased Cost at $10/ ft^2
Bell-206B	39.2'	32.5'	1,056'	544 ft^2	$3,264	$5,440
AS-365	45.1	37.4'	1,399'	201 ft^2	$1,206	$2,010

At those location that support helicopters larger than those identified above, any cost increase would be based on how much larger the helicopter's overall length may be in comparison to the minimum 40' X 40' standard.

The largest non-military helicopter generally operated in the United States is currently the Sikorsky S-92 which has an overall length of 68.5 feet with a maximum takeoff weight of 26,500 lbs. For these larger helicopters additional consideration for weight capacity also needs to be considered, which will in turn increase cost. For this helicopter the minimum TLOF dimension would be 68.5' X 68.5' with an overall square footage of 4,692'.
Overall cost estimate at $20/ft^2 for the increased material would be approximately $93,840.

It should be pointed out that for both personal and public heliports may utilize a Turf surface, i.e., grass in lieu of concrete when deemed appropriate.

Potential Fire Safety Equipment Cost Increase

For ground-based heliports, NFPA-418 identifies the acceptable size and number of fire extinguishers that shall be required to meet the standard. With the deletion of the term "rooftop" all heliports, helistops, vertiports, and vertistop would be required to have a fire extinguisher of the appropriate size and category on site. The size of the fire extinguisher is dictated by the overall length of the largest helicopter, see applicable chart, that the heliport is required to accommodate. The category of fire extinguisher is dictated by NFPA-10, Standard for Portable Fire Extinguishers.

NFPA-418 Minimum Requirement. At least one portable fire extinguisher as specified in Table 11.2 shall be provided for each takeoff and landing area, parking area, and fuel storage area.

Fire Extinguisher Size Based on helicopters Overall Length

Helicopter Model	Overall Length (ft)	Overall Length (m)	Category
Brantly/Hynes B-2B	28.1	8.6	H-1
Robinson R-22 Beta	28.8	8.8	H-1
Sikorsky HU-269A/A-1/B, TH55A	29.0	8.8	H-1
Entrom F28F/ 280FX	29.3	8.9	H-1
Enstrom 480 / TH-28	30.1	9.2	H-1
MD500 E	30.8	9.4	H-1
Sikorsky 300C	30.8	9.4	H-1
Sikorsky 300CB / Cbi	30.8	9.4	H-1
Sikorsky 330 / 330SP /333	31.2	9.5	H-1
Sikorsky S-434	31.2	9.5	H-1
MD530 F	32.1	9.8	H-1
MD520 N	32.1	9.8	H-1
Brantly/Hynes 305	32.9	10.0	H-1
Eurocopter SA-316/319 Alouette	33.4	10.2	H-1
MD600 N	36.9	11.2	H-1
Eurocopter EC-120	37.8	11.5	H-1
Robinson R-44 Raven	38.3	11.7	H-1
Robinson R-66 Turbine	38.3	11.7	H-1
MDExplorer / 902	38.8	11.8	H-1
Eurocopter BO-105	38.9	11.9	H-1
Bell B206B-1,2,3	39.2	11.9	H-1
Eurocopter SA-341/342 Gazelle	39.3	12.0	H-1
EurocopterEC-135	40.0	12.2	H-1
Farchild-Hiller 360/UH-12/OH-23	40.8	12.4	H-1
Rgoerson-Hiller FH/RH-1100	41.3	12.6	H-1
Bell B407	41.4	12.6	H-1
Eurocopter EC-130	41.5	12.6	H-1
Eurocopter SA-315 Lama	42.3	12.9	H-1
Agusta Westland AW - 119 Ke	42.4	12.9	H-1
Bell B206L-1,3,4	42.4	12.9	H-1
Agusta Westland AW - 109S Grand	42.5	13.0	H-1
Eurocopter AS-350 A Star	42.5	13.0	H-1
Eurocopter AS-355 Twin Star	42.5	13.0	H-1
Bell B427VFR	42.6	13.0	H-1

Helicopter Model	Overall Length (ft)	Overall Length (m)	Category
Agusta WestlandA -119 Koala	42.7	13.0	H-1
Eurocopter BK-117	42.7	13.0	H-1
Eeurocopter C-145 / UH-72A	42.7	13.0	H-1
Agusta Westland A-109 A	42.8	13.0	H-1
Agusta Westland AW-109E Power	42.8	13.0	H-1
Bell B429	43.0	13.1	H-1
Eurocopter AS-360 Dauphin	43.3	13.2	H-1
Bell B47G	43.6	13.3	H-1
Eurocopter AS-365 DauphinH-65 Dolphin	45.1	13.7	H-1
Eurocopter EC-155	46.9	14.3	H-1
Bell B222B, UT	50.3	15.3	H-2
Bell B230	50.3	15.3	H-2
Bell B430	50.3	15.3	H-2
Kaman K-Max / K1200	52.0	15.8	H-2
Agusta Westland Westland WG30	52.2	15.9	H-2
Kaman SH-G Seasprite	52.5	16.0	H-2
Sikorsky S-76A/B/C/D	52.5	16.0	H-2
Agusta Westland AW - 139	54.7	16.7	H-2
Bell B412EP, SP, HP	56.2	17.1	H-2
Bell B212	57.3	17.5	H-2
Bell B205B, UH-1H, Huey II, 210	57.8	17.6	H-2
Eurocopter SA-330 Puma	59.6	18.2	H-2
Eurocopter SA/AS-332 Super Puma	61.3	18.7	H-2
Bell B214 ST	62.2	19.0	H-2
Sikorsky S-55 / H19	62.6	19.1	H-2
Eurocopter EC-224	64.0	19.5	H-2
Sikorsky S-70i/UH-60L Blackhawk	64.8	19.8	H-2
Sikorsky S-58 / H34	65.8	20.1	H-2
Sikorsky S-92	68.5	20.9	H-2
Sikorsky S-61 / H-3	72.8	22.2	H-2
Agusta Westland AW - 101	74.8	22.8	H-2
Boeing 107/CH-46E	84.3	25.7	H-3
Erickson S-64E Air Crane	88.5	27.0	H-3
Erickson S-64F Air Crane	88.5	27.0	H-3

Depending on the size and type of fire extinguisher required the cost can range from as little as $500.00 for a 30 lb. ABC fire extinguisher to upwards of $12,000 and above for a wheeled 250 lb. Purple K.

Cost Impact: Potential Cost Savings

INCLUSION OF EMERGENCY HELICOPTER LANDING FACILITY

By defining and including the term Emergency Helicopter Landing Facility (EHLF) it provides the Authority Having Jurisdiction the ability to apply those FAA standards in lieu of those for heliports, helistops, vertiports, and vertistops. This will in turn means that less stringent criteria can now be used and the cost associated will decrease.

ACCIDENT PREVENTION

Heliport Accident Research

In the Vertical Flight Society research paper entitled “A Retrospective & Historical Analysis of Vertical Lift Infrastructure Accidents for the Purpose of Operational Risk Identification and Accident Prevention”, published May 2021, see included material, it was found that 93% of all heliport accidents occurred at heliports that did not follow FAA standards.

Price of Human Life on a Helicopter

In 2011, the FAA reported that the U.S. Government equated each human life on board a helicopter to be worth approximately $6 million.

Link to quote: https://www.aviationlawmonitor.com/2011/01/airlines/faa-human-life-worth-6-million/

Based on standard inflation, in 2024 that same amount would equate to $8.1 million.

Heliport Accident Research

2021 Grand Canyon Accident Report

In a recent out of court settlement involving a helicopter accident in Peach Springs, Arizona (NTSB Accident Number WPR18MA087) where the heliport being utilized did not meet basic FAA standards, i.e., and approach departure path that avoids downwind operations, a jury awarded one of the familys involved $100 million dollars.

Link to review: https://aerossurance.com/safety-management/grand-canyon-air-tour-tailwind/

Link to Story: https://www.bbc.com/news/uk-england-sussex-55674015

Tucson Medical Center Heliport

Helicopter Accident at the Tucson Medical Center rooftop heliport in Tucson, Arizona, NTSB Accident Number WPR22LA018, helicopter hits incorrectly placed fire extinguisher while operating at substandard heliport. See included case study.

1. Link to Article: https://verticalmag.com/features/blind-spots-the-danger-of-inadequate-landing-infrastructure/

F180-24

F181-24

IFC: SECTION 202, CHAPTER 22

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Robert J Davidson, Davidson Code Concepts LLC, Self (rjd@davidsoncodeconcepts.com)

2024 International Fire Code

CHAPTER 2 DEFINITIONS

SECTION 202 GENERAL DEFINITIONS

Revise as follows:

COMBUSTIBLE DUST. Finely divided solid material which ~~is 420 microns or less in diameter and which~~, when dispersed in air <u>or oxidizing medium</u> in the proper proportions, could be ignited by a flame, spark or other source of ignition. ~~*Combustible dust* will pass through a US No. 40 standard sieve.~~

DEFLAGRATION. An exothermic reaction, such as the extremely rapid oxidation of a flammable dust or vapor in air <u>or oxidizing medium,</u> in which the reaction progresses through the unburned material at a rate less than the velocity of sound. A deflagration can have an explosive effect.

EXPLOSION. ~~An effect produced by the sudden violent expansion of gases, which may be accompanied by a shock wave or disruption, or both,~~ <u>The failure</u> of enclosing materials or structures <u>due to an increase in internal pressure from deflagration or detonation.</u> An explosion could result from any of the following:

1. Chemical changes such as rapid oxidation, *deflagration* or *detonation*, decomposition of molecules and runaway polymerization (usually *detonations*).
2. Physical changes such as pressure tank ruptures.
3. Atomic changes (nuclear fission or fusion).

Add new definition as follows:

<u>**FLASH FIRE**</u>**.**
<u>A fire that spreads by means of a flame front rapidly through a diffuse fuel, such as dust, gas, or the vapors of an ignitible liquid, without the production of damaging pressure.</u>

CHAPTER 22 COMBUSTIBLE DUST-PRODUCING OPERATIONS

SECTION 2201 GENERAL

Revise as follows:

2201.1 Scope. The <u>facilities,</u> equipment, processes and operations ~~involving~~ <u>in which combustible</u> dust explosion, deflagration<u>, fire or flash fire</u> hazards ~~and use or handling of *combustible dust*~~ <u>exist</u> shall comply with the provisions of this chapter.

Exceptions:

1. Storage and use of consumer materials in Group B or R occupancies.
2. Storage and use of commercially packaged materials in Group M occupancies.

3. Materials displayed in original packaging in Group M occupancies and intended as building materials or for personal or household use.
4. Storage of sealed containers of *combustible dust* at facilities not associated with an operation that uses, handles or generates *combustible dust*.
5. Materials stored or used in farm buildings or similar occupancies intended for on-premises agricultural purposes.
6. <u>When the facility or use is outside the scope of NFPA 652.</u>
7. <u>Restaurants, retail bakeries, coffee shops, and similar occupancies that have limited use of flour, sugar, coffee grinds, and other finely divided combustible dust or particulate solid ingredients in preparation of foods, snacks, and similar.</u>

2201.2 Permits.
Permits shall be required for *combustible dust*-producing operations as set forth in Section 105.5.

SECTION 2202 DEFINITIONS

Revise as follows:

2202.1 Definition.
The following terms are defined in Chapter 2:

COMBUSTIBLE DUST.

DUST COLLECTION SYSTEM.

<u>FLASH FIRE.</u>

SECTION 2203 DUST EXPLOSION ~~PREVENTION~~ <u>CONTROL</u>

2203.1 ~~Critical depth layer~~ <u>Combustible Dust Hazard Identification</u>.
~~The maximum dust layer on all surfaces, including but not limited to walls, ceilings, beams, equipment, furniture, pipes and ducts, shall not exceed the critical depth layer specified in Table 2203.1. The critical depth layer is permitted to be adjusted for explosion hazard where further evaluated in accordance with one of the following:~~

1. ~~Section 7.2.1.3 of NFPA 654.~~
2. ~~Section 4.1.3.3 of NFPA 664 for wood flour.~~

~~Accumulated *combustible dust* shall be collected by one of the methods listed in Section 2203.5.~~<u>Where the smallest dimension of the material is less than or equal to 500 µm, the owner/operator shall be responsible for determining whether the material is combustible or explosible. Where the combustibility of a dust or particulate solid is not determined by an *approved* source, the owner/operator shall test representative samples in accordance with NFPA 652. A copy of the test results shall be provided to the *fire code official* upon request.</u>

Delete without substitution:

~~TABLE 2203.1 CRITICAL DEPTH LAYER~~

TYPE OF DUST	CRITICAL DEPTH LAYER (INCHES)
Wood flour	$^{1}/_{8}$

All other dusts	1/32

~~For SI: 1 inch = 25.4 mm.~~

Revise as follows:

2203.2 Dust Hazard Analysis ~~-producing and dust-handling equipment~~. ~~Dust producing equipment and dust-handling equipment, including but not limited to vacuums, dust collection systems, dryers, mixers, blenders, separators, conveyors, storage containers, silos or other similar devices, shall be *listed* and shall be maintained in accordance with the manufacturer's recommended standards.~~ Where a dust is combustible or *explosible*, a dust hazard analysis (DHA) shall be performed and documented for new or existing facilities in accordance with NFPA 652. A copy of the DHA shall be provided to the *fire code official* upon request.

> **Exception:** Woodworking operations that occupy areas smaller than 5000 ft (465 m2), and where dust-producing equipment requires an aggregate dust collection flow rate less than 1500 ft3/min (2549 m3/hr) and the equipment is installed in accordance with the International Mechanical Code. (NFPA 664 1.1.2)

2203.3 Dust control and management system ~~-collection and dust-conveying systems~~.
~~Dust-collection and dust-conveying systems shall be in accordance with Sections 2203.3.1 through 2203.3.3.~~ Facilities where combustible dusts or powders are used, handled, generated shall have dust control, cleaning, training, operations procedures, and management procedures to prevent conditions, operations, or accumulations of combustible dusts that could pose a fire, flashfire, or explosion hazard.

2203.3.1 Housekeeping and cleaning ~~Dust-collection systems~~.
~~Dust-collection systems shall be designed to collect dust emissions from dust-producing equipment at the point of generation. Dust-collection systems shall be in accordance with Section 510 of the *International Mechanical Code*.~~

> ~~**Exception:** *Closed systems* using *listed* equipment and designed in accordance with manufacturer's recommendations and specifications, where cleanouts are provided in accordance with Section 2203.3.3.~~

~~Heating, ventilation, and air conditioning (HVAC) systems shall not be used as the means to collect dusts from localized sources.~~
Facilities where combustible dusts or powders are used, handled, generated shall have regular housekeeping and cleaning procedures to prevent accumulations of combustible dusts that could pose a fire, flash fire, or explosion hazard. Dust shall be maintained at 1/8" inch or less, or as otherwise required in standards listed in Table 2205.1

Delete without substitution:

~~2203.3.1.1 Location~~.
~~Dust collectors shall be located outside of buildings.~~

> ~~**Exceptions:**~~
> 1. ~~Dust collectors inside buildings complying with Section 510 of the *International Mechanical Code*.~~
> 2. ~~Wet-type dust collectors specifically *listed* for the type of dust conveyed shall be permitted inside buildings where in accordance with the manufacturer's instructions and specifications.~~
> 3. ~~Dust collectors designed to specific NFPA standards listed in Table 2205.1 for the specific type of dust conveyed.~~

~~2203.3.1.2 Minimum conveying velocities~~.
~~The minimum velocities within ducts used as part of the dust collection system shall be in accordance withTable 2203.3.1.2.~~

~~TABLE 2203.3.1.2 MINIMUM CONVEYING VELOCITIES~~

TYPE OF PRODUCT	FEET PER MINUTE
Fine light dust such as cotton, lint and wood flour (100 mesh and under)	2,000
Dry dust such as fine rubber molding powder	2,500
Average dust such as sawdust, grinding dust and coal dust	3,500
Heavy dust such as metal turnings, including aluminum and magnesium powder	4,000

~~For SI: 1 foot per minute = 0.00508 m/s.~~

~~**2203.3.2 Plastic ducts and conveying systems.** Plastic, fiberglass, other nonconductive ducts, duct liners or pipes shall not be used as part of ducts and conveying systems. Ductwork utilizing a combustible lining shall be permitted only in high-impact areas and where *approved*. Flexible hose shall be permitted if designed and installed in accordance with the following requirements:~~

1. ~~Manufactured of static dissipative construction.~~
2. ~~Used only for connections and isolation purposes.~~
3. ~~Limited to 18 inches (457 mm) in length.~~
4. ~~Properly grounded.~~

Add new text as follows:

2203.3.2 Management systems, training, and operation procedures. The owner / operator shall maintain management systems in accordance with Chapter 8 of NFPA 652 to ensure the facility and equipment is safely maintained and operated.

Delete without substitution:

~~2203.3.3 Cleanouts~~.
~~Openings in enclosed equipment and conveyors shall be provided to allow access to all parts of the equipment and conveyors to permit inspection, cleaning, maintenance and the effective use of portable fire extinguishers or hose streams. Cleanouts for ducts used as part of the dust collection system shall be in accordance with the *International Mechanical Code*.~~

Add new text as follows:

2203.3.3 Documentation. A copy of the required documentation shall be maintained in accordance with NFPA 652.

Revise as follows:

2203.4 Sources of ignition.
Sources of ignition shall be controlled in accordance with NFPA 652 and NFPA 70 ~~Sections 2203.4.1 through 2203.4.9.5~~.

Delete without substitution:

~~2203.4.1 Classified electrical~~.
~~Classified electrical shall be in accordance with NFPA 70. Electrical motors and electrical components of the equipment shall not be installed in the dust-laden airstream unless *listed* for Class II, Division 1, locations.~~

~~**2203.4.2 Static electricity.** Bonding and grounding is required to minimize accumulation of static electric charge in the following locations:~~

1. ~~Dust-producing equipment.~~
2. ~~Dust collection system.~~
3. ~~Pneumatic dust-conveying systems conveying *combustible dust* from one location to another, *combustible dust* conveyors, piping and conductive components. Conveying systems include transport modes such as railcars, hopper cars, boxcars, tank cars and trucks into which or from which commodities or products are pneumatically conveyed.~~
4. ~~Conveying systems using metallic piping.~~

~~**2203.4.3 Hot works.**~~

~~Hot work and similar spark-producing operations shall not be conducted in or adjacent to *combustible dust* producing areas unless precautions have been taken to provide safety. Hot work shall be permitted only in safe, designated areas in accordance with Chapter 35. Hot work is prohibited on equipment that is operating.~~

~~**2203.4.3.1 Signs.** Conspicuous signs with the following warning shall be posted in the vicinity of *combustible dust* producing areas or in the vicinity of *combustible dust* use:~~

~~NO WELDING. THE USE OF WELDING OR CUTTING EQUIPMENT IN OR NEAR THIS AREA IS DANGEROUS BECAUSE OF FIRE AND EXPLOSION HAZARDS.~~

~~WELDING AND CUTTING SHALL BE DONE ONLY UNDER THE SUPERVISION OF THE PERSON IN CHARGE.~~

~~**2203.4.4 Hot surfaces and hot equipment.**~~

~~In areas where a dust explosion hazard or dust flash fire hazard exists, the temperature (in degrees Celsius) of external surfaces shall be maintained below 80 percent of the lower of the dust surface ignition temperature or the dust cloud ignition temperature for worst-case dusts. External surfaces shall include but are not limited to:~~

1. ~~Compressors.~~
2. ~~Steam, water or process piping.~~
3. ~~Ducts.~~
4. ~~Conveyors.~~
5. ~~Process equipment.~~

~~Where steam pipes or hot surfaces occur in dust-producing or dust-handling areas, accumulation of dust on the surfaces shall be minimized by an *approved* method.~~

~~**Exception:** Drying apparatus *listed* for the intended use and installed in accordance with the manufacturer's instructions.~~

~~**2203.4.5 Powered industrial trucks.** Powered industrial trucks used in electrically classified areas shall be *listed* for such use.~~

~~**2203.4.6 Smoking prohibited.**~~

~~Smoking shall be prohibited in or adjacent to dust-producing or dust-handling areas. " No Smoking " signs complying with Section 310 shall be conspicuously posted in such areas. Smoking shall be permitted only in designated areas.~~

~~**2203.4.7 Spark-producing devices.** S park-producing devices shall not be located within 20 feet (6096 mm) of areas requiring classified electrical unless separated by a permanent partition.~~

~~**2203.4.8 Self-heating materials.**~~
~~Materials in silos and other large storage piles of particulates prone to self-heating shall be in accordance with Section 9.4.11 of NFPA 652.~~

~~**2203.4.9 Open flames and fuel-fired equipment.**~~
~~Open flames and fuel-fired equipment shall be in accordance with Sections 2203.4.9.1 through 2203.4.9.5.~~

~~**2203.4.9.1 Release ofairborne combustible dust.** Production, maintenance or repair activities that have the potential to release or force *combustible dust* to become airborne shall not be conducted within 35 feet (11 m) of an open flame or pilot flame.~~

~~**2203.4.9.2 Space heaters.** Fuel-fired space heaters drawing local ambient air shall not be located within electrically classified areas. Space-heating appliances in dust producing or dust-handling areas shall be located where not subject to the accumulation of deposits of *combustible dust*.~~

~~**2203.4.9.3 Equipment listing.** Fuel-fired process equipment shall be *listed* for its intended use and shall be operated and maintained in accordance with the manufacturer's instructions.~~

~~**2203.4.9.4 Inspection and preventive maintenance.** Inspection and maintenance of fuel-fired process equipment shall include verification that significant *combustible dust* accumulations do not exist within or around the equipment.~~

~~**2203.4.9.5 Sources of combustion air.** In Class II electrically classified locations, heating units shall be provided with a source of combustion air ducted directly from the building exterior or from an unclassified location.~~

~~**2203.5 Housekeeping.**~~
~~Accumulation of *combustible dust* on surfaces inside buildings shall be maintained below the critical depth layer in Section 2203.1. Pressurized air or similar methods shall not be used to remove dust from surfaces. Accumulated *combustible dust* shall be collected by one of the following methods:~~

1. ~~Portable vacuum cleaners *listed* for use in Class II, Group G, Division 1, atmospheres as defined in NFPA 70.~~
2. ~~Dust collection systems.~~
3. ~~Other *approved* means that will not place *combustible dust* into suspension in air.~~

~~**Exception:** Forced-air or similar methods shall be permitted to remove dust in accordance with NFPA 652, NFPA 654 or NFPA 664.~~

~~**2203.6 Standard operational procedures.** Dust-producing equipment and all associated equipment, including dust collection equipment, shall be maintained in accordance with the manufacturer's instructions and specifications and applicable codes. The inspection, testing and maintenance program shall include the following, as applicable:~~

1. ~~Fire and explosion protection and prevention equipment, as applicable, in accordance with the appropriate NFPA standards.~~
2. ~~Dust control equipment.~~
3. ~~Control of potential ignition sources.~~
4. ~~Electrical, process and mechanical equipment, including applicable process interlocks.~~
5. ~~Lubrication of bearings for dust collection, dust-handling and dust-producing equipment.~~
6. ~~Additional maintenance in accordance with the manufacturer's instructions and specifications for dust collection, dust-handling and dust-producing equipment.~~

~~Records shall be kept of maintenance and repairs performed. The standard operating procedures shall be submitted to the *fire code official* for review and approval. The written standard operating procedures shall be signed by the person responsible for facility~~

~~operations.~~

~~**2203.7 Emergency response plan.** A written emergency response plan shall be developed for preventing, preparing for and responding to work-related emergencies, including but not limited to fire and explosion. The following information shall be developed into the plan:~~

1. ~~Identification of dust hazards.~~
2. ~~Identification and location of all utilities to affected areas.~~
3. ~~Site plans or floor plans locating utility shutoff controls, including water, gas and power.~~
4. ~~The potential for explosion.~~
5. ~~Locations of fire-extinguishing equipment compatible with the hazards present.~~
6. ~~Any additional information required by the *fire code official* .~~

~~**2203.8 Training.**~~

~~The plans and procedures required in Sections 2203.5, 2203.6 and 2203.7 shall be *approved* by the *fire code official*. The plans and procedures shall be reviewed annually and updated as required by process changes. Initial and annual refresher training shall be provided to employees who are involved in operating, maintaining and supervising facilities that handle *combustible dust*. Initial and annual refresher training shall include:~~

1. ~~Workplace hazards.~~
2. ~~General orientation, plant diagrams and plant safety rules.~~
3. ~~Process description or flowchart.~~
4. ~~Equipment operation, safe startup and shutdown, and response to hazard conditions or an incident.~~
5. ~~The location and use of all related fire and explosion protection and prevention systems.~~
6. ~~Equipment maintenance requirements and practices, including visual inspections of conveyors and ducts.~~
7. ~~Housekeeping requirements, including the maintenance of the critical depth layer in Section 2203.1.~~
8. ~~Emergency response plans as required in Section 2203.7.~~

~~The employer shall maintain records of initial and annual training and review.~~

~~SECTION 2204~~
~~DUST EXPLOSION SCREENING TESTS~~

~~**2204.1 Combustibility and explosivity tests.**~~

~~Where combustibility or explosivity screening tests are required to analyze the *combustible dust* as part of compliance with Section 104.9 and Section 414.1.3 of the *International Building Code*, they shall be in accordance with Section 5.4 of NFPA 652.~~

~~**2204.2 Samples.**~~

~~Representative samples for the screening test shall be obtained in accordance with Section 5.5 of NFPA 652.~~

Add new text as follows:

SECTION 2204
FACILITIES, EQUIPMENT, AND OPERATIONS

2204.1 Facilities, equipment, and operations. Facilities, equipment and operations with combustible dust hazards shall be in accordance with Sections 2204.1 through 2204.4.

2204.1.1 Dust-producing and dust-handling equipment. Dust-producing equipment and dust-handling equipment, including but not limited to vacuums, dust collection systems, dryers, mixers, blenders, separators, conveyors, storage containers, silos or other similar devices, shall be designed, installed and maintained in accordance with the International Mechanical Code and applicable standards listed in Table 2205.1

2204.1.2 Dust-collection systems. Dust-collection systems shall be designed to collect dust emissions from dust-producing equipment at the point of generation. Dust-collection systems shall be in accordance with Section 511 of the *International Mechanical Code* and applicable standards listed in Table 2205.1.

2204.2 HVAC systems. Heating, ventilation, and air conditioning (HVAC) systems shall not be used as the means to collect dusts from localized sources.

Revise as follows:

~~2203.2.1~~ 2204.3 Signages and markings.
Signages and markings shall be provided in accordance with Sections 2204.3 and applicable standards listed in Table 2205.1 ~~2203.2.1.1 through 2203.2.1.3~~.

~~2203.2.1.1~~ 2204.3.1 Deflagration vent discharge area markings. Where dust collection systems and other equipment, systems or system components are provided with *deflagration* vents , the area within the *deflagration* vent's discharge area shall be marked in an *approved*manner.

~~2203.2.1.2~~ 2204.3.2 Caution signs. Signs that read as follows shall be posted near the dust-containing equipment with deflagration vents:
CAUTION: THIS EQUIPMENT CAN CONTAIN EXPLOSIVE DUST.
KEEP OUTSIDE THE MARKED AREA WHILE EQUIPMENT IS OPERATING.

~~2203.2.1.3~~ 2204.3.3 Warning signs. Where dust collection systems and other equipment, systems or system components are provided with deflagration vents, vent closures shall be clearly marked as follows:
WARNING: EXPLOSION RELIEF DEVICE. STAY CLEAR.

Add new text as follows:

2204.4 Exhaust system and ducts. Exhaust systems and ducts shall be designed, constructed and maintained in accordance with the International Mechanical Code and applicable standards listed in Table 2205.1.

SECTION 2205
STANDARDS

Revise as follows:

2205.1 Specific hazards standards. The owner/operator of a facility with a combustible dust hazard shall be responsible for following the ~~*fire code official* is authorized to enforce~~ additional industry- or material-specific provisions of the codes and standards listed in Table 2205.1 to prevent and control dust explosions, as applicable. Mission continuity requirements found in NFPA standards are not required by this code.

TABLE 2205.1 EXPLOSION PROTECTION STANDARDS

STANDARD	SUBJECT

STANDARD	SUBJECT
NFPA 61	Standard for the Prevention of Fires and Dust Explosions in Agricultural and Food Processing Facilities
NFPA 68	Standard on Explosion Protection by Deflagration Venting
NFPA 69	Standard on Explosion Prevention Systems
NFPA 70	National Electrical Code
NFPA 77	Recommended Practice on Static Electricity
NFPA 85	Boiler and Combustion System Hazards Code
NFPA 120	Standard for Fire Prevention and Control in Coal Mines
NFPA 484	Standard for Combustible Metals
NFPA 652	The Fundamentals of Combustible Dust
NFPA 654	Standard for Prevention of Fire and Dust Explosions from the Manufacturing, Processing and Handling of Combustible Particulate Solids
NFPA 655	Standard for the Prevention of Sulfur Fires and Explosions
NFPA 664	Standard for the Prevention of Fires and Explosions in Wood Processing and Woodworking Facilities

2205.1.1 Dust hazard analysis.

If a dust hazard analysis (DHA) is required by the *fire code official* for new or existing facilities and operations, it shall be in accordance with NFPA 652. The DHA for existing facilities shall be in accordance with Section 7.1.1 of NFPA 652.

Reason: The chapter has been completely rewritten for consistency with updated NFPA standards, to ensure that correct standards are requirements are followed (as recommended by Chemical Safety Board and OSHA), and to provide users with an simple, organized approach for applying the correct provisions and standards. The proposed chapter is simpler and easier for users to follow and apply.

The new chapter follows the same basic recognized and methodical approach found in NFPA standards:

1) Identify whether dusts or particulates are combustible or explosible, including testing where necessary.

2) Perform a DHA if combustible or explosible dusts are present. The DHA identifies where dust hazards exist and how to safely prevent and mitigate incidents.

3) Ensure that dust control and management (housekeeping, training, management-of-change, etc.) systems are in place.

4) Ensure that facilities, equipment, and operations are designed in accordance with IMC, NFPA, and related reference standards.

Importantly, this proposal also includes the reference to NFPA 652 which was missing in the prior language.

The existing Chapter 22 language included a large number of isolated details specific applications, which was misleading for users, potentially resulting in dangerous conditions and lack of compliance with referenced standards. The safe use and handling of combustible dusts is extremely complicated, with hundreds of pages of material specific standards. It does not make sense to recreate hundreds or thousands of code sections in IFC that already exist in recognized standards. However, it was also not appropriate to only list some, while ignoring many more. Therefore, most detailed items were deleted – instead requiring a DHA to determine the specific requirements, which is how the NFPA and other related standards are intended to work.

Notes on specific sections:

Explosion definition: Revised for consistency with NFPA and to reflect the context of how it is used in this chapter and elsewhere in the code.

2203.2 Woodworking Exception: For the convenience of the user, and consistency with NFPA standards, the long standing NFPA 664 exception is specifically included. This is likely the most common application that AHJs and code users will encounter. It will save users time by highlighting this common exception.

2204.1.2 The exception did not make sense.

As some text was moved between sections, in CDPACCES it appears deleted in the original location and as new language in the new location. In truth it is often existing text moved. Below shows how the chapter will appear in approved.

SECTION 2201 GENERAL

2201.1 Scope. The facilities, equipment, processes and operations involving in which combustible dust explosion, deflagration, fire or flash fire hazards and use or handling of *combustible dust* may exist shall comply with the provisions of this chapter.

Exceptions:

1. Storage and use of consumer materials in Group B or R occupancies.
2. Storage and use of commercially packaged materials in Group M occupancies.
3. Materials displayed in original packaging in Group M occupancies and intended as building materials or for personal or household use.
4. Storage of sealed containers of combustible dust at facilities not associated with an operation that uses, handles or generates combustible dust.
5. Materials stored or used in farm buildings or similar occupancies intended for on-premises agricultural purposes.
6. When the facility or use is outside the scope of NFPA 652.
7. Restaurants, retail bakeries, coffee shops, and similar occupancies that have limited use of flour, sugar, coffee grinds, and other finely divided combustible dust or particulate solid ingredients in preparation of foods, snacks, and similar.

2201.2 Permits.

Permits shall be required for combustible dust-producing operations as set forth in Section 105.5.

SECTION 2202 DEFINITIONS

2202.1 Definition. The following terms are defined in Chapter 2:

COMBUSTIBLE DUST.

DUST COLLECTION SYSTEM.

FLASH FIRE

SECTION 2203 DUST EXPLOSION

PREVENTION CONTROL

2203.1. Combustible Dust Hazard Identification. Where the smallest dimension of the material is less than or equal to 500 µm, the owner/operator shall be responsible for determining whether the material is combustible or explosible. Where the combustibility of a dust or particulate solid is not determined by an *approved* source, the owner/operator shall test representative samples in accordance with NFPA 652. A copy of the test results shall be provided to the *fire code official* upon request.

2203.2 Dust hazard analysis. Where a dust is combustible or *explosible*, a dust hazard analysis (DHA) shall be performed and documented for new or existing facilities in accordance with NFPA 652. A copy of the DHA shall be provided to the fire code official upon request.

Exception: Woodworking operations that occupy areas smaller than 5000 ft (465 m2), and where dust-producing equipment requires an aggregate dust collection flow rate less than 1500 ft3/min (2549 m3/hr) and the equipment is installed in accordance with the International Mechanical Code. (NFPA 664 1.1.2)

2203.3 Dust Control and management Systems. Facilities where combustible dusts or powders are used, handled, generated shall have dust control, cleaning, training, operations procedures, and management procedures to prevent conditions, operations, or accumulations of combustible dusts that could pose a fire, flashfire, or explosion hazard.

2203.3.1. Housekeeping and cleaning. Facilities where combustible dusts or powders are used, handled, generated shall have regular housekeeping and cleaning procedures to prevent accumulations of combustible dusts that could pose a fire, flash fire, or explosion hazard. Dust shall be maintained at 1/8” inch or less, or as otherwise required in standards listed in Table 2205.1

2203.3..2 Management systems, training, and operating procedures. The owner / operator shall maintain management systems in accordance with Chapter 8 of NFPA 652 to ensure the facility and equipment is safely maintained and operated.

2203.3.3 Documentation. A copy of the required documentation shall be maintained in accordance with NFPA 652**.**

2203.4 Sources of ignition. Sources of ignition shall be controlled in accordance with NFPA 652 and NFPA 70.

SECTION 2204

DUST EXPLOSION SCREENING TESTS FACILITIES, EQUIPMENT AND OPERATIONS

2204.1 Facilities, equipment, and operations. Facilities, equipment and operations with combustible dust hazards shall be in accordance with Sections 2204.1 through 2204.4.

2204.1.1 Dust-producing and dust-handling equipment. Dust-producing equipment and dust-handling equipment, including but not limited to vacuums, dust collection systems, dryers, mixers, blenders, separators, conveyors, storage containers, silos or other similar devices, shall be *listed* and shall be maintained in accordance with the manufacturer's recommended standards. designed, installed and maintained in accordance with the International Mechanical Code and applicable standards listed in Table 2205.1

2204.1.2 Dust-collection systems. Dust-collection systems shall be designed to collect dust emissions from dust-producing equipment at the point of generation. Dust-collection systems shall be in accordance with Section 511 of the *International Mechanical Code* and applicable standards listed in Table 2205.1.

Exception: Closed systems using listed equipment and designed in accordance with manufacturer's recommendations and specifications, where cleanouts are provided in accordance with Section 2203.3.3.

2204.2 HVAC Systems. Heating, ventilation, and air conditioning (HVAC) systems shall not be used as the means to collect dusts from localized sources.

2204.3 Signages and markings. Signages and markings shall be provided in accordance with Sections 2203.2.1.1 through 2203.2.1.32204.3 and applicable standards listed in Table 2205.1.

2204.3.1 Deflagration vent discharge area markings. Where dust collection systems and other equipment, systems or system components are provided with deflagration vents, the area within the deflagration vent's discharge area shall be marked in an *approved* manner.

2204.3.2 Caution signs. Signs that read as follows shall be posted near the dust-containing equipment with deflagration vents:

CAUTION: THIS EQUIPMENT CAN CONTAIN EXPLOSIVE DUST.

KEEP OUTSIDE THE MARKED AREA WHILE EQUIPMENT IS OPERATING.

2204.3.3 Warning signs. Where dust collection systems and other equipment, systems or system components are provided with deflagration vents, vent closures shall be clearly marked as follows:

WARNING: EXPLOSION RELIEF DEVICE. STAY CLEAR.

2204.4 Exhaust Systems and ducts. Exhaust systems and ducts shall be designed, constructed and maintained in accordance with the International Mechanical Code and applicable standards listed in Table 2205.1.

Section 2205 Standards2205.1 Specific hazards standards.

The owner/operator of a facility with combustible dust hazards shall be responsible for following the *fire code official* is authorized to enforce additional industry- or material-specific provisions of the codes and standards listed in Table 2205.1 to prevent and control dust explosions, as applicable. Mission continuity requirements found in NFPA standards are not required by this code.

TABLE 2205.1 EXPLOSION PROTECTION STANDARDSSTANDARD SUBJECT

NFPA 61 Standard for the Prevention of Fires and Dust Explosions in Agricultural and Food Processing Facilities

NFPA 68 Standard on Explosion Protection by Deflagration Venting

NFPA 69 Standard on Explosion Prevention Systems

NFPA 70 National Electrical Code

NFPA 77 Recommended Practice on Static Electricity

NFPA 85 Boiler and Combustion System Hazards Code

NFPA 120 Standard for Fire Prevention and Control in Coal Mines

NFPA 484 Standard for Combustible Metals

NFPA 652 The Fundamentals of Combustible Dust

NFPA 654 Standard for Prevention of Fire and Dust Explosions from the Manufacturing, Processing and Handling of Combustible Particulate Solids

NFPA 655 Standard for the Prevention of Sulfur Fires and Explosions

NFPA 664 Standard for the Prevention of Fires and Explosions in Wood Processing and Woodworking Facilities

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The chapter has been completely rewritten for consistency with updated NFPA standards, to ensure that correct standards are requirements are followed as recommended by the Chemical Safety Board, and to provide users with an organized approach for applying the correct provisions.

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IFC: CHAPTER 23, 2301.1, 2302.1, 2307 (New), 5706.2, 5706.2.1, 5706.2.2, 5706.2.3, 5706.2.4, 5706.2.4.1, 5706.2.4.2, 5706.2.4.3, 5706.2.4.4, 5706.2.5, 5706.2.5.1, 5706.2.5.1.1, 5706.2.5.2, 5706.2.6, 5706.2.7, 5706.2.8, 2308 (New), 5706.2.8.1, 2308.1 (New), 5706.5.4.2, 5706.5.4.3, 5706.5.4.4, 5706.5.4.5, SECTION 5707, 5707.1, 5707.1.1, 5707.1.2, 5707.2, 5707.2.1, 5707.2.2, 5707.3, 5707.3.1, 5707.3.2, 5707.3.3, 5707.4, 5707.4.1, 5707.4.2, 5707.4.3, 5707.5, 5707.5.1, 5707.5.2, 5707.5.3, 5707.5.4, 5707.5.5, 5707.6, 5707.6.1, 5707.6.2, 5707.6.3, 5707.6.4, 5707.6.5, 5707.6.6, SECTION 2307, 2307.1, 2307.2, 2307.2.1, 2307.2.2, 2307.3, 2307.4, 2307.5, 2307.6, 2307.6.1, 2307.6.2, 2307.6.3, 2307.6.4, 2307.7, 2307.8, SECTION 2308, 2308.1, 2308.2, 2308.2.1, 2308.2.2, 2308.2.3, 2308.2.4, 2308.3, 2308.3.1, 2308.4, 2308.5, 2308.6, 2308.7, 2308.8, 2308.8.1, 2308.8.1.1, 2308.8.1.2, 2308.8.1.2.1, 2308.8.1.2.2, 2308.8.1.2.3, TABLE 2308.8.1.2.3, 2308.8.1.2.4, 2308.8.1.2.5, 2308.8.1.2.6, SECTION 2309, 2309.1, 2309.2, 2309.2.1, 2309.2.2, 2309.2.3, 2309.3, 2309.3.1, 2309.3.1.1, 2309.3.1.2, 2309.3.1.2.1, 2309.3.1.2.2, 2309.3.1.2.3, 2309.3.1.2.4, 2309.3.1.3, 2309.3.1.4, 2309.3.1.5, 2309.3.1.5.1, 2309.3.1.5.2, 2309.3.1.5.3, 2309.3.1.5.4, 2309.3.1.5.5, 2309.3.2, 2309.4, 2309.4.1, 2309.5, 2309.5.1, 2309.5.1.1, 2309.5.2, 2309.5.2.1, 2309.5.3, 2309.5.3.1, 2309.6, 2309.6.1, SECTION 5809, 5809.1, 5809.1.1, 5809.2, 5809.2.1, 5809.3, 5809.3.1, 5809.3.2, 5809.3.3, 5809.4, 5809.4.1, 5809.4.2, 5809.5, 5809.5.1, 5809.5.2, 5809.6, 5809.6.1, 5809.6.2, 5809.6.3, 5809.6.4, 5809.6.5, 5809.6.6, 5809.6.7, SECTION 2310, 2310.1, 2310.2, 2310.2.1, 2310.2.2, 2310.2.3, 2310.3, 2310.3.1, 2310.3.2, 2310.3.3, 2310.3.4, 2310.3.5, 2310.4, 2310.4.1, 2310.4.2, 2310.5, 2310.5.1, 2310.5.2, 2310.5.3, 2310.5.4, 2310.5.5, 2310.5.5.1, 2310.5.6, 2310.5.7, 2310.6, 2310.6.1, 2310.6.2, 2310.6.3, 2310.6.4, SECTION 2311, 2311.1, 2311.2, 2311.2.1, 2311.2.2, 2311.2.2.1, 2311.2.2.2, 2311.2.3, 2311.2.3.1, 2311.2.3.2, 2311.2.4, 2311.3, 2311.3.1, 2311.3.2, 2311.4, 2311.4.1, 2311.4.2, 2311.4.3, 2311.5, 2311.6, 2311.6.1, 2311.6.2, TABLE 2311.6.2, 2311.7, 2311.8, 2311.8.1, 2311.8.2, 2311.8.3, 2311.8.4, 2311.8.4.1, 2311.8.4.2, 2311.8.4.3, 2311.8.4.4, 2311.8.5, 2311.8.6, 2311.8.7, 2311.8.8, 2311.8.8.1, 2311.8.8.2, 2311.8.9, 2311.8.9.1, 2311.8.9.2, 2311.8.10, 2311.8.11

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2024 International Fire Code

Revise as follows:

CHAPTER 23 MOTOR FUEL-DISPENSING ~~FACILITIES~~ AND REPAIR GARAGES

2301.1 Scope.
Automotive motor fuel-dispensing facilities, marine motor fuel-dispensing facilities, fleet vehicle motor fuel-dispensing facilities, aircraft motor-vehicle fuel-dispensing facilities, <u>and the d</u>~~D~~ispensing of motor fuels into fuel tanks of vehicles, <u>fuel containers</u> or special equipment and repair garages shall ~~be in accordance~~ <u>comply</u> with this chapter<u>,</u> ~~and~~ the *International Building Code*, *International Fuel Gas Code* and *International Mechanical Code*. ~~Such operations shall include both those that are open to the public and private operations.~~

2302.1 Definitions.
The following terms are defined in Chapter 2:

AIRCRAFT MOTOR-VEHICLE FUEL-DISPENSING FACILITY.

ALCOHOL-BLENDED FUELS.

AUTOMOTIVE MOTOR FUEL-DISPENSING FACILITY.

DISPENSING DEVICE, OVERHEAD TYPE.

FLEET VEHICLE MOTOR FUEL-DISPENSING FACILITY.

LIQUEFIED NATURAL GAS (LNG).

<u>MOBILE FUELING</u>

MARINE MOTOR FUEL-DISPENSING FACILITY.

REPAIR GARAGE.

SELF-SERVICE MOTOR FUEL-DISPENSING FACILITY.

Add new text as follows:

2307
FLAMMABLE AND COMBUSTIBLE LIQUID FUEL-DISPENSING ON FARMS AND CONSTRUCTION SITES

Revise as follows:

~~5706.2~~ 2307.1 Storage and dispensing of flammable and combustible liquids on farms and construction sites.
Permanent and temporary storage and dispensing of Class I and II liquids for private use on farms and rural areas and at construction sites, earth-moving projects, gravel pits or borrow pits shall be in accordance with Sections ~~5706.2.1~~ 2307.1 through ~~5706.2.8.1~~ 2307.1.8.

Exception: Storage and use of fuel oil and containers connected with oil-burning equipment regulated by Section 605 and the *International Mechanical Code*.

~~5706.2.1~~ 2307.1.1 Combustibles and open flames near tanks. Storage areas shall be kept free from weeds and extraneous combustible material. Open flames and smoking are prohibited in *flammable* or *combustible liquid* storage areas.

~~5706.2.2~~ 2307.1.2 Marking of tanks and containers. Tanks and containers for the storage of liquids above ground shall be conspicuously marked with the name of the product that they contain and the words: "FLAMMABLE—KEEP FIRE AND FLAME AWAY." Tanks shall bear the additional marking: "KEEP 50 FEET FROM BUILDINGS."

~~5706.2.3~~ 2307.1.3 Containers for storage and use.
Metal containers used for storage of Class I or II liquids shall be in accordance with DOTn requirements or shall be of an *approved* design.
Discharge devices shall be of a type that do not develop an internal pressure on the container. Pumping devices or *approved* self-closing faucets used for dispensing liquids shall not leak and shall be well-maintained. Individual containers shall not be interconnected and shall be kept closed when not in use.

Containers stored outside of buildings shall be in accordance with Section 5704 and the *International Building Code*.

~~5706.2.4~~ 2307.1.4 Permanent and temporary tanks.
The capacity of permanent above-ground tanks containing Class I or II liquids shall not exceed 1,100 gallons (4164 L). The capacity of temporary above-ground tanks containing Class I or II liquids shall not exceed 10,000 gallons (37 854 L). Tanks shall be of the single-compartment design.

Exception: Permanent above-ground tanks of greater capacity that meet the requirements of Section 5704.2.

~~5706.2.4.1~~ 2307.1.4.1 Fill-opening security. Fill openings shall be equipped with a locking closure device. Fill openings shall be separate from vent openings.

~~5706.2.4.2~~ 2307.1.4.2 Vents.
Tanks shall be provided with a method of normal and emergency venting. Normal vents shall be in accordance with Section 5704.2.7.3. Emergency vents shall be in accordance with Section 5704.2.7.4. Emergency vents shall be arranged to discharge in a manner that prevents localized overheating or flame impingement on any part of the tank in the event that vapors from such vents are ignited.

~~5706.2.4.3~~ 2307.1.4.3 Location. Tanks containing Class I or II liquids shall be kept outside and not less than 50 feet (15 240 mm) from buildings and combustible storage. Additional distance shall be provided where necessary to ensure that vehicles, equipment and containers being filled directly from such tanks will not be less than 50 feet (15 240 mm) from structures, haystacks or other combustible storage.

~~5706.2.4.4~~ 2307.1.4.4 Locations where above-ground tanks are prohibited. The storage of Class I and II liquids in above-ground tanks is prohibited within the limits established by law as set forth in the fire code adoption ordinance or other regulation adopted by the jurisdiction .

~~5706.2.5~~ 2307.1.5 **Type of tank.** Tanks shall be provided with top openings only or shall be elevated for gravity discharge.

~~5706.2.5.1~~ 2307.1.5.1 **Tanks with top openings only.** Tanks with top openings shall be mounted in accordance with either of the following:

1. On well-constructed metal legs connected to shoes or runners designed so that the tank is stabilized and the entire tank and its supports can be moved as a unit.
2. For stationary tanks, on a stable base of timbers or blocks approximately 6 inches (152 mm) in height that prevents the tank from contacting the ground.

~~5706.2.5.1.1~~ 2307.1.5.1.1 **Pumps and fittings.** Tanks with top openings only shall be equipped with a tightly and permanently attached, *approved* pumping device having an *approved* hose of sufficient length for filling vehicles, equipment or containers to be served from the tank. Either the pump or the hose shall be equipped with a padlock to its hanger to prevent tampering. An effective antisiphoning device shall be included in the pump discharge unless a self-closing nozzle is provided. Siphons or internal pressure discharge devices shall not be used.

~~5706.2.5.2~~ 2307.1.5.2 **Tanks for gravity discharge.** Tanks with a connection in the bottom or the end for gravity-dispensing liquids shall be mounted and equipped as follows:

1. Supports to elevate the tank for gravity discharge shall be designed to carry all required loads and provide stability.
2. Bottom or end openings for gravity discharge shall be equipped with a valve located adjacent to the tank shell that will close automatically in the event of fire through the operation of an effective heat-activated releasing device. Where this valve cannot be operated manually, it shall be supplemented by a second, manually operated valve.

The gravity discharge outlet shall be provided with an *approved* hose equipped with a self-closing valve at the discharge end of a type that can be padlocked to its hanger.

~~5706.2.6~~ 2307.1.6 **Spill control drainage control and diking.**
Indoor storage and dispensing areas shall be provided with spill control and drainage control as set forth in Section 5703.4. Outdoor storage areas shall be provided with drainage control or diking as set forth in Section 5704.2.10.

~~5706.2.7~~ 2307.1.7 **Portable fire extinguishers.**
Portable fire extinguishers with a minimum rating of 20-B:C and complying with Section 906 shall be provided where required by the *fire code official*.

~~5706.2.8~~ 2307.1.8 **Dispensing from tank vehicles.**
Where *approved*, liquids used as fuels are allowed to be transferred from tank vehicles into the tanks of motor vehicles or special equipment, provided that:

1. The tank vehicle's specific function is that of supplying fuel to motor vehicle fuel tanks.
2. The dispensing hose does not exceed 100 feet (30 480 mm) in length.
3. The dispensing nozzle is an *approved* type.
4. The dispensing hose is properly placed on an *approved* reel or in a compartment provided before the tank vehicle is moved.
5. Signs prohibiting smoking or open flames within 25 feet (7620 mm) of the vehicle or the point of refueling are prominently posted on the tank vehicle.
6. Electrical devices and wiring in areas where fuel dispensing is conducted are in accordance with NFPA 70.
7. Tank vehicle-dispensing equipment is operated only by designated personnel who are trained to handle and dispense motor fuels.
8. Provisions are made for controlling and mitigating unauthorized discharges.
9. Dispensing from tank vehicles shall be conducted not less than 50 feet (15 240mm) from structures or combustible storage.

Add new text as follows:

2308
FLAMMABLE AND COMBUSTIBLE LIQUID MOBILE FUEL-DISPENSING

Delete without substitution:

~~**5706.2.8.1 Location.** Dispensing from tank vehicles shall be conducted not less than 50 feet (15 240 mm) from structures or combustible storage.~~

Add new text as follows:

2308.1 Mobile fuel-dispensing.. Liquids intended for use as motor fuels are allowed tobe transferred from tank vehicles and tank cars into the fuel tanks of motor vehicles and special equipment in accordance with Sections 2308.2 through 2308.6.6.6. Marine mobile fuel-dispensing operations shall be in accordance with Section 2313.

Revise as follows:

~~5706.5.4.2~~ 2308.2 Emergency refueling.
Where *approved* by the *fire code official*, dispensing of motor vehicle fuel from tank vehicles into the fuel tanks of motor vehicles is allowed during emergencies. Dispensing from tank vehicles shall be in accordance with Sections ~~5706.2.8 and 5706.6.~~ 2308.6 and 5706.2.8.

~~5706.5.4.3~~ 2308.3 Aircraft fueling.
Transfer of liquids from tank vehicles to the fuel tanks of aircraft shall be in accordance with Chapter 20.

~~5706.5.4.4~~ 2308.4 Fueling of vehicles at farms, construction sites and similar areas.
Transfer of liquid from tank vehicles to motor vehicles for private use on farms and rural areas and at construction sites, earth-moving projects, gravel pits and borrow pits is allowed in accordance with Section ~~5706.2.8~~2307.1.8.

~~5706.5.4.5~~ 2308.5 ~~Commercial, industrial, governmental or manufacturing~~ Mobile fuel-dispensing for fleet vehicles..
Dispensing of Class I, II and III motor vehicle fuel from tank vehicles into the fuel tanks of fleet motor vehicles located at commercial, industrial, governmental or manufacturing establishments is allowed where *approved* , provided that such dispensing operations are conducted in accordance with the following:

1. Dispensing shall occur only at sites that have been issued a permit to conduct *mobile fueling*.
2. The *owner* of a *mobile fueling* operation shall provide to the jurisdiction a written response plan that demonstrates readiness to respond to a fuel spill and carry out appropriate mitigation measures, and describes the process to dispose properly of contaminated materials.
3. A detailed site plan shall be submitted with each application for a permit. The site plan shall indicate: all buildings, structures and appurtenances on site and their use or function; all uses adjacent to the *lot lines* of the site; the locations of all storm drain openings, adjacent waterways or wetlands; information regarding slope, natural drainage, curbing, impounding and how a spill will be retained on the site property; and the scale of the site plan.
   Provisions shall be made to prevent liquids spilled during dispensing operations from flowing into buildings or off-site. Acceptable methods include, but shall not be limited to, grading driveways, raising doorsills or other *approved* means.
4. The *fire code official* is allowed to impose limits on the times and days during which *mobile fueling* operations is allowed to take place, and specific locations on a site where fueling is permitted.
5. *Mobile fueling* operations shall be conducted in areas not open to the public or shall be limited to times when the public is not present.

6. *Mobile fueling* shall not take place within 15 feet (4572 mm) of buildings, property lines, combustible storage or storm drains.

   Exceptions:

   1. The distance to storm drains shall not apply where an *approved* storm drain cover or an *approved* equivalent that will prevent any fuel from reaching the drain is in place prior to fueling or a fueling hose being placed within 15 feet (4572 mm) of the drain. Where placement of a storm drain cover will cause the accumulation of excessive water or difficulty in conducting the fueling, such cover shall not be used and the fueling shall not take place within 15 feet (4572 mm) of a drain.
   2. The distance to storm drains shall not apply for drains that direct influent to *approved* oil interceptors.

7. The tank vehicle shall comply with the requirements of NFPA 385 and local, state and federal requirements. The tank vehicle's specific functions shall include that of supplying fuel to motor vehicle fuel tanks. The vehicle and all its equipment shall be maintained in good repair.
8. Signs prohibiting smoking or open flames within 25 feet (7620 mm) of the tank vehicle or the point of fueling shall be prominently posted on three sides of the vehicle including the back and both sides.
9. A portable fire extinguisher with a minimum rating of 40:BC shall be provided on the vehicle with signage clearly indicating its location.
10. The dispensing nozzles and hoses shall be of an *approved* and *listed* type.
11. The dispensing hose shall not be extended from the reel more than 100 feet (30 480 mm) in length.
12. Absorbent materials, nonwater-absorbent pads, a 10-foot-long (3048 mm) containment boom, an *approved* container with lid and a nonmetallic shovel shall be provided to mitigate a minimum 5-gallon (19 L) fuel spill.
13. Tank vehicles shall be equipped with a “fuel limit” switch such as a count-back switch, to limit the amount of a single fueling operation to not more than 500 gallons (1893 L) before resetting the limit switch.

    Exception: Tank vehicles where the operator carries and can utilize a remote emergency shutoff device that, when activated, immediately causes flow of fuel from the tank vehicle to cease.

14. Persons responsible for dispensing operations shall be trained in the appropriate mitigating actions in the event of a fire, leak or spill. Training records shall be maintained by the dispensing company.
15. Operators of tank vehicles used for *mobile fueling* operations shall have in their possession at all times an emergency communications device to notify the proper authorities in the event of an emergency.
16. The tank vehicle dispensing equipment shall be constantly attended and operated only by designated personnel who are trained to handle and dispense motor fuels.
17. Fuel dispensing shall be prohibited within 25 feet (7620 mm) of any source of ignition.
18. The engines of vehicles being fueled shall be shut off during dispensing operations.
19. Nighttime fueling operations shall only take place in adequately lighted areas.
20. The tank vehicle shall be positioned with respect to vehicles being fueled to prevent traffic from driving over the delivery hose.
21. During fueling operations, tank vehicle brakes shall be set, chock blocks shall be in place and warning lights shall be in operation.
22. Motor vehicle fuel tanks shall not be topped off.
23. The dispensing hose shall be properly placed on an *approved* reel or in an *approved* compartment prior to moving the tank vehicle.
24. The *fire code official* and other appropriate authorities shall be notified when a reportable spill or unauthorized discharge occurs.

25. Operators shall place a drip pan or an absorbent pillow under each fuel fill opening prior to and during dispensing operations. Drip pans shall be liquid-tight. The pan or absorbent pillow shall have a capacity of not less than 3 gallons (11.36 L). Spills retained in the drip pan or absorbent pillow need not be reported. Operators, when fueling, shall have on their person an absorbent pad capable of capturing diesel fuel overfills. Except during fueling, the nozzle shall face upward and an absorbent pad shall be kept under the nozzle to catch drips. Contaminated absorbent pads or pillows shall be disposed of regularly in accordance with local, state and federal requirements.

Delete without substitution:

~~SECTION 5707~~
~~ON-DEMAND MOBILE FUELING OPERATIONS~~

Revise as follows:

~~5707.1~~ 2308.6 ~~General~~ On-demand mobile fueling..

On-demand *mobile fueling* operations that dispense Class I, II and III liquids into the fuel tanks of motor vehicles shall comply with Sections ~~5707.1 through 5707.6.6.~~ 2308.6.1 through 2308.6.6.6.

Exception: Fueling from an *approved* portable container in cases of an emergency or for personal use.

~~5707.1.1~~ 2308.6.1 Approval required.

Mobile fueling operations shall not be conducted without first obtaining an operational permit in accordance with Section 105.5.18.

~~5707.1.2~~ 2308.6.1.1 Location.

Mobile fueling operations shall occur only at *approved* locations. The *fire code official* is authorized to approve individual locations or geographic areas where *mobile fueling* is allowed.

~~5707.2~~ 2308.6.2 Mobile fueling vehicle.

An on-demand *mobile fueling* vehicle shall be that which is utilized in on-demand fueling operations for the dispensing of Class I, II or III liquids into the fuel tanks of motor vehicles.

~~5707.2.1~~ 2308.6.2.1 Mobile fueling vehicle classifications.

An on-demand *mobile fueling* vehicle shall be characterized as one of the following:

1. **Tier 1 *mobile fueling* vehicle.** A tank vehicle that complies with NFPA 385 and that has chassis-mounted tanks where the aggregate capacity does not exceed 1,600 gallons (6057 L).
2. **Tier 2 *mobile fueling* vehicle.** A vehicle with one or more chassis-mounted tanks or containers that do not exceed 110 gallons (416 L) in capacity with an aggregate capacity that does not exceed 800 gallons (3028 L) or the weight capacity of the vehicle in accordance with DOTn.
3. **Tier 3 *mobile fueling* vehicle.** A vehicle that carries a maximum aggregate capacity of 60 gallons (227 L) of motor fuel in metal safety cans *listed* in accordance with UL 30 or other *approved* metal containers, each not to exceed 5 gallons (19 L) in capacity.

~~5707.2.2~~ 2308.6.2.2 Mobile fueling vehicle requirements.

Each *mobile fueling* vehicle shall comply with all local, state and federal requirements, as well as the following:

1. *Mobile fueling* vehicles with a chassis-mounted tank in excess of 110 gallons (416 L) shall also comply with the requirements of Section 5706.6 and NFPA 385.
2. The *mobile fueling* vehicle and its equipment shall be maintained in good repair.
3. Safety cans and *approved* metal containers shall be secured to the *mobile fueling* vehicle except when in use.
4. Fueling a motor vehicle from tanks or containers mounted in a trailer connected to a *mobile fueling* vehicle shall be prohibited.

~~5707.3~~ 2308.6.3 Required documents.

Documents developed to comply with Sections ~~5707.3.1~~ 2308.6.3.1 through ~~5707.3.3~~ 2308.6.3.3 shall be updated as necessary by the *owner* of the *mobile fueling* operation and shall be maintained in compliance with Section 110.3.

~~5707.3.1~~ 2308.6.3.1 Safety and emergency response plan. *Mobile fueling* operators shall have an *approved* written safety and emergency response plan that establishes policies and procedures for fire safety, spill prevention and control, personnel training and compliance with other applicable requirements of this code.

~~5707.3.2~~ 2308.6.3.2 Training records. *Mobile fueling* vehicles shall be operated only by designated personnel who are trained on proper fueling procedures and the safety and emergency response plan. Training records of operators shall be maintained.

~~5707.3.3~~ 2308.6.3.3 Site plan.

Where required by the *fire code official*, a site plan shall be developed for each location or area at which *mobile fueling* occurs. The site plan shall be in sufficient detail to indicate the following:

1. All buildings and structures.
2. *Lot lines* or property lines.
3. Electric car chargers.
4. Solar photovoltaic parking lot canopies.
5. Appurtenances on-site and their use or function.
6. All uses adjacent to the *lot lines* of the site.
7. Fueling locations.
8. Locations of all storm drain openings and adjacent waterways or wetlands.
9. Information regarding slope, natural drainage, curbing and impounding.
10. How a spill will be kept on the site property.
11. Scale of the site plan.

~~5707.4~~ 2308.6.4 Mobile fueling areas. During fueling, the *mobile fueling* vehicle and point of connection to the vehicle shall not be located on public streets, *public ways* or inside *buildings*. Fueling on the roof level of parking structures or other *buildings* is prohibited.

~~5707.4.1~~ 2308.6.4.1 Separation.

During fueling, the point of connection to the vehicle being fueled shall not take place within 25 feet (7620 mm) of buildings, *lot lines*, property lines or combustible storage. *Mobile fueling* vehicles shall not park within 10 feet (3048 mm) of buildings, *lot lines*, property lines or combustible storage.

Exceptions:

1. The *fire code official* shall be authorized to decrease the separation distance for dispensing from metal safety cans or other *approved* metal containers in accordance with Section ~~5707.2~~ 2308.6.2.
2. The point of fueling shall not take place within 10 feet (3048 mm) of buildings, *lot lines*, property lines or combustible storage where the *mobile fueling* vehicle has an *approved* vapor recovery system or is servicing vehicles with onboard refueling vapor recovery.

Where dispensing operations occur within 15 feet (4572 mm) of a storm drain, an *approved* storm drain cover or an *approved* equivalent method that will prevent any fuel from reaching the drain shall be used.

~~5707.4.2~~ 2308.6.4.2 Sources of ignition. Smoking, open flames and other sources of ignition shall be prohibited within 25 feet (7620 mm) of fuel dispensing activities. Signs prohibiting smoking or open flames within 25 feet (7620 mm) of the vehicle or the point of fueling shall be prominently posted on the *mobile fueling* vehicle. The engines of vehicles being fueled shall be shut off during fueling.

~~5707.4.3~~ 2308.6.4.3 Electrical equipment.

Mobile fueling shall not occur within 20 feet (6096 mm) of electrical equipment located within 18 inches (457 mm) of the ground unless such electrical equipment is rated for Class I, Division 2, hazardous locations in accordance with NFPA 70.

~~5707.5~~ 2308.6.5 Equipment.
Mobile fueling equipment shall comply with Sections ~~5707.5.1~~ 2308.6.5.1 through ~~5707.5.5~~ 2308.6.5.5.

~~5707.5.1~~ 2308.6.5.1 Dispensing hoses and nozzles. Where equipped, the dispensing hose shall not exceed 50 feet (15 240 mm) in length. The dispensing nozzles and hoses shall be of an *approved* and *listed* type. Where metal-to-metal contact cannot be made between the nozzle and the fuel fill opening, a means for bonding the *mobile fueling* vehicle to the motor vehicle shall be provided and employed during fueling operations.

~~5707.5.2~~ 2308.6.5.2 Breakaway device.
A *listed* breakaway device shall be provided at the nozzle.

Exception: *Mobile fueling* vehicles equipped with an *approved* brake interlock tied to the nozzle holder that prohibits movement of the *mobile fueling* vehicle when the nozzle is removed from its holder or tied to the delivery of fuel that prevents activation of the pumping system.

~~5707.5.3~~ 2308.6.5.3 Shutoff valve and fuel limit. *Mobile fueling* vehicles shall be equipped with a *listed* shutoff valve assembly and a fuel limit switch set to a maximum of 30 gallons (116 L).

~~5707.5.4~~ 2308.6.5.4 Fire extinguisher.
An *approved* portable fire extinguisher complying with Section 906 with a minimum rating of4-A:80-B:C shall be provided on the *mobile fueling* vehicle with signage clearly indicating its location.

~~5707.5.5~~ 2308.6.5.5 Spill kit. *Mobile fueling* vehicles shall contain a minimum 5-gallon (19 L) spill kit of an *approved* type.

~~5707.6~~ 2308.6.6 Operations. *Mobile fueling* vehicles shall be constantly attended during fueling operations with brakes set and warning lights in operation. *Mobile fueling* vehicles shall not obstruct emergency vehicle access roads.

~~5707.6.1~~ 2308.6.6.1 Dispensing hose. Where equipped, *mobile fueling* vehicles shall be positioned in a manner to preclude traffic from driving over the dispensing hose. The dispensing hose shall be properly placed on an *approved* reel or in an *approved* compartment prior to moving the *mobile fueling* vehicle.

~~5707.6.2~~ 2308.6.6.2 Drip control. Operators shall place a drip pan or an absorbent pillow under the nozzle and each fuel fill opening prior to and during dispensing operations to catch drips.

~~5707.6.3~~ 2308.6.6.3 Safety cones. Safety cones or other visual barriers shall be employed as warning devices to highlight the vehicle fueling area.

~~5707.6.4~~ 2308.6.6.4 Vehicle lights. The *mobile fueling* vehicle flasher lights shall be in operation while dispensing operations are in progress.

~~5707.6.5~~ 2308.6.6.5 Nighttime deliveries. Nighttime deliveries shall be made only in areas deemed adequately lighted by the *fire code official.*

~~5707.6.6~~ 2308.6.6.6 Spill reporting.
Spills shall be reported in accordance with Section 5003.3.1.

SECTION ~~2307~~ 2309
LIQUEFIED PETROLEUM GAS MOTOR FUEL-DISPENSING FACILITIES

~~2307.1~~ 2309.1 General.
Motor fuel-dispensing facilities for liquefied petroleum gas (LP-gas) fuel shall be in accordance with this section and Chapter 61.

~~2307.2~~ 2309.2 Approvals.
Storage vessels and equipment used for the storage or dispensing of LP-gas shall be *approved* or *listed* in accordance with Sections ~~2307.2.1~~ 2309.2.1 and ~~2307.2.2~~ 2309.2.2.

~~2307.2.1~~ 2309.2.1 Approved equipment. Containers, pressure relief devices (including pressure relief valves), pressure regulators and piping for LP-gas shall be *approved*.

~~2307.2.2~~ 2309.2.2 Listed equipment. Hoses, hose connections, vehicle fuel connections, dispensers, LP-gas pumps and electrical equipment used for LP-gas shall be *listed*.

~~2307.3~~ 2309.3 Attendants.
Motor fuel-dispensing operations for LP-gas shall be conducted by qualified attendants or in accordance with Section ~~2307.7~~ 2309.7 by persons trained in the proper handling of LP-gas.

~~2307.4~~ 2309.4 Location of dispensing operations and equipment.
The point of transfer for LP-gas dispensing operations shall be separated from buildings and other exposures in accordance with the following:

1. Not less than 25 feet (7620 mm) from buildings where the *exterior wall* is not part of a *fire-resistance-rated* assembly having a rating of 1 hour or greater.
2. Not less than 25 feet (7620 mm) from combustible overhangs on buildings, measured from a vertical line dropped from the face of the overhang at a point nearest the point of transfer.
3. Not less than 25 feet (7620 mm) from the *lot line* of property that can be built on.
4. Not less than 25 feet (7620 mm) from the centerline of the nearest mainline railroad track.
5. Not less than 10 feet (3048 mm) from public streets, highways, thoroughfares, sidewalks and driveways.
6. Not less than 10 feet (3048 mm) from buildings where the *exterior wall* is part of a *fire-resistance-rated* assembly having a rating of 1 hour or greater.

Exception: The point of transfer for LP-gas dispensing operations need not be separated from canopies that are constructed in accordance with the International Building Code and that provide weather protection for the dispensing equipment.

LP-gas containers shall be located in accordance with Chapter 61. LP-gas storage and dispensing equipment shall be located outdoors.

~~2307.5~~ 2309.5 Additional requirements for LP-gas dispensers and equipment.
LP-gas dispensers and related equipment shall comply with the following provisions:

1. Pumps shall be fixed in place and shall be designed to allow control of the flow and to prevent leakage and accidental discharge.
2. Dispensing devices installed within 10 feet (3048 mm) of where vehicle traffic occurs shall be protected against physical damage by mounting on a concrete island 6 inches (152 mm) or more in height, or shall be protected in accordance with Section 312.
3. Dispensing devices shall be securely fastened to their mounting surface in accordance with the dispenser manufacturer's instructions.

~~2307.6~~ 2309.6 Installation of LP-gas dispensing devices and equipment.
The installation and operation of LP-gas dispensing systems shall be in accordance with Sections ~~2307.6.1~~ 2309.6.1 through ~~2307.6.4~~ 2309.6.4 and Chapter 61. LP-gas dispensers and dispensing stations shall be installed in accordance with the manufacturer's specifications and their listing.

~~2307.6.1~~ 2309.6.1 Product control valves. The dispenser system piping shall be protected from uncontrolled discharge in accordance with the following:

1. Where mounted on a concrete base, a means shall be provided and installed within $^{1}/_{2}$ inch (12.7 mm) of the top of the concrete base that will prevent flow from the supply piping in the event that the dispenser is displaced from its mounting.
2. A manual shutoff valve and an excess flow-control check valve shall be located in the liquid line between the pump and the dispenser inlet where the dispensing device is installed at a remote location and is not part of a complete storage and dispensing unit mounted on a common base.
3. An excess flow-control check valve or an emergency shutoff valve shall be installed in or on the dispenser at the point at which the dispenser hose is connected to the liquid piping.
4. A *listed* automatic-closing type hose nozzle valve with or without a latch-open device shall be provided on island-type dispensers.

~~2307.6.2~~ <u>2309.6.2</u> **Hoses.** Hoses and piping for the dispensing of LP-gas shall be provided with hydrostatic relief valves. The hose length shall not exceed 18 feet (5486 mm). An *approved* method shall be provided to protect the hose against mechanical damage.

~~2307.6.3~~ <u>2309.6.3</u> **Emergency breakaway devices.** Dispenser hoses shall be equipped with a *listed* emergency breakaway device designed to retain liquid on both sides of the breakaway point. Where hoses are attached to hose-retrieving mechanisms, the emergency breakaway device shall be located such that the breakaway device activates to protect the dispenser from being displaced.

~~2307.6.4~~ <u>2309.6.4</u> **Vehicle impact protection.**
Where installed within 10 feet of vehicle traffic, LP-gas storage containers, pumps and dispensers shall be protected in accordance with Section 2309.5, Item 2.

~~2307.7~~ <u>2309.7</u> **Public fueling of motor vehicles.**
Self-service LP-gas dispensing systems, including key, code and card lock dispensing systems, shall be limited to the filling of permanently mounted containers providing fuel to the LP-gas powered vehicle.
The requirements for self-service LP-gas dispensing systems shall be in accordance with the following:

1. The arrangement and operation of the transfer of product into a vehicle shall be in accordance with this section and Chapter 61.
2. The system shall be provided with an emergency shutoff switch located within 100 feet (30 480 mm) of, but not less than 20 feet (6096 mm) from, dispensers.
3. The *owner* of the LP-gas motor fuel-dispensing facility or the *owner's* designee shall provide for the safe operation of the system and the training of users.
4. The dispenser and hose-end valve shall release not more than $^{1}/_{8}$ fluid ounce (4 cc) of liquid to the atmosphere upon breaking the connection with the fill valve on the vehicle.
5. Portable fire extinguishers shall be provided in accordance with Section 2305.5.
6. Warning signs shall be provided in accordance with Section 2305.6.
7. The area around the dispenser shall be maintained in accordance with Section 2305.7.

~~2307.8~~ <u>2309.8</u> **Overfilling.** LP-gas containers shall not be filled with LP-gas in excess of the volume determined using the fixed maximum liquid level gauge installed on the container, the volume determined by the overfilling prevention device installed on the container or the weight determined by the required percentage of the water capacity marked on the container.

SECTION ~~2308~~ <u>2310</u> COMPRESSED NATURAL GAS MOTOR FUEL-DISPENSING FACILITIES

~~2308.1~~ <u>2310.1</u> **General.**
Motor fuel-dispensing facilities for compressed natural gas (CNG) fuel shall be in accordance with this section, Chapter 53 and Section 413 of the *International Fuel Gas Code*.

~~2308.2~~ 2310.2 Approvals.
Storage vessels and equipment used for the storage, compression or dispensing of CNG shall be *approved* or *listed* in accordance with Sections ~~2308.2~~ 2310.2.1 through ~~2308.2.4~~ 2310.2.4.

~~2308.2.1~~ 2310.2.1 Approved equipment. Containers, compressors, pressure relief devices (including pressure relief valves), and pressure regulators and piping used for CNG shall be *approved*.

~~2308.2.2~~ 2310.2.2 Listed equipment. Hoses, hose connections, dispensers and electrical equipment used for CNG shall be *listed*. Vehicle-fueling connections shall be *listed* and *labeled*.

~~2308.2.3~~ 2310.2.3 Residential fueling appliance (RFA).
Residential fueling appliances shall be *listed*and installed in accordance with the installation requirements of CSA/ANSI NGV 5.1, manufacturer's installation instructions and Section 413 of the *International Fuel Gas Code*. The capacity of an RFA shall not exceed 5 cubic feet per minute (0.14 m^3/min) of natural gas.

~~2308.2.4~~ 2310.2.4 Vehicle fueling appliance (VFA).
Nonresidential fueling appliances shall be *listed*and installed in accordance with the installation requirements of CSA/ANSI NGV 5.2, manufacturer's installation instructions and the requirements of Section 413 of the *International Fuel Gas Code* for VFAs. The capacity of the VFA shall not exceed 10 cubic feet per minute (0.28 m^3/min) of natural gas.

~~2308.3~~ 2310.3 Location of dispensing operations and equipment.
Compression, storage and dispensing equipment shall be located above ground, outdoors.

Exceptions:

1. Compression, storage or dispensing equipment shall be allowed in buildings of noncombustible construction, as set forth in the *International Building Code*, that are unenclosed for three-quarters or more of the perimeter.
2. Compression, storage and dispensing equipment shall be allowed indoors or in vaults in accordance with Chapter 53.

~~2308.3.1~~ 2310.3.1 Location on property.
In addition to the requirements of Section 2303.1, compression, storage and dispensing equipment not located in vaults complying with Chapter 53 shall be installed as follows:

1. Not beneath power lines.
2. Ten feet (3048 mm) or more from the nearest building or *lot line* that could be built on, public street, sidewalk or source of ignition.

   Exception: Dispensing equipment need not be separated from canopies that are constructed in accordance with the *International Building Code* and that provide weather protection for the dispensing equipment.
3. Twenty-five feet (7620 mm) or more from the nearest rail of any railroad track and 50 feet (15 240 mm) or more from the nearest rail of any railroad main track or any railroad or transit line where power for train propulsion is provided by an outside electrical source, such as third rail or overhead catenary.
4. Fifty feet (15 240 mm) or more from the vertical plane below the nearest overhead wire of a trolley bus line.

~~2308.4~~ 2310.4 Private fueling of motor vehicles.
Self-service CNG-dispensing systems, including key, code and card lock dispensing systems, shall be limited to the filling of permanently mounted fuel containers on CNG-powered vehicles.
In addition to the requirements in Section 2305, the *owner*of a self-service CNG motor fuel-dispensing facility shall ensure the safe operation of the system and the training of users.

~~2308.5~~ 2310.5 Pressure regulators. Pressure regulators shall be designed and installed or protected so that their operation will not be affected by the elements (freezing rain, sleet, snow or ice), mud or debris. The protection is allowed to be an integral part of the regulator.

~~2308.6~~ 2310.6 Valves. Gas piping to equipment shall be provided with a remote, manual shutoff valve that is provided with *ready access*.

~~2308.7~~ 2310.7 **Emergency shutdown control.** An emergency shutdown control shall be located within 75 feet (22 860 mm) of, but not less than 25 feet (7620 mm) from, dispensers and shall be provided in the compressor area. Upon activation, the emergency shutdown system shall automatically shut off the power supply to the compressor and close valves between the main gas supply and the compressor and between the storage containers and dispensers.

~~2308.8~~ 2310.8 Discharge of CNG from motor vehicle fuel storage containers.

The discharge of CNG from motor vehicle fuel cylinders for the purposes of maintenance, cylinder certification, calibration of dispensers or other activities shall be in accordance with Sections ~~2308.8.1~~ 2310.8.1 through ~~2308.8.1.2.6~~ 2310.8.1.2.6.

~~2308.8.1~~ 2310.8.1 Methods of discharge.

The discharge of CNG from motor vehicle fuel cylinders shall be accomplished through a closed transfer system in accordance with Section ~~2308.8.1.1~~ 2310.8.1.1 or an *approved* method of atmospheric venting in accordance with Section ~~2308.8.1.2~~ 2310.8.1.2.

~~2308.8.1.1~~ 2310.8.1.1 Closed transfer system. A documented procedure that explains the logical sequence for discharging the cylinder shall be provided to the *fire code official* for review and approval. The procedure shall include what actions the operator will take in the event of a low-pressure or high-pressure natural gas release during the discharging activity. A drawing illustrating the arrangement of piping, regulators and equipment settings shall be provided to the *fire code official* for review and approval. The drawing shall illustrate the piping and regulator arrangement and shall be shown in spatial relation to the location of the compressor, storage vessels and emergency shutdown devices.

~~2308.8.1.2~~ 2310.8.1.2 Atmospheric venting.

Atmospheric venting of CNG shall comply with Sections ~~2308.8.1.2.1~~ 2310.8.1.2.1 through ~~2308.8.1.2.6~~ 2310.8.1.2.6.

~~2308.8.1.2.1~~ 2310.8.1.2.1 Plans and specifications. A drawing illustrating the location of the vessel support, piping, the method of grounding and bonding, and other requirements specified herein shall be provided to the *fire code official* for review and approval.

~~2308.8.1.2.2~~ 2310.8.1.2.2 Cylinder stability. A method of rigidly supporting the vessel during the venting of CNG shall be provided. The selected method shall provide not less than two points of support and shall prevent the horizontal and lateral movement of the vessel. The system shall be designed to prevent the movement of the vessel based on the highest gas-release velocity through valve orifices at the vessel's rated pressure and volume. The structure or appurtenance shall be constructed of noncombustible materials.

~~2308.8.1.2.3~~ 2310.8.1.2.3 Separation.

The structure or appurtenance used for stabilizing the cylinder shall be separated from the site equipment, features and exposures and shall be located in accordance with Table ~~2308.8.1.2.3~~ 2310.8.1.2.3.

TABLE ~~2308.8.1.2.3~~ 2310.8.1.2.3 SEPARATION DISTANCE FOR ATMOSPHERIC VENTING OF CNG

EQUIPMENT OR FEATURE	MINIMUM SEPARATION (feet)
Buildings	25
Building openings	25
CNG compressor and storage vessels	25
CNG dispensers	25
Lot lines	15
Public ways	15
Vehicles	25

For SI: 1 foot = 304.8 mm.

~~2308.8.1.2.4~~ 2310.8.1.2.4 Grounding and bonding.

The structure or appurtenance used for supporting the cylinder shall be grounded in accordance with NFPA 70. The cylinder valve shall be bonded prior to the commencement of venting operations.

~~2308.8.1.2.5~~ 2310.8.1.2.5 Vent tube.

A vent tube that will divert the gas flow to the atmosphere shall be installed on the cylinder prior to commencement of the venting and purging operation. The vent tube shall be constructed of pipe or tubing materials *approved* for use with CNG in accordance with Chapter

53.
The vent tube shall be capable of dispersing the gas not less than 10 feet (3048 mm) above grade level. The vent tube shall not be provided with a rain cap or other feature that would limit or obstruct the gas flow.

At the connection fitting of the vent tube and the CNG cylinder, a *listed* bidirectional *detonation* flame arrester shall be provided.

~~2308.8.1.2.6~~ 2310.8.1.2.6 Signage.
Approved “No Smoking” signs complying with Section 310 shall be posted within 10 feet (3048 mm) of the cylinder support structure or appurtenance. *Approved* “Cylinder Shall Be Bonded” signs shall be posted on the cylinder support structure or appurtenance.

SECTION ~~2309~~ 2311
HYDROGEN MOTOR FUEL-DISPENSING AND GENERATION FACILITIES

~~2309.1~~ 2311.1 General.
Hydrogen motor fuel-dispensing and generation facilities shall be in accordance with this section, Chapter 58 and NFPA 2. Where a fuel-dispensing facility includes a repair garage, the repair operation shall comply with Section ~~2311~~ 2314.

~~2309.2~~ 2311.2 Equipment.
Equipment used for the generation, compression, storage or dispensing of hydrogen shall be designed for the specific application in accordance with Sections ~~2309.2.1~~ 2311.2.1 through ~~2309.2.3~~ 2311.2.3.

~~2309.2.1~~ 2311.2.1 Approved equipment.
Cylinders, containers and tanks; pressure relief devices, including pressure valves; hydrogen vaporizers; pressure regulators; and piping used for gaseous hydrogen systems shall be designed and constructed in accordance with Chapters 53, 55 and 58.

~~2309.2.2~~ 2311.2.2 Listed or approved equipment. Hoses, hose connections, compressors, hydrogen generators, dispensers, motor-fueling connections and electrical equipment used for hydrogen shall be *listed* or *approved* for use with hydrogen.

~~2309.2.3~~ 2311.2.3 Electrical equipment.
Electrical installations shall be in accordance with NFPA 70.

~~2309.3~~ 2311.3 Location on property.
In addition to the requirements of Section 2303.1, dispensing equipment shall be located in accordance with Sections ~~2309.3.1~~ 2311.3.1 through Section ~~2309.3.2~~ 2311.3.2.

~~2309.3.1~~ 2311.3.1 Location of operations and equipment.
Generation, compression, storage and dispensing equipment shall be located in accordance with Sections ~~2309.3.1.1~~ 2311.3.1.1 through ~~2309.3.1.5.5~~ 2311.3.1.5.5.

~~2309.3.1.1~~ 2311.3.1.1 Outdoors.
Generation, compression or storage equipment shall be allowed outdoors in accordance with Chapter 58 and NFPA 2.

~~2309.3.1.2~~ 2311.3.1.2 Indoors.
Generation, compression, storage and dispensing equipment shall be located in indoor rooms or areas constructed in accordance with the requirements of the *International Building Code*, the *International Fuel Gas Code*, the *International Mechanical Code* and NFPA 2.

~~2309.3.1.2.1~~ 2311.3.1.2.1 Maintenance. Gaseous hydrogen systems and detection devices shall be maintained in accordance with the manufacturer’s instructions.

~~2309.3.1.2.2~~ 2311.3.1.2.2 Smoking. Smoking shall be prohibited in hydrogen cutoff rooms. “No Smoking” signs shall be provided at all entrances to hydrogen fuel gas rooms.

~~2309.3.1.2.3~~ 2311.3.1.2.3 Ignition source control.
Open flames, flame-producing devices and other sources of ignition shall be controlled in accordance with Chapter 58.

~~2309.3.1.2.4~~ 2311.3.1.2.4 Housekeeping. Hydrogen fuel gas rooms shall be kept free from combustible debris and storage.

~~2309.3.1.3~~ 2311.3.1.3 Gaseous hydrogen storage.
Storage of gaseous hydrogen shall be in accordance with Chapters 53 and 58.

~~2309.3.1.4~~ 2311.3.1.4 Liquefied hydrogen storage.
Storage of liquefied hydrogen shall be in accordance with Chapters 55 and 58.

~~2309.3.1.5~~ 2311.3.1.5 Canopy tops.
Gaseous hydrogen compression and storage equipment located on top of motor fuel-dispensing facility canopies shall be in accordance with Sections ~~2309.3.1.5.1~~ 2311.3.1.5.1 through ~~2309.3.1.5.5~~ 2311.3.1.5.5, Chapters 53 and 58, and the *International Fuel Gas Code*.

~~2309.3.1.5.1~~ 2311.3.1.5.1 Construction.
Canopies shall be constructed in accordance with the motor fuel-dispensing facility canopy requirements of Section 406.7 of the International Building Code.

~~2309.3.1.5.2~~ 2311.3.1.5.2 Fire-extinguishing systems.
Fuel-dispensing areas under canopies shall be equipped throughout with an *approved automatic sprinkler system* in accordance with Section 903.3.1.1. The design of the sprinkler system shall be not less than that required for Extra Hazard Group 2 occupancies. Operation of the sprinkler system shall activate the emergency functions of Sections ~~2309.3.1.5.3~~ 2311.3.1.5.3 and ~~2309.3.1.5.4~~ 2311.3.1.5.4.

~~2309.3.1.5.3~~ 2311.3.1.5.3 Emergency discharge. Operation of the *automatic sprinkler system* shall activate an automatic emergency discharge system, which will discharge the hydrogen gas from the equipment on the canopy top through the vent pipe system.

~~2309.3.1.5.4~~ 2311.3.1.5.4 Emergency shutdown control.
Operation of the *automatic sprinkler system* shall activate the emergency shutdown control required by Section ~~2309.5.3~~ 2311.5.3.

~~2309.3.1.5.5~~ 2311.3.1.5.5 Signage. *Approved* signage having 2-inch (51 mm) block letters shall be affixed at *approved* locations on the exterior of the canopy structure stating: “CANOPY TOP HYDROGEN STORAGE.”

~~2309.3.2~~ 2311.3.2 Canopies.
Dispensing equipment need not be separated from canopies of Type I or II construction that are constructed in a manner that prevents the accumulation of hydrogen gas and in accordance with Section 406.7 of the International Building Code.

~~2309.4~~ 2311.4 Dispensing into motor vehicles at hydrogen motor fuel-dispensing facilities.
Hydrogen motor fuel-dispensing systems, including key, code and card lock dispensing systems, shall be limited to the filling of permanently mounted motor vehicle fuel tanks on hydrogen-powered vehicles.
In addition to the requirements in Section ~~2311~~ 2314, the *owner* of a hydrogen motor fuel-dispensing facility shall provide for the safe operation of the system by complying with this code and the fueling protocols in NFPA 2 and through the institution of a fire safety plan submitted in accordance with Section 404, the training of employees and operators who use and maintain the system in accordance with Section 406, and provisions for hazard communication in accordance with Section 407.

> **Exception:** Filling of nonpermanently mounted storage containers or tanks for motor fuel-dispensing system testing purposes is permitted.

~~2309.4.1~~ 2311.4.1 Dispensing systems. Dispensing systems shall be equipped with an overpressure protection device set at not greater than 140 percent of the service pressure of the fueling nozzle it supplies.

~~2309.5~~ 2311.5 Safety precautions.

Safety precautions at hydrogen motor fuel-dispensing and generation facilities shall be in accordance with Sections ~~2309.5.1~~ 2311.5.1 through ~~2309.5.3.1~~ 2311.5.3.1.

~~2309.5.1~~ 2311.5.1 Protection from vehicles.
Guard posts or other *approved* means shall be provided to protect hydrogen storage systems and use areas subject to vehicular damage in accordance with Section 312.

~~2309.5.1.1~~ 2311.5.1.1 Vehicle fueling pad.
The vehicle shall be fueled on noncoated concrete or other *approved* paving material having a resistance not exceeding 1 megohm as determined by the methodology specified in EN 1081.

~~2309.5.2~~ 2311.5.2 Emergency shutoff valves. A manual emergency shutoff valve shall be provided to shut down the flow of gas from the hydrogen supply to the piping system.

~~2309.5.2.1~~ 2311.5.2.1 Identification. Manual emergency shutoff valves shall be identified and the location shall be clearly visible, have access and be indicated by means of a sign.

~~2309.5.3~~ 2311.5.3 Emergency shutdown controls.
In addition to the manual emergency shutoff valve required by Section ~~2309.5.2~~ 2311.5.2, a remotely located, manually activated emergency shutdown control shall be provided. An emergency shutdown control shall be located within 75 feet (22 860 mm) of, but not less than 25 feet (7620 mm) from, dispensers and hydrogen generators.

~~2309.5.3.1~~ 2311.5.3.1 System requirements. Activation of the emergency shutdown control shall automatically shut off the power supply to all hydrogen storage, compression and dispensing equipment; shut off natural gas or other fuel supply to the hydrogen generator; and close valves between the main supply and the compressor and between the storage containers and dispensing equipment.

~~2309.6~~ 2311.6 Repairs, purging, defueling and discharge.
The repair, purging, defueling or discharge activities associated with hydrogen motor fuel-dispensing and generation systems, storage tanks and the installation of the systems shall be in accordance with Chapters 53 and 58 and NFPA 2.

> **Exception:** The motor vehicle fuel tank and the fuel supply piping from the motor vehicle fuel tank to the engine compartment on a motor vehicle or forklift unless the fuel tank is required to be defueled in accordance with Section ~~2311.8.11~~ 2314.8.1.

~~2309.6.1~~ 2311.6.1 Documented procedure. A documented procedure that explains the logic sequence for defueling or discharging operations shall be maintained on-site and shall be provided to the *fire code official* upon request. The procedure shall include what actions the operator is required to take in the event of a low-pressure or high-pressure hydrogen release during discharging activity. Schematic design documents shall be maintained on-site, illustrating the arrangement of piping, regulators and equipment settings. The schematic shall illustrate the piping and regulator arrangement and shall be shown in spatial relation to the location of the vehicle being defueled and, if applicable, to the compressor, storage vessels and emergency shutdown devices.

SECTION ~~5809~~2312
~~ON-DEMAND HYDROGEN MOBILE FUELING OPERATIONS~~MOBILE FUEL-DISPENSING OF HYDROGEN

~~5809.1~~2312.1 General.
On-demand *hydrogen mobile fueling* operations that dispense gaseous hydrogen into the fuel tanks of motor vehicles shall comply with Sections ~~5809.1~~2312.1 through ~~5809.6.5~~2312.7.7.

~~5809.1.1~~2312.2 Approval required.
Hydrogen mobile fueling operations shall not be conducted without first obtaining a permit and approval from the *fire code official*. *Hydrogen mobile fueling* operations shall occur only at *approved* locations. The *fire code official* is authorized to approve individual locations or geographic areas where *mobile fueling* is allowed.

~~5809.2~~2312.3 Hydrogen mobile fueling vehicle or trailer.
An on-demand *hydrogen mobile fueling* vehicle or *mobile fueling* trailer shall be that which is utilized in on-demand fueling operations for the dispensing of gaseous hydrogen into the fuel tanks of motor vehicles.

~~5809.2.1~~2312.3.1 Hydrogen mobile fueling vehicle requirements.
Each *hydrogen mobile fueling* vehicle or *mobile fueling* trailer shall comply with all local, state and federal requirements, as well as the following:

1. The *hydrogen mobile fueling* vehicle or *mobile fueling* trailer and its equipment shall be in compliance with the appropriate requirements of NFPA 2.
2. *Hydrogen mobile fueling* vehicles or *mobile fueling* trailers shall only contain and dispense gaseous hydrogen.
3. The *hydrogen mobile fueling* vehicle or *mobile fueling* trailer and its equipment shall be maintained in good repair.
4. Fueling a hydrogen motor vehicle shall be from tanks or containers mounted on a *mobile fueling* trailer or from tanks or containers mounted on a *mobile fueling* vehicle. A *mobile fueling* operation shall not combine a *mobile fueling* vehicle with a *mobile fueling* trailer.
5. *Mobile fueling* vehicles and trailers shall be provided with at least one minimum 10-pound ABC dry-chemical portable fire extinguisher with an agent discharge rate of 1 pound per second (0.454 kg/s) or greater.

~~5809.3~~2312.4 Required documents.
Documents developed to comply with Sections ~~5809.3.1~~2312.4.1 through ~~5809.3.3~~2312.4.3 shall be updated as necessary by the owner of the *mobile fueling* operation and shall be maintained in compliance with Section 110.3.

~~5809.3.1~~2312.4.1 Safety and emergency response plan.
Hydrogen mobile fueling operators shall have an *approved* written safety and emergency response plan that establishes policies and procedures for fire safety, release and control, personnel training and compliance with other applicable requirements of this code.

~~5809.3.2~~2312.4.2 Training records.
Hydrogen mobile fueling vehicles or *mobile fueling* trailers shall be operated only by designated personnel who are trained on proper fueling procedures and the safety and emergency response plan. Training records of operators shall be maintained.

~~5809.3.3~~2312.4.3 Site plan.
Where required by the *fire code official*, a site plan shall be developed for each location at which *hydrogen mobile fueling* occurs. The site plan shall be of sufficient detail to indicate the following:

1. All buildings and structures.
2. Lot lines or property lines.
3. Solar photovoltaic parking lot canopies.
4. Appurtenances on-site and their use or function.
5. All uses adjacent to the lot lines of the site.
6. Hydrogen fueling locations.
7. Scale of the site plan.

~~5809.4~~2312.5 Hydrogen mobile fueling areas.
Hydrogen mobile fueling shall not occur on public streets, in public ways or inside buildings. Fueling on the roof level of parking structures or other buildings is prohibited unless access to the roof level is available without entering the structure or building.

~~5809.4.1~~2312.5.1 Separation.
The point of connection of the vehicle being fueled shall not take place within the distances specified by NFPA 2 Table 7.2.2.3.2 based on the maximum rated capacity of the *hydrogen mobile fueling* vehicle.

~~5809.4.2~~2312.5.2 Sources of ignition.
Smoking, open flames and other sources of ignition shall be prohibited within 25 feet (7620 mm) of fuel-dispensing activities. Signs prohibiting smoking or open flames within 25 feet (7620 mm) of the vehicle or the point of fueling shall be prominently posted on the *hydrogen mobile fueling* vehicle. The fuel cell of vehicles being fueled shall be shut off during fueling.

~~5809.5~~2312.6 Equipment.
Hydrogen mobile fueling equipment shall comply with Sections ~~5809.5.1~~2312.6.1 and ~~5809.5.2~~2312.6.2.

~~5809.5.1~~2312.6.1 Dispensing hoses, nozzles and equipment.
Dispensing hoses, nozzles and equipment shall comply with NFPA 2.

~~5809.5.2~~2312.6.2 Fire extinguisher.
An *approved* portable fire extinguisher complying with Section 906 with a minimum rating of 4-A:80-B:C shall be provided on the *hydrogen mobile fueling* vehicle with signage clearly indicating its location.

~~5809.6~~2312.7 Operations.
Hydrogen mobile fueling vehicles or *mobile fueling* trailers shall be operated in accordance with this section and NFPA 2.

~~5809.6.1~~2312.7.1 Attendant.
Hydrogen mobile fueling vehicles or *mobile fueling* trailers shall be attended at all times during fueling operations, with brakes set and warning lights in operation.

~~5809.6.2~~2312.7.2 Emergency access roads.
Hydrogen mobile fueling vehicles shall not obstruct emergency vehicle access roads.

~~5809.6.3~~2312.7.3 Dispensing hose.
Where equipped, *hydrogen mobile fueling* vehicles or *mobile fueling* trailers shall be positioned in a manner to preclude traffic from driving over the dispensing hose. The dispensing hose shall be properly placed on an *approved* reel or in an *approved* compartment prior to moving the *mobile fueling* vehicle.

~~5809.6.4~~2312.7.4 Safety cones.
Safety cones or other visual barriers shall be employed as warning devices to highlight the vehicle fueling area.

~~5809.6.5~~2312.7.5 Vehicle lights.
The *hydrogen mobile fueling* vehicle or *mobile fueling* trailer flasher lights shall be in operation while dispensing operations are in progress.

~~5809.6.6~~2312.7.6 Nighttime deliveries.
Nighttime deliveries shall be made only in areas deemed adequately lighted by the *fire code official*.

~~5809.6.7~~2312.7.7 Spill reporting.
Releases shall be reported where required by Section 5003.3.1.

SECTION ~~2310~~2313
MARINE MOTOR FUEL-DISPENSING ~~FACILITIES~~

~~2310.1~~2313.1 General.
The construction of marine motor fuel-dispensing facilities shall be in accordance with the *International Building Code* and NFPA 30A. The storage of Class I, II or IIIA liquids at marine motor fuel-dispensing facilities shall be in accordance with this chapter and Chapter 57.

~~2310.2~~2313.2 Storage and handling.

The storage and handling of Class I, II or IIIA liquids at marine motor fuel-dispensing facilities shall be in accordance with Sections ~~2310.2.1~~2313.2.1 through ~~2310.2.3~~2313.2.3.

~~2310.2.1~~2313.2.1 Class I, II or IIIA liquid storage.
Class I, II or IIIA liquids stored inside buildings used for marine motor fuel-dispensing facilities shall be stored in *approved* containers or portable tanks. Storage of Class I liquids shall not exceed 10 gallons (38 L).

Exception: Storage in liquid storage rooms in accordance with Section 5704.3.7.

~~2310.2.2~~2313.2.2 Class II or IIIA liquid storage and dispensing. Class II or IIIA liquids stored or dispensed inside buildings used for marine motor fuel-dispensing facilities shall be stored in and dispensed from *approved* containers or portable tanks. Storage of Class II and IIIA liquids shall not exceed 120 gallons (454 L).

~~2310.2.3~~2313.2.3 Heating equipment.
Heating equipment installed in Class I, II or IIIA liquid storage or dispensing areas shall comply with Section 2301.6.

~~2310.3~~2313.3 Dispensing.
The dispensing of liquid fuels at marine motor fuel-dispensing facilities shall comply with Sections ~~2310.3.1~~2313.3.1 through ~~2310.3.5~~ 2313.3.5.

~~2310.3.1~~2313.3.1 General. Wharves, piers or floats at marine motor fuel-dispensing facilities shall be used exclusively for the dispensing or transfer of petroleum products to or from marine craft, except that transfer of essential ship stores is allowed.

~~2310.3.2~~2313.3.2 Supervision. Marine motor fuel-dispensing facilities shall have an attendant or supervisor who is fully aware of the operation, mechanics and hazards inherent to fueling of boats on duty whenever the facility is open for business. The attendant's primary function shall be to supervise, observe and control the dispensing of Class I, II or IIIA liquids or *flammable gases*.

~~2310.3.3~~2313.3.3 Hoses and nozzles. Dispensing of Class I, II or IIIA liquids into the fuel tanks of marine craft shall be by means of an *approved*-type hose equipped with a *listed* automatic-closing nozzle without a latch-open device.
Hoses used for dispensing or transferring Class I, II or IIIA liquids, when not in use, shall be reeled, racked or otherwise protected from mechanical damage.

~~2310.3.4~~2313.3.4 Portable containers.
Dispensing of Class I, II or IIIA liquids into containers, other than fuel tanks, shall be in accordance with Section 2304.4.1.

~~2310.3.5~~2313.3.5 Liquefied petroleum gas.
Liquefied petroleum gas cylinders shall not be filled at *marine motor fuel-dispensing facilities* unless *approved*. *Approved* storage facilities for LP-gas cylinders shall be provided. See also Section ~~2307~~2309.

~~2310.4~~2313.4 Fueling of marine vehicles ~~at other than approved marine motor fuel-dispensing facilities~~ from tank vehicles..
Fueling of floating marine craft at other than a marine motor fuel-dispensing facility shall comply with Sections ~~2310.4.1~~2313.4.1 and ~~2310.4.2~~2313.4.2.

~~2310.4.1~~2313.4.1 Class I liquid fuels. Fueling of floating marine craft with Class I fuels at other than a marine motor fuel-dispensing facility is prohibited.

~~2310.4.2~~2313.4.2 Class II or III liquid fuels.
Fueling of floating marine craft with Class II or III fuels at other than a marine motor fuel-dispensing facility shall be in accordance with all of the following:

1. The premises and operations shall be *approved* by the *fire code official*.

~~2. Tank vehicles and fueling operations shall comply with Section 5706.6.~~

~~3~~ 2. The dispensing nozzle shall be of the *listed* automatic-closing type without a latch-open device.

~~4~~ 3. Nighttime deliveries shall be made only in lighted areas.

~~5~~ 4 . The tank vehicle flasher lights shall be in operation while dispensing.

~~6~~ 5. Fuel expansion space shall be left in each fuel tank to prevent overflow in the event of temperature increase.

6. The tank vehicle's specific function is that of supplying fuel to fuel tanks.

7. The operation is not performed where the public has access or where there is unusual exposure to life and property.

8. The dispensing line does not exceed 50 feet (15 240 mm) in length.

~~2310.5~~2313.5 Fire prevention regulations.
General fire safety regulations for marine motor fuel-dispensing facilities shall comply with Sections ~~2310.5.1~~2313.5.1 through ~~2310.5.7~~ 2313.5.7.

~~2310.5.1~~2313.5.1 Housekeeping. Marine motor fuel-dispensing facilities shall be maintained in a neat and orderly manner. Accumulations of rubbish or waste oils in excessive amounts shall be prohibited.

~~2310.5.2~~2313.5.2 Spills. Spills of Class I, II or IIIA liquids at or on the water shall be reported immediately to the fire department and jurisdictional authorities.

~~2310.5.3~~2313.5.3 Rubbish containers.
Containers with tight-fitting or self-closing lids shall be provided for temporary storage of combustible debris, rubbish and waste material. The rubbish containers shall be constructed entirely of materials that comply with any one of the following:

1. Noncombustible materials.
2. Materials that meet a peak rate of heat release not exceeding 300 kW/m^2 when tested in accordance with ASTM E1354 at an incident heat flux of 50 kW/m^2 in the horizontal orientation.

~~2310.5.4~~2313.5.4 Marine vessels and craft. Vessels or craft shall not be made fast to fuel docks serving other vessels or craft occupying a berth at a marine motor fuel-dispensing facility.

~~2310.5.5~~2313.5.5 Sources of ignition. Construction, maintenance, repair and reconditioning work involving the use of open flames, arcs or spark-producing devices shall not be performed at marine motor fuel-dispensing facilities or within 50 feet (15 240 mm) of the dispensing facilities, including piers, wharves or floats, except for emergency repair work *approved* in writing by the *fire code official*. Fueling shall not be conducted at the pier, wharf or float during the course of such emergency repairs.

~~2310.5.5.1~~2313.5.5.1 Smoking.
Smoking or open flames shall be prohibited within 50 feet (15 240 mm) of fueling operations. "No Smoking" signs complying with Section 310 shall be posted conspicuously about the premises. Such signs shall have letters not less than 4 inches (102 mm) in height on a background of contrasting color.

~~2310.5.6~~2313.5.6 Preparation of tanks for fueling. Boat *owners* and operators shall not offer their craft for fueling unless the tanks being filled are properly vented to dissipate fumes to the outside atmosphere.

~~2310.5.7~~2313.5.7 Warning signs.
Warning signs shall be prominently displayed at the face of each wharf, pier or float at such elevation as to be clearly visible from the decks of marine craft being fueled. Such signs shall have letters not less than 3 inches (76 mm) in height on a background of contrasting color bearing the following or *approved* equivalent wording:

WARNING
NO SMOKING—STOP ENGINE WHILE FUELING,
SHUT OFF ELECTRICITY

DO NOT START ENGINE UNTIL AFTER BELOW
DECK SPACES ARE VENTILATED.

~~2310.6~~2313.6 Fire protection.
Fire protection features for marine motor fuel-dispensing facilities shall comply with Sections ~~2310.6.1~~2313.6.1 through ~~2310.6.4~~2313.6.4 .

~~2310.6.1~~2313.6.1 Standpipe hose stations. Fire hose, where provided, shall be enclosed within a cabinet, and hose stations shall be labeled: "FIRE HOSE—EMERGENCY USE ONLY."

~~2310.6.2~~2313.6.2 Obstruction of fire protection equipment. Materials shall not be placed on a pier in such a manner as to obstruct access to firefighting equipment or piping system control valves.

~~2310.6.3~~2313.6.3 Access. Where the pier is designed for vehicular traffic, an unobstructed roadway to the shore end of the wharf shall be maintained for access by fire apparatus.

~~2310.6.4~~2313.6.4 Portable fire extinguishers. Portable fire extinguishers in accordance with Section 906, each having a minimum rating of 20-B:C, shall be provided as follows:

1. One on each float.
2. One on the pier or wharf within 25 feet (7620 mm) of the head of the gangway to the float, unless the office is within 25 feet (7620 mm) of the gangway or is on the float and an extinguisher is provided thereon.

SECTION ~~2311~~2314
REPAIR GARAGES

~~2311.1~~2314.1 General.
Repair garages shall comply with this section and the *International Building Code*. Repair garages for vehicles that use more than one type of fuel shall comply with the applicable provisions of this section for each type of fuel used.
Where a repair garage includes a motor fuel-dispensing facility, the fuel-dispensing operation shall comply with the requirements of this chapter for motor fuel-dispensing facilities.

~~2311.2~~2314.2 Storage and use of flammable and combustible liquids.
The storage and use of *flammable* and *combustible liquids* in repair garages shall comply with Chapter 57 and Sections ~~2311.2.1~~ 2314.2.1 through ~~2311.2.4~~2314.2.4.

~~2311.2.1~~2314.2.1 Cleaning of parts.
Cleaning of parts shall be conducted in *listed* and *approved* parts-cleaning machines in accordance with Chapter 57.

~~2311.2.2~~2314.2.2 Waste oil, motor oil and other Class IIIB liquids. Waste oil, motor oil and other Class IIIB liquids shall be stored in *approved* tanks or containers, which are allowed to be stored and dispensed from inside repair garages.

~~2311.2.2.1~~2314.2.2.1 Tank location. Tanks storing Class IIIB liquids in *repair garages* are allowed to be located at, below or above grade, provided that adequate drainage or containment is provided.

~~2311.2.2.2~~2314.2.2.2 Liquid classification. Crankcase drainings shall be classified as Class IIIB liquids unless otherwise determined by testing.

~~2311.2.3~~2314.2.3 Drainage and disposal of liquids and oil-soaked waste.
Garage floor drains, where provided, shall drain to *approved* oil separators or traps discharging to a sewer in accordance with the

International Plumbing Code. Contents of oil separators, traps and floor drainage systems shall be collected at sufficiently frequent intervals and removed from the premises to prevent oil from being carried into the sewers.

~~2311.2.3.1~~2314.2.3.1 Disposal of liquids.
Crankcase drainings and liquids shall not be dumped into sewers, streams or on the ground, but shall be stored in *approved* tanks or containers in accordance with Chapter 57 until removed from the premises.

~~2311.2.3.2~~2314.2.3.2 Disposal of oily waste. Self-closing metal cans shall be used for oily waste.

~~2311.2.4~~2314.2.4 Spray finishing.
Spray finishing with *flammable* or *combustible liquids* shall comply with Chapter 24.

~~2311.3~~2314.3 Sources of ignition.
Sources of ignition shall not be located within 18 inches (457 mm) of the floor and shall comply with Chapters 3 and 35.

~~2311.3.1~~2314.3.1 Equipment.
Appliances and equipment installed in a repair garage shall comply with the provisions of the *International Building Code*, the *International Mechanical Code* and NFPA 70.

~~2311.3.2~~2314.3.2 Smoking. Smoking shall not be allowed in repair garages except in *approved* locations.

~~2311.4~~2314.4 Below-grade areas.
Pits and below-grade work areas in repair garages shall comply with Sections ~~2311.4.1~~2314.4.1 through ~~2311.4.3~~2314.4.3.

~~2311.4.1~~2314.4.1 Construction.
Pits and below-grade work areas shall be constructed in accordance with the *International Building Code*.

~~2311.4.2~~2314.4.2 Means of egress.
Pits and below-grade work areas shall be provided with *means of egress* in accordance with Chapter 10.

~~2311.4.3~~2314.4.3 Ventilation.
Where Class I liquids or LP-gas are stored or used within a building having a *basement* or pit wherein flammable vapors could accumulate, the*basement* or pit shall be provided with mechanical ventilation in accordance with the *International Mechanical Code*, at a minimum rate of $1^1/_2$ cubic feet per minute per square foot (cfm/ft^2) [0.008 m^3/(s × m^2)] to prevent the accumulation of flammable vapors.

~~2311.5~~2314.5 Vehicles powered by liquefied petroleum gas (LP-gas).
Vehicles powered by LP-gas and the servicing of vehicles powered by LP-gas shall be in compliance with this chapter, Chapter 61 and NFPA 58.

~~2311.6~~2314.6 Vehicles powered by liquefied natural gas (LNG) and compressed natural gas (CNG).
LNG vehicles and CNG vehicles shall comply with Sections ~~2311.6.1~~2314.6.1 and ~~2311.6.2~~2314.6.2, as applicable.

~~2311.6.1~~2314.6.1 Liquefied natural gas (LNG). LNG vehicle fuel system pressure shall be measured and recorded prior to entering the repair facility. The maximum allowable system pressure shall be not more than 170 psig (1172 kPa). Pressure greater than 170 psig (1172 kPa) shall be reduced by operating the vehicle or limited venting outdoors, as required.

~~2311.6.2~~2314.6.2 Compressed natural gas (CNG).
CNG vehicle fuel system pressure and the ambient temperature shall be measured and recorded prior to entering the repair facility. Pressure greater than the indicated maximum pressure in accordance with Table ~~2311.6.2~~ 2314.6.2shall be reduced by defueling the vehicle.

TABLE ~~2311.6.2~~2314.6.2 TEMPERATURE COMPENSATED CYLINDER PRESSURE TABLE[a]

GAS TEMPERATURE °F	PRESSURE IN FULL 3,600 PSI CNG CONTAINER, psig
123.6	4,500
120	4,455
110	4,272
100	4,105
90	3,936
80	3,768
70	3,600
60	3,432
50	3,263
40	3,094
30	2,926
20	2,757
10	2,589
0	2,421
-10	2,253
-20	2,086
-30	1,919
-40	1,753

For SI: °C = (°F – 32)/1.8, 1 psig = 6.895 kPa.

a. 3,600 psi service pressure calculated from the standard gas composition used to create the gasoline gallon equivalent (GGE).

~~2311.7~~2314.7 Fire extinguishers.
Fire extinguishers shall be provided in accordance with Section 906.

~~2311.8~~2314.8 Repair garages for vehicles fueled by lighter-than-air fuels. The room, motor vehicle repair booth or motor vehicle repair space containing repair garage activities for the conversion or repair of vehicles that use CNG, LNG, hydrogen or other lighter-than-air motor fuels shall be in accordance with Sections ~~2311.8~~2314.8 through ~~2311.8.11~~2314.8.11 in addition to the other requirements of Section ~~2311~~2314. Repair garages for the repair of vehicles that use hydrogen fuel shall be in accordance with this code and NFPA 2.

Exceptions:

1. Repair garages where work is conducted only on vehicles where the motor vehicle fuel tank and system have been defueled and the motor vehicle fuel tank has been purged with nitrogen gas, and where standard operating procedures to document and maintain the fueling status throughout repair operations are *approved*.
2. Repair garages where work is not performed on the fuel system and is limited to exchange of parts and maintenance not requiring open flame or welding on the CNG-, LNG-, hydrogen- or other lighter-than-air-fueled motor vehicle. Movement of a subassembly on which the motor vehicle fuel tank remains mounted to allow access to other parts of the vehicle that are not a portion of the fuel system shall be permitted.
3. Repair garages for hydrogen-fueled vehicles where work is not performed on the motor vehicle fuel tank and is limited to the exchange of parts and maintenance not requiring open flame or welding on the hydrogen-fueled vehicle. During the work, the entire hydrogen fuel system shall contain less than 400 cubic feet (11.3 m^3) of hydrogen.
4. Repair garages for natural-gas-fueled vehicles where work is not being performed on the motor vehicle fuel tank, and is limited to the exchange of parts and maintenance not requiring open flame or welding on the natural-gas-fueled vehicle. During the work, the natural gas in the motor vehicle fuel tank shall contain a pressure of not more than 250 psi at 70°F (1724 kPa at 21°C).

~~2311.8.1~~2314.8.1 Preparation of vehicles for repair. For vehicles powered by gaseous fuels, the fuel shutoff valves shall be closed prior to repairing any portion of the vehicle fuel system.
Vehicles powered by gaseous fuels in which the fuel system has been damaged shall be inspected and evaluated for fuel system integrity prior to being brought into the repair garage. The inspection shall include testing of the entire fuel delivery system for leakage.

~~2311.8.2~~2314.8.2 Repair garages used for the repair of hydrogen-fueled vehicles.
Repair garages used for the repair of hydrogen-fueled vehicles shall be provided with an *approved* exhaust ventilation system in

accordance with the *International Mechanical Code* and Chapter 6 of NFPA 2.

~~2311.8.3~~2314.8.3 Motor vehicle repair rooms.
Motor vehicle repair rooms shall be enclosed with not less than 1-hour *fire barriers* constructed in accordance with Section 707 of the International Building Code, or *horizontal assemblies* constructed in accordance with Section 711 of the International Building Code, or both, with 1-hour-rated opening protectives.

~~2311.8.4~~2314.8.4 Motor vehicle repair booths.
The design and construction of motor vehicle repair booths shall be in accordance with Sections ~~2311.8.4.1~~2314.8.4.1 through ~~2311.8.4.4~~2314.8.4.4.

~~2311.8.4.1~~2314.8.4.1 Construction. Motor vehicle repair booths shall be constructed of *approved*noncombustible materials. Where walls or ceiling assemblies are constructed of sheet metal, single-skin assemblies shall be not thinner than 0.0478 inch (18 gage) (1.2 mm) and each sheet of double-skin assemblies shall be not thinner than 0.0359 inch (20 gage) (0.9 mm). Structural sections of motor vehicle repair booths shall be sealed in an *approved* manner.

~~2311.8.4.2~~2314.8.4.2 Surfaces. The interior surfaces of motor vehicle repair booths shall be constructed to permit the free passage of exhaust air from all parts of the interior.

~~2311.8.4.3~~2314.8.4.3 Means of egress.
Means of egress shall be provided in accordance with Chapter 10.

Exception: *Means of egress* doors from premanufactured motor vehicle repair booths shall be not less than 30 inches (762 mm) in width by 80 inches (2032 mm) in height.

~~2311.8.4.4~~2314.8.4.4 Clear space. Motor vehicle repair booths shall be installed so that all parts of the booth be provided with *ready access* for cleaning. A clear area of not less than 3 feet (914 mm) wide shall be maintained on all sides of the motor vehicle repair booth. This clear area shall be kept free of any storage or combustible construction.

Exceptions:

1. This requirement shall not prohibit locating a motor vehicle repair booth closer than 3 feet (914 mm) to or directly against an interior partition, wall or floor/ceiling assembly that has a *fire-resistance rating* of not less than 1 hour, provided that the motor vehicle repair booth can be adequately maintained and cleaned.
2. This requirement shall not prohibit locating a motor vehicle repair booth closer than 3 feet (914 mm) to an *exterior wall* or a roof assembly, provided that the wall or roof is constructed of noncombustible material and the motor vehicle repair booth can be adequately maintained and cleaned.

~~2311.8.5~~2314.8.5 Motor vehicle repair spaces. Where such spaces are not separately enclosed, noncombustible spray curtains shall be provided to restrict the spread of *flammable gases*.

~~2311.8.6~~2314.8.6 Fire protection. Motor vehicle repair booths or spaces installed in a room or area protected by an *automatic sprinkler system* shall have the protection extended to include the inside of the motor vehicle repair booth or space.

~~2311.8.7~~2314.8.7 Fire extinguishers.
Portable fire extinguishers complying with Section 906 shall be provided for motor vehicle repair rooms, motor vehicle repair booths or motor vehicle repair spaces.

~~2311.8.8~~2314.8.8 Exhaust ventilation system. Repair garages used for the repair of CNG, LNG, or other lighter-than-air motor fuels other than hydrogen shall be provided with an *approved* mechanical ventilation system. The mechanical exhaust ventilation system shall be in accordance with the *International Mechanical Code* and Sections ~~2311.8.8.1~~ 2314.8.8.1 and ~~2311.8.8.2~~2314.8.8.2.

Exception: Where *approved* by the *fire code official*, natural ventilation shall be permitted in lieu of mechanical exhaust ventilation.

~~2311.8.8.1~~2314.8.8.1 Design. For indoor locations, air supply inlets and exhaust outlets for mechanical ventilation shall be arranged to provide uniformly distributed air movement with inlets uniformly arranged on walls near floor level and outlets at the high point of the room in walls or the roof.

Failure of the ventilation system shall cause the fueling system to shut down.

The exhaust ventilation rate shall be not less than 1 cubic foot per minute (0.03 m^3/minute) per 12 cubic feet (34 m^3) of room volume.

~~2311.8.8.2~~2314.8.8.2 **Operation.**

The mechanical exhaust ventilation system shall operate continuously.

Exceptions:

1. Mechanical exhaust ventilation systems that are interlocked with a *gas detection system* designed in accordance with Sections ~~2311.8.9~~2314.8.9 through ~~2311.8.9.2~~2314.8.9.2.
2. Mechanical exhaust ventilation systems in repair garages that are used only for repair of vehicles fueled by liquid fuels or odorized gases, such as CNG, where the ventilation system is electrically interlocked with the lighting circuit.

~~2311.8.9~~2314.8.9 **Gas detection system.**

Repair garages used for repair of vehicles fueled by nonodorized gases, including, but not limited to, hydrogen and nonodorized LNG, shall be provided with a *gas detection system* that complies with Section 916. The *gas detection system* shall be designed to detect leakage of nonodorized gaseous fuel. Where lubrication or chassis service pits are provided in garages used for repairing nonodorized LNG-fueled vehicles, gas sensors shall be provided in such pits.

~~2311.8.9.1~~2314.8.9.1 **System activation.** Activation of the gas detection alarm shall result in all of the following:

1. Initiation of local audible and visual alarms in *approved* locations.
2. Deactivation of heating systems located in the repair garage.
3. Activation of the mechanical exhaust ventilation system, where the ventilation system is interlocked with gas detection.

~~2311.8.9.2~~2314.8.9.2 **Failure of the gas detection system.** Failure of the *gas detection system* shall automatically deactivate the heating system, activate the mechanical exhaust ventilation system where the system is interlocked with the *gas detection system* and cause a trouble signal to sound in an *approved* location.

~~2311.8.10~~2314.8.10 **Classified electrical area.**

Areas within 18 inches (450 mm) of a ceiling within a motor vehicle repair room or motor vehicle repair booth shall be designed and installed in accordance with the requirements for Class I, Division 2, classified locations, as set forth in NFPA 70.

Exceptions:

1. Rooms with exhaust ventilation of not less than 1 cubic foot per minute per square foot (0.3 m^3/ min/m^2) of floor area, with suction taken from a point within 18 inches (450 mm) of the highest point in the ceiling in repair garages for vehicles that use CNG, liquefied natural gas (LNG) or other lighter-than-air motor fuels.
2. Rooms used for the repair of hydrogen-fueled vehicles that have an *approved* exhaust ventilation system in accordance with the *International Mechanical Code* and NFPA 2.

~~2311.8.11~~2314.8.11 **Defueling equipment required at vehicle maintenance and repair facilities.**

Facilities for repairing or replacing hydrogen fuel tanks on hydrogen-fueled vehicles shall have equipment to defuel vehicle storage tanks. Where work must be performed on a motor vehicle's fuel tank for the purpose of maintenance, repair or cylinder certification, defueling and purging shall be conducted in accordance with Section ~~2309.6~~2311.6 and NFPA 2.

Reason: This proposal creates a comprehensive fueling chapter by moving fueling operations from Chapters 57 and 58 into Chapter 23. Chapter 23 is renumbered to allow for these additions. There are no changes in requirements or application. All of these revisions are editorial and the majority of the changes are simply renumbering the sections to fit the relocated items from other chapters.

New sections in Chapter 23 will be:

- 2307 FLAMMABLE AND COMBUSTIBLE LIQUID MOTOR FUEL-DISPENSING ON FARMS AND CONSTRUCTION SITES (was

5706.2)

- 2308 MOBILE FUEL-DISPENSING OF FLAMMABLE AND COMBUSTIBLE LIQUIDS (was 5706.5.4)
- 2312 MOBILE FUEL-DISPENSING OF HYDROGEN (was 5809)

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This change is simply moving everything fueling into the same chapter and will not have a cost impact.
Changes proposed are entirely editorial. The reformatting and editorial clarifications make no changes to the requirements or their application.

F182-24

F183-24

IFC: CHAPTER 23, SECTION 2301, 2301.1, SECTION 2302, 2302.1, SECTION 2309, 2309.6, SECTION 2311, CHAPTER 43 (New), 2311.1, SECTION 4302 (New), 4302.1 (New), 4303.1 (New), 2311.2, 2311.2.1, 2311.2.2, 2311.2.2.1, 2311.2.2.2, 2311.2.3, 2311.2.3.1, 2311.2.3.2, 2311.2.4, 2311.3, 2311.3.1, 2311.3.2, 2311.4, 2311.4.1, 2311.4.2, 2311.4.3, 2311.5, 2311.6, 2311.6.1, 2311.6.2, TABLE 2311.6.2, 2311.7, 2311.8, 2311.8.1, 2311.8.2, 2311.8.3, 2311.8.4, 2311.8.4.1, 2311.8.4.2, 2311.8.4.3, 2311.8.4.4, 2311.8.5, 2311.8.6, 2311.8.7, 2311.8.8, 2311.8.8.1, 2311.8.8.2, 2311.8.9, 2311.8.9.1, 2311.8.9.2, 2311.8.10, 2311.8.11, 4303.8.11.1 (New)

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2024 International Fire Code

CHAPTER 23 MOTOR FUEL-DISPENSING FACILITIES AND REPAIR GARAGES

SECTION 2301 GENERAL

Revise as follows:

2301.1 Scope.
Automotive motor fuel-dispensing facilities, marine motor fuel-dispensing facilities, fleet vehicle motor fuel-dispensing facilities, aircraft motor-vehicle fuel-dispensing facilities ~~and repair garages~~ shall be in accordance with this chapter and the *International Building Code*, *International Fuel Gas Code* and *International Mechanical Code*. Such operations shall include both those that are open to the public and private operations.

SECTION 2302 DEFINITIONS

Revise as follows:

2302.1 Definitions.
The following terms are defined in Chapter 2:

AIRCRAFT MOTOR-VEHICLE FUEL-DISPENSING FACILITY.

ALCOHOL-BLENDED FUELS.

AUTOMOTIVE MOTOR FUEL-DISPENSING FACILITY.

DISPENSING DEVICE, OVERHEAD TYPE.

FLEET VEHICLE MOTOR FUEL-DISPENSING FACILITY.

LIQUEFIED NATURAL GAS (LNG).

MARINE MOTOR FUEL-DISPENSING FACILITY.

~~**REPAIR GARAGE.**~~

SELF-SERVICE MOTOR FUEL-DISPENSING FACILITY.

SECTION 2309 HYDROGEN MOTOR FUEL-DISPENSING AND GENERATION FACILITIES

Revise as follows:

2309.6 Repairs, purging, defueling and discharge.
The repair, purging, defueling or discharge activities associated with hydrogen motor fuel-dispensing and generation systems, storage tanks and the installation of the systems shall be in accordance with Chapters 53 and 58 and NFPA 2.

> ~~**Exception:** The motor vehicle fuel tank and the fuel supply piping from the motor vehicle fuel tank to the engine compartment on a motor vehicle or forklift unless the fuel tank is required to be defueled in accordance with Section 2311.8.11.~~

Delete without substitution:

~~SECTION 2311~~
~~REPAIR GARAGES~~

Add new text as follows:

CHAPTER 43 REPAIR GARAGES

Revise as follows:

~~2311.1~~ 4301.1 ~~General~~ Scope..
Motor vehicle, marine motor craft, aircraft, industrial power truck and off-road vehicle ~~R~~ repair garages shall comply with this ~~section~~ Chapter, ~~and~~ the *International Building Code* , and *the International Mechanical Code*. ~~Repair garages for vehicles that use more than one type of fuel shall comply with the applicable provisions of this section for each type of fuel used.~~ Where a repair garage includes a motor fuel-dispensing facility, the fuel-dispensing operation shall comply with the requirements of ~~this c~~ Chapter 23 for motor fuel-dispensing facilities.

Add new text as follows:

SECTION 4302 DEFINITIONS

4302.1 Definitions.. The following terms are defined in Chapter 2.
REPAIR GARAGE.

4303.1 General.. Repair garages shall comply with the applicable sections of this chapter for the type of fuel powering the vehicle that is being serviced or repaired.

Revise as follows:

~~2311.2~~ 4303.2 Storage and use of flammable and combustible liquids.
The storage and use of *flammable* and *combustible liquids* in repair garages shall comply with Chapter 57 and Sections ~~2311.2.1~~ 4303.2.1 through ~~2311.2.4~~ 4303.2.4.

~~2311.2.1~~ 4303.2.1 Cleaning of parts.
Cleaning of parts shall be conducted in *listed* and *approved* parts-cleaning machines in accordance with Chapter 57.

~~2311.2.2~~ 4303.2.2 Waste oil, motor oil and other Class IIIB liquids. Waste oil, motor oil and other Class IIIB liquids shall be stored in *approved* tanks or containers, which are allowed to be stored and dispensed from inside repair garages.

~~2311.2.2.1~~ 4303.2.2.1 Tank location. Tanks storing Class IIIB liquids in *repair garages* are allowed to be located at, below or above grade, provided that adequate drainage or containment is provided.

~~2311.2.2.2~~ 4303.2.2.2 Liquid classification. Crankcase drainings shall be classified as Class IIIB liquids unless otherwise determined by testing.

~~2311.2.3~~ 4303.2.3 Drainage and disposal of liquids and oil-soaked waste.
Garage floor drains, where provided, shall drain to *approved* oil separators or traps discharging to a sewer in accordance with the *International Plumbing Code*. Contents of oil separators, traps and floor drainage systems shall be collected at sufficiently frequent intervals and removed from the premises to prevent oil from being carried into the sewers.

~~2311.2.3.1~~ 4303.2.3.1 Disposal of liquids.
Crankcase drainings and liquids shall not be dumped into sewers, streams or on the ground, but shall be stored in *approved* tanks or containers in accordance with Chapter 57 until removed from the premises.

~~2311.2.3.2~~ 4303.2.3.2 Disposal of oily waste. Self-closing metal cans shall be used for oily waste.

~~2311.2.4~~ 4303.2.4 Spray finishing.
Spray finishing with *flammable* or *combustible liquids* shall comply with Chapter 24.

~~2311.3~~ 4303.3 Sources of ignition.
Sources of ignition shall not be located within 18 inches (457 mm) of the floor and shall comply with Chapters 3 and 35.

~~2311.3.1~~ 4303.3.1 Equipment.
Appliances and equipment installed in a repair garage shall comply with the provisions of the *International Building Code*, the *International Mechanical Code* and NFPA 70.

~~2311.3.2~~ 4303.3.2 Smoking. Smoking shall not be allowed in repair garages except in *approved* locations.

~~2311.4~~ 4303.4 Below-grade areas.
Pits and below-grade work areas in repair garages shall comply with Sections ~~2311.4.1~~ 4303.4.1 through ~~2311.4.~~3 4303.4.3.

~~2311.4.1~~ 4303.4.1 Construction.
Pits and below-grade work areas shall be constructed in accordance with the *International Building Code*.

~~2311.4.2~~ 4303.4.2 Means of egress.
Pits and below-grade work areas shall be provided with *means of egress* in accordance with Chapter 10.

~~2311.4.3~~ 4303.4.3 Ventilation.
Where Class I liquids or LP-gas are stored or used within a building having a *basement* or pit wherein flammable vapors could accumulate, the *basement* or pit shall be provided with mechanical ventilation in accordance with the *International Mechanical Code*, at a minimum rate of $1^1/_2$ cubic feet per minute per square foot (cfm/ft^2) [0.008 m^3/(s × m^2)] to prevent the accumulation of flammable vapors.

~~2311.5~~ 4303.5 Vehicles powered by liquefied petroleum gas (LP-gas).
Vehicles powered by LP-gas and the servicing of vehicles powered by LP-gas shall be in compliance with this chapter, Chapter 61 and NFPA 58.

~~2311.6~~ 4303.6 Vehicles powered by liquefied natural gas (LNG) and compressed natural gas (CNG).
LNG vehicles and CNG vehicles shall comply with Sections ~~2311.6.1~~ 4303.6.1 and ~~2311.6.2~~ 4303.6.2, as applicable.

~~2311.6.1~~ 4303.6.1 Liquefied natural gas (LNG). LNG vehicle fuel system pressure shall be measured and recorded prior to entering the repair facility. The maximum allowable system pressure shall be not more than 170 psig (1172 kPa). Pressure greater than 170 psig (1172 kPa) shall be reduced by operating the vehicle or limited venting outdoors, as required.

~~2311.6.2~~ 4303.6.2 Compressed natural gas (CNG).
CNG vehicle fuel system pressure and the ambient temperature shall be measured and recorded prior to entering the repair facility. Pressure greater than the indicated maximum pressure in accordance with Table ~~2311.6.2~~ 4303.6.2 shall be reduced by defueling the

vehicle.

TABLE ~~2311.6.2~~ 4303.6.2 TEMPERATURE COMPENSATED CYLINDER PRESSURE TABLE[a]

GAS TEMPERATURE °F	PRESSURE IN FULL 3,600 PSI CNG CONTAINER, psig
123.6	4,500
120	4,455
110	4,272
100	4,105
90	3,936
80	3,768
70	3,600
60	3,432
50	3,263
40	3,094
30	2,926
20	2,757
10	2,589
0	2,421
-10	2,253
-20	2,086
-30	1,919
-40	1,753

For SI: °C = (°F – 32)/1.8, 1 psig = 6.895 kPa.

a. 3,600 psi service pressure calculated from the standard gas composition used to create the gasoline gallon equivalent (GGE).

~~2311.7~~ 4303.7 Fire extinguishers.
Fire extinguishers shall be provided in accordance with Section 906.

~~2311.8~~ 4303.8 Repair garages for vehicles fueled by lighter-than-air fuels.
The room, motor vehicle repair booth or motor vehicle repair space containing repair garage activities for the conversion or repair of vehicles that use CNG, LNG, hydrogen or other lighter-than-air motor fuels shall be in accordance with Sections ~~2311.8~~ 4303.8 through ~~2311.8.11~~ 4303.8.11 in addition to the other requirements of ~~Section 2311~~ this chapter. Repair garages for the repair of vehicles that use hydrogen fuel shall be in accordance with this code and NFPA 2.

Exceptions:

1. Repair garages where work is conducted only on vehicles where the motor vehicle fuel tank and system have been defueled and the motor vehicle fuel tank has been purged with nitrogen gas, and where standard operating procedures to document and maintain the fueling status throughout repair operations are *approved*.
2. Repair garages where work is not performed on the fuel system and is limited to exchange of parts and maintenance not requiring open flame or welding on the CNG-, LNG-, hydrogen- or other lighter-than-air-fueled motor vehicle. Movement of a subassembly on which the motor vehicle fuel tank remains mounted to allow access to other parts of the vehicle that are not a portion of the fuel system shall be permitted.
3. Repair garages for hydrogen-fueled vehicles where work is not performed on the motor vehicle fuel tank and is limited to the exchange of parts and maintenance not requiring open flame or welding on the hydrogen-fueled vehicle. During the work, the entire hydrogen fuel system shall contain less than 400 cubic feet (11.3 m^3) of hydrogen.
4. Repair garages for natural-gas-fueled vehicles where work is not being performed on the motor vehicle fuel tank, and is limited to the exchange of parts and maintenance not requiring open flame or welding on the natural-gas-fueled vehicle. During the work, the natural gas in the motor vehicle fuel tank shall contain a pressure of not more than 250 psi at 70°F (1724 kPa at 21°C).

~~2311.8.1~~ 4303.8.1 Preparation of vehicles for repair. For vehicles powered by gaseous fuels, the fuel shutoff valves shall be closed prior to repairing any portion of the vehicle fuel system.
Vehicles powered by gaseous fuels in which the fuel system has been damaged shall be inspected and evaluated for fuel system integrity prior to being brought into the repair garage. The inspection shall include testing of the entire fuel delivery system for leakage.

~~2311.8.2~~ <u>4303.8.2</u> Repair garages used for the repair of hydrogen-fueled vehicles.
Repair garages used for the repair of hydrogen-fueled vehicles shall be provided with an *approved* exhaust ventilation system in accordance with the *International Mechanical Code* and Chapter 6 of NFPA 2.

~~2311.8.3~~ <u>4303.8.3</u> Motor vehicle repair rooms.
Motor vehicle repair rooms shall be enclosed with not less than 1-hour *fire barriers* constructed in accordance with Section 707 of the International Building Code, or *horizontal assemblies* constructed in accordance with Section 711 of the International Building Code, or both, with 1-hour-rated opening protectives.

~~2311.8.4~~ <u>4303.8.4</u> Motor vehicle repair booths.
The design and construction of motor vehicle repair booths shall be in accordance with Sections ~~2311.8.4.1~~ <u>4303.8.4.1</u> through ~~2311.8.4.4~~ <u>4303.8.4.4.</u>

~~2311.8.4.1~~ <u>4303.8.4.1</u> Construction. Motor vehicle repair booths shall be constructed of *approved*noncombustible materials. Where walls or ceiling assemblies are constructed of sheet metal, single-skin assemblies shall be not thinner than 0.0478 inch (18 gage) (1.2 mm) and each sheet of double-skin assemblies shall be not thinner than 0.0359 inch (20 gage) (0.9 mm). Structural sections of motor vehicle repair booths shall be sealed in an *approved* manner.

~~2311.8.4.2~~ <u>4303.8.4.2</u> Surfaces. The interior surfaces of motor vehicle repair booths shall be constructed to permit the free passage of exhaust air from all parts of the interior.

~~2311.8.4.3~~ <u>4303.8.4.3</u> Means of egress.
Means of egress shall be provided in accordance with Chapter 10.

Exception: *Means of egress* doors from premanufactured motor vehicle repair booths shall be not less than 30 inches (762 mm) in width by 80 inches (2032 mm) in height.

~~2311.8.4.4~~ <u>4303.8.4.4</u> Clear space. Motor vehicle repair booths shall be installed so that all parts of the booth be provided with *ready access* for cleaning. A clear area of not less than 3 feet (914 mm) wide shall be maintained on all sides of the motor vehicle repair booth. This clear area shall be kept free of any storage or combustible construction.

Exceptions:

1. This requirement shall not prohibit locating a motor vehicle repair booth closer than 3 feet (914 mm) to or directly against an interior partition, wall or floor/ceiling assembly that has a *fire-resistance rating* of not less than 1 hour, provided that the motor vehicle repair booth can be adequately maintained and cleaned.
2. This requirement shall not prohibit locating a motor vehicle repair booth closer than 3 feet (914 mm) to an *exterior wall* or a roof assembly, provided that the wall or roof is constructed of noncombustible material and the motor vehicle repair booth can be adequately maintained and cleaned.

~~2311.8.5~~ <u>4303.8.5</u> Motor vehicle repair spaces. Where such spaces are not separately enclosed, noncombustible spray curtains shall be provided to restrict the spread of *flammable gases*.

~~2311.8.6~~ <u>4303.8.6</u> Fire protection. Motor vehicle repair booths or spaces installed in a room or area protected by an *automatic sprinkler system* shall have the protection extended to include the inside of the motor vehicle repair booth or space.

~~2311.8.7~~ <u>4303.8.7</u> Fire extinguishers.
Portable fire extinguishers complying with Section 906 shall be provided for motor vehicle repair rooms, motor vehicle repair booths or motor vehicle repair spaces.

~~2311.8.8~~ <u>4303.8.8</u> Exhaust ventilation system.
Repair garages used for the repair of CNG, LNG, or other lighter-than-air motor fuels other than hydrogen shall be provided with an *approved* mechanical ventilation system. The mechanical exhaust ventilation system shall be in accordance with the *International Mechanical Code* and Sections ~~2311.8.8.1~~ <u>4303.8.8.1</u> and ~~2311.8.8.2~~ <u>4303.8.8.2.</u>

Exception: Where *approved* by the *fire code official*, natural ventilation shall be permitted in lieu of mechanical exhaust ventilation.

~~2311.8.8.1~~ 4303.8.8.1 Design. For indoor locations, air supply inlets and exhaust outlets for mechanical ventilation shall be arranged to provide uniformly distributed air movement with inlets uniformly arranged on walls near floor level and outlets at the high point of the room in walls or the roof.

Failure of the ventilation system shall cause the fueling system to shut down.

The exhaust ventilation rate shall be not less than 1 cubic foot per minute (0.03 m^3/minute) per 12 cubic feet (34 m^3) of room volume.

~~2311.8.8.2~~ 4303.8.8.2 Operation.

The mechanical exhaust ventilation system shall operate continuously.

Exceptions:

1. Mechanical exhaust ventilation systems that are interlocked with a *gas detection system* designed in accordance with Sections 2311.8.9 4303.8.9 through ~~2311.8.9.2~~ 4303.8.9.2.
2. Mechanical exhaust ventilation systems in repair garages that are used only for repair of vehicles fueled by liquid fuels or odorized gases, such as CNG, where the ventilation system is electrically interlocked with the lighting circuit.

~~2311.8.9~~ 4303.8.9 Gas detection system.

Repair garages used for repair of vehicles fueled by nonodorized gases, including, but not limited to, hydrogen and nonodorized LNG, shall be provided with a *gas detection system* that complies with Section 916. The *gas detection system* shall be designed to detect leakage of nonodorized gaseous fuel. Where lubrication or chassis service pits are provided in garages used for repairing nonodorized LNG-fueled vehicles, gas sensors shall be provided in such pits.

~~2311.8.9.1~~ 4303.8.9.1 System activation. Activation of the gas detection alarm shall result in all of the following:

1. Initiation of local audible and visual alarms in *approved* locations.
2. Deactivation of heating systems located in the repair garage.
3. Activation of the mechanical exhaust ventilation system, where the ventilation system is interlocked with gas detection.

~~2311.8.9.2~~ 4303.8.9.2 Failure of the gas detection system. Failure of the *gas detection system* shall automatically deactivate the heating system, activate the mechanical exhaust ventilation system where the system is interlocked with the *gas detection system* and cause a trouble signal to sound in an *approved* location.

~~2311.8.10~~ 4303.8.10 Classified electrical area.

Areas within 18 inches (450 mm) of a ceiling within a motor vehicle repair room or motor vehicle repair booth shall be designed and installed in accordance with the requirements for Class I, Division 2, classified locations, as set forth in NFPA 70.

Exceptions:

1. Rooms with exhaust ventilation of not less than 1 cubic foot per minute per square foot (0.3 m^3/ min/m^2) of floor area, with suction taken from a point within 18 inches (450 mm) of the highest point in the ceiling in repair garages for vehicles that use CNG, liquefied natural gas (LNG) or other lighter-than-air motor fuels.
2. Rooms used for the repair of hydrogen-fueled vehicles that have an *approved* exhaust ventilation system in accordance with the *International Mechanical Code* and NFPA 2.

~~2311.8.11~~ 4303.8.11 Defueling equipment required at vehicle maintenance and repair facilities.

Facilities for repairing or replacing hydrogen fuel tanks on hydrogen-fueled vehicles shall have equipment to defuel vehicle storage tanks. Where work must be performed on a motor vehicle's fuel tank for the purpose of maintenance, repair or cylinder certification, defueling and purging shall be conducted in accordance with Section ~~2309.6~~ 4303.8.11.1 and NFPA 2.

Add new text as follows:

4303.8.11.1 Documented procedure.. A documented procedure that explains the logic sequence for defueling or discharging operations shall be maintained on-site and shall be provided to the fire code official upon request. The procedure shall include what actions the operator is required to take in the event of a low-pressure or high-pressure hydrogen release during discharging activity. Schematic design documents shall be maintained on-site, illustrating the arrangement of piping, regulators and equipment settings. The schematic shall illustrate the piping and regulator arrangement and shall be shown in spatial relation to the location of the vehicle being defueled and, if applicable, to the compressor, storage vessels and emergency shutdown devices.

Reason: The purpose of this proposal is to remove repair garages from Chapter 23 and create a chapter just for repair garages. Years ago, motor -fueling operations and repairs garages were typically a connected pair of operations, however, over time that has changed with typical motor-fueling and repair garage operations separate occupancies. Motor-fueling operations are now more commonly associated with convenience centers and fleet operations. Eight sections of Chapter 23 apply to motor-fueling operations with one section devoted to repair garages. With the single section for repair garages currently in Chapter 23 it does not pick up servicing of other fueled vehicle such as industrial power trucks and off-road vehicles which present similar hazards. Moving repair garages to its own chapter highlights its existence and the scope has been modified to capture industrial power trucks and off-road vehicles.

With a dedicated Chapter the goal moving forward is to focus on re-writing the chapter to break down the application of the technical language based upon fuel type in conjunction with changes to the related codes, IBC and IMC. A missing component is repair of EVs.

The changes are overwhelmingly editorial related to the move.

2309.6 - The exception is no longer needed here with the repair garage language being put in its own chapter.

4301.1 - The deleted sentence is covered by new 4303.1.

4303.8.11.1 Is a copy of 2309.6.1. With the repair garage in its own chapter the needed language should be here instead of looking back to Chapter 23.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is an editorial move to relocate 2311 Repair Garages to its own Chapter.

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Chapter 24

Proponents: Geoffrey Raifsnider, Global Finishing Solutions, Self (graifsnider@globalfinishing.com)

2024 International Fire Code

CHAPTER 24 FLAMMABLE FINISHES

SECTION 2401
GENERAL

Revise as follows:

2401.1 Scope. This chapter shall apply to locations or areas where any of the following activities are conducted:

1. The application of flammable finishes to articles or materials by means of spray apparatus.
2. The application of flammable finishes by dipping or immersing articles or materials into the contents of tanks, vats or containers of *flammable* or *combustible liquids* for coating, finishing, treatment or similar processes.
3. The application of flammable finishes by applying combustible powders to articles or materials utilizing powder spray guns, electrostatic powder spray guns, fluidized beds or electrostatic fluidized beds.
4. Floor surfacing or finishing operations using Class I or II liquids in areas exceeding 350 square feet (32.5 m^2).
5. The application of flammable finishes consisting of dual-component coatings or Class I or II liquids where applied by brush or roller in quantities exceeding 1 gallon (4 L).
6. The application of waterborne finishes that contain ignitable liquids or that produce combustible deposits.

2401.2 Nonapplicability.
This chapter shall not apply to spray finishing utilizing *flammable* or *combustible liquids* that do not sustain combustion, including:

1. Liquids that do not have a fire point when tested in accordance with ASTM D92.
2. Liquids with a flashpoint greater than 95°F (35°C) in a water-miscible solution or dispersion with a water and inert (noncombustible) solids content of more than 80 percent by weight.

2401.3 Permits.
Permits shall be required as set forth in Sections 105.5 and 105.6.

SECTION 2402
DEFINITIONS

2402.1 Definitions.
The following terms are defined in Chapter 2:

DETEARING.

DIP TANK.

ELECTROSTATIC FLUIDIZED BED.

FLAMMABLE FINISHES.

FLAMMABLE VAPOR AREA.

FLUIDIZED BED.

LIMITED SPRAYING SPACE.

RESIN APPLICATION AREA.

ROLL COATING.

SPRAY BOOTH.

SPRAY ROOM.

SPRAYING SPACE.

Revise as follows:

SECTION ~~2404~~ 2403 SPRAY FINISHING

~~2404.1~~ 2403.1 General.
The application of *flammable* or *combustible liquids* by means of spray apparatus in continuous or intermittent processes shall be in accordance with the requirements of Sections 2403.2 through 2403.9.4, 2409, 2410 and NFPA 33. ~~2403 and 2404.4 through 2404.11.4~~.

~~2404.2 Prohibited enclosures for spray application operations~~.
~~Inflatable or portable enclosures shall not be used for spray application of flammable finishes.~~

> **~~Exception:~~** ~~Enclosures for the spray application of flammable finishes in marinas, dry docking areas or construction areas shall comply with Section 2404.3.~~

~~2404.4~~ 2403.2 Location of spray-finishing operations.
Spray-finishing operations conducted in buildings used for Group A, E, I or R occupancies shall be located in a spray room protected with an *approved automatic sprinkler system* installed in accordance with Section 903.3.1.1 and separated vertically and horizontally from the remainder of the building by *fire barrier* walls and *horizontal assemblies* with not less than a 1-hour *fire-resistance rating* in accordance with the *International Building Code*. In other occupancies, spray-finishing operations shall be conducted in a spray room, spray booth or limited spraying space *approved* for such use.

Exceptions:

1. Automobile undercoating spray operations and spray-on automotive lining operations conducted in areas with *approved* natural or mechanical ventilation shall be exempt from the provisions of Section ~~2404~~ 2403 when *approved* and where utilizing Class IIIA or IIIB *combustible liquids*.
2. In buildings other than Group A, E, I or R occupancies, *approved* limited spraying space in accordance with Section ~~2404.11~~ 2403.4.
3. Resin application areas used for manufacturing of reinforced plastics complying with Section ~~2409~~ 2408 shall not be required to be located in a spray room, spray booth or spraying space.

~~2404.5~~ 2403.3 Design and construction.
Design and construction of spray rooms, spray booths, limited finishing workstations, inflatable finishing workstations, membrane enclosures and spray spaces shall be in accordance with Sections ~~2404.5.1~~ 2403.3.1through ~~2494.5.5.1~~ 2403.3.6.1.

~~2404.5.1~~ 2403.3.1 Spray rooms.
The design, construction, protection, operation and maintenance of spray rooms shall be in accordance with NFPA 33, ~~Spray rooms shall be constructed and designed in accordance with~~ Section 416 of the International Building Code and Sections 2403.3.1.1 and 2403.3.1.2 of this code. ~~2404.5.2 of this code, and shall comply with Sections 2404.6 through 2404.10 of this code~~.

Add new text as follows:

2403.3.1.1 Ventilation. The ventilation system shall be designed, installed and maintained so that the flammable contaminates are diluted in noncontaminated air to maintain concentrations in the exhaust airflow below 25 percent of the contaminant's lower flammable limit (LFL).

Revise as follows:

~~**2404.5.2**~~ **2403.3.1.2 Floor.** Combustible floor construction in spray rooms shall be covered by *approved*, noncombustible, nonsparking material, except where combustible coverings, including but not limited to thin paper or plastic and strippable coatings, are utilized over noncombustible materials to facilitate cleaning operations in spray rooms.

~~**2404.5.3**~~ **2403.3.2 Spray booths.**
~~The design and construction of spray booths~~The design, construction, protection, operation and maintenance of spray booths shall be in accordance with NFPA 33, and ~~shall be in accordance with~~ Sections 2403.3.1 through 2403.3.3 ~~2404.5.3.1 through 2404.5.3.6, Sections 2404.6 through 2404.10 and NFPA 33~~.

~~**2404.5.3.1 Construction.** Spray booths shall be constructed of *approved* noncombustible materials. Aluminum shall not be used. Where walls or ceiling assemblies are constructed of sheet metal, single-skin assemblies shall be not thinner than 0.0478 inch (18 gage) (1.2 mm) and each sheet of double-skin assemblies shall be not thinner than 0.0359 inch (20 gage) (0.9 mm). Structural sections of spray booths are allowed to be sealed with latex-based or similar caulks and sealants.~~

~~**2404.5.3.2 Surfaces.** The interior surfaces of spray booths shall be smooth; shall be constructed so as to permit the free passage of exhaust air from all parts of the interior, and to facilitate washing and cleaning; and shall be designed to confine residues within the booth. Aluminum shall not be used.~~

~~**2404.5.3.3 Floor.** Combustible floor construction in spray booths shall be covered by *approved*, noncombustible, nonsparking material, except where combustible coverings, including but not limited to thin paper or plastic and strippable coatings, are utilized over noncombustible materials to facilitate cleaning operations in spray booths.~~

~~**2404.9**~~ **2403.3.2.1 Ventilation.**
Mechanical ventilation of flammable vapor areas shall be provided in accordance with NFPA 33, Section 2403.3.2.1.1 and Section 502.7 of the *International Mechanical Code*.

~~**2404.9.3**~~ **2403.3.2.1.1 Air velocity.**
The ventilation system shall be designed, installed and maintained so that the flammable contaminants are diluted in noncontaminated air to maintain concentrations in the exhaust airflow below 25 percent of the contaminant’s lower flammable limit (LFL). In addition, the spray booth shall be provided with mechanical ventilation so that the average air velocity through openings is in accordance with Sections ~~2404.9.1 and 2404.9.3.2~~ 2403.3.2.1.1.1 and 2403.3.2.1.1.2.

~~**2404.9.3.1**~~ **2403.3.2.1.1.1 Open-face or open-front spray booth.** For spray application operations conducted in an open-face or open-front spray booth, the ventilation system shall be designed, installed and maintained so that the average air velocity into the spray booth through all openings is not less than 100 feet per minute (0.51 m/s).

Exception: For fixed or automated electrostatic spray application equipment, the average air velocity into the spray booth through all openings shall be not less than 50 feet per minute (0.25 m/s).

~~**2404.9.3.2**~~ **2403.3.2.1.1.2 Enclosed spray booth or spray room with openings for product conveyance.** For spray application operations conducted in an enclosed spray booth or spray room with openings for product conveyance, the ventilation system shall be designed, installed and maintained so that the average air velocity into the spray booth through openings is not less than 100 feet per minute (0.51 m/s).

Exceptions:

1. For fixed or automated electrostatic spray application equipment, the average air velocity into the spray booth through all openings shall be not less than 50 feet per minute (0.25 m/s).

2. Where methods are used to reduce cross drafts that can draw vapors and overspray through openings from the spray booth or spray room, the average air velocity into the spray booth or spray room shall be that necessary to capture and confine vapors and overspray to the spray booth or spray room.

~~2404.9.4~~ 2403.3.2.1.2 Ventilation obstruction. Articles being sprayed shall be positioned in a manner that does not obstruct collection of overspray.

~~2404.9.8.4~~ 2403.3.2.1.3 Filter rolls. Spray booths equipped with a filter roll that is automatically advanced when the air velocity is reduced to less than 100 feet per minute (0.51 m/s) shall be arranged to shut down the spraying operation if the filter roll fails to advance automatically.

~~2404.5.3.4~~ 2403.3.2.2 Means of egress. *Means of egress* shall be provided in accordance with Chapter 10.

Exception: *Means of egress* doors from premanufactured spray booths shall be not less than 30 inches (762 mm) in width by 80 inches (2032 mm) in height.

~~2404.5.3.5~~ 2403.3.2.3 Clear space. Spray booths shall be installed so that all parts of the booth are able to be accessed for cleaning. A clear space of not less than 3 feet (914 mm) shall be maintained on all sides of the spray booth. This clear space shall be kept free of any storage or combustible construction.

Exceptions:

1. This requirement shall not prohibit locating a spray booth closer than 3 feet (914 mm) to or directly against an interior partition, wall or floor/ceiling assembly that has a *fire-resistance rating* of not less than 1 hour, provided that the spray booth can be adequately maintained and cleaned.
2. This requirement shall not prohibit locating a spray booth closer than 3 feet (914 mm) to an *exterior wall* or a roof assembly, provided that the wall or roof is constructed of noncombustible material and the spray booth can be adequately maintained and cleaned.

~~2404.5.3.6 Size.~~

~~The aggregate area of spray booths in a building shall not exceed the lesser of 10 percent of the area of any floor of a building or the basic area allowed for a Group H-2 occupancy without area increases, as set forth in the *International Building Code*.~~

~~**Exception:** One individual booth not exceeding 500 square feet (46 m^2).~~

~~2404.5.4~~ 2403.3.3 Limited finishing workstation.

The design, construction, protection, operation and maintenance of a~~A~~ limited finishing workstation shall be in accordance with ~~comply with the applicable provisions of~~ NFPA 33 ~~and Sections 2404.6 through 2404.10~~.

Add new text as follows:

2403.3.4 Inflatable Finishing Workstation. The design, construction, protection, operation and maintenance of an inflatable finishing workstation shall be in accordance with NFPA 33.

Revise as follows:

~~2404.3~~ 2403.3.5 Membrane enclosures.

The design, construction, protection, operation and maintenance of membrane enclosures shall be in accordance with NFPA 33.

~~2404.5.5~~ 2403.3.6 Spraying spaces.

Spraying spaces shall be designed and constructed in accordance with the *International Building Code*, and Section ~~2404.5.5.1 and Sections 2404.6 through 2404.10~~ 2403.3.6.1 of this code.

~~2404.5.5.1~~ 2403.3.6.1 Floor. Combustible floor construction in spraying spaces shall be covered by *approved*, noncombustible, nonsparking material, except where combustible coverings, such as thin paper or plastic and strippable coatings, are utilized over noncombustible materials to facilitate cleaning operations in spraying spaces.

Delete without substitution:

~~2404.6 Fire protection~~.
~~Spray booths and spray rooms shall be protected by an *approved automatic fire-extinguishing system* complying with Chapter 9. Protection shall extend to exhaust plenums, exhaust ducts and both sides of dry filters where such filters are used.~~

~~2404.6.1 Fire extinguishers~~.
~~Portable fire extinguishers complying with Section 906 shall be provided for spraying areas in accordance with the requirements for an extra (high) hazard occupancy.~~

~~2404.7 Housekeeping, maintenance and storage of hazardous materials~~.
~~Housekeeping, maintenance, storage and use of hazardous materials shall be in accordance with Sections 2403.3, 2403.4, 2404.7.1 and 2404.7.2.~~

~~2404.7.1 Different coatings.~~ ~~Spray booths, spray rooms and spraying spaces shall not be alternately utilized for different types of coating materials where the combination of materials is conducive to spontaneous ignition, unless all deposits of one material are removed from the booth, room or space and exhaust ducts prior to spraying with a different material.~~

~~2404.7.2 Protection of sprinklers~~. ~~Automatic sprinklers installed in flammable vapor areas shall be protected from the accumulation of residue from spraying operations in an *approved* manner. Bags used as a protective covering shall be 0.003-inch-thick (0.076 mm) polyethylene or cellophane or shall be thin paper. Automatic sprinklers contaminated by overspray particles shall be replaced with new automatic sprinklers.~~

~~2404.8 Sources of ignition~~.
~~Control of sources of ignition shall be in accordance with Section 2403.2 and Sections 2404.8.1 through 2404.8.2.4.~~

~~2404.8.1 Drying operations~~.
~~Spray booths and spray rooms shall not be alternately used for the purpose of drying by arrangements or methods that could cause an increase in the surface temperature of the spray booth or spray room except in accordance with Sections 2404.8.1.1 and 2404.8.1.2. Except as specifically provided in this section, drying or baking units utilizing a heating system having open flames or that are capable of producing sparks shall not be installed in a flammable vapor areas.~~

~~2404.8.1.1 Spraying procedure.~~ ~~The spraying procedure shall use low-volume spray application.~~

~~2404.8.1.2 Drying apparatus~~.
~~Fixed drying apparatus shall comply with this chapter and the applicable provisions of Chapter 30. Where recirculation ventilation is provided in accordance with Section 2404.9.2, the heating system shall not be within the recirculation air path.~~

~~2404.8.1.2.1 Interlocks.~~ ~~The spraying apparatus, drying apparatus and ventilating system for the spray booth or spray room shall be equipped with interlocks arranged to accomplish all of the following:~~

1. ~~Prevent operation of the spraying apparatus while drying operations are in progress.~~

2. ~~Where the drying apparatus is located in the spray booth or spray room, prevent operation of the drying apparatus until a timed purge of spray vapors from the spray booth or spray room is complete. This purge time shall be based on completing not fewer than four air changes of spray booth or spray room volume or for a period of not less than 3 minutes, whichever is greater.~~
3. ~~Have the ventilating system maintain a safe atmosphere within the spray booth or spray room during the drying process and automatically shut off drying apparatus in the event of a failure of the ventilating system.~~
4. ~~Shut off the drying apparatus automatically if the discharge temperature of the air heater exceeds the maximum discharge air temperature allowed in accordance with the heater's listing or 221°F (105°C).~~

~~2404.8.1.2.2 Portable infrared apparatus.~~
~~Where a portable infrared drying apparatus is used, electrical wiring and portable infrared drying equipment shall comply with NFPA 70. Electrical equipment located within 18 inches (457 mm) of floor level shall be *approved* for Class I, Division 2, hazardous locations. Metallic parts of drying apparatus shall be electrically bonded and grounded. During spraying operations, portable drying apparatus and electrical connections and wiring thereto shall not be located within spray booths, spray rooms or other areas where spray residue would be deposited thereon.~~

~~2404.8.2 Illumination.~~ ~~Where spraying spaces, spray rooms or spray booths are illuminated through glass panels or other transparent materials, only fixed luminaires shall be utilized as a source of illumination.~~

~~2404.8.2.1 Glass panels.~~ ~~Panels for luminaires or for observation shall be of heat-treated glass, wired glass or hammered wire glass and shall be sealed to confine vapors, mists, residues, dusts and deposits to the flammable vapor area. Panels for luminaires shall be separated from the luminaire to prevent the surface temperature of the panel from exceeding 221°F (105°C).~~

~~2404.8.2.2 Exterior luminaires.~~ ~~Luminaires attached to the walls or ceilings of a flammable vapor area, but outside of any classified area and separated from the flammable vapor areas by vapor-tight glass panels, shall be suitable for use in ordinary hazard locations. Such luminaires shall be serviced from outside the flammable vapor areas.~~

~~2404.8.2.3 Integral luminaires.~~ ~~Luminaires that are an integral part of the walls or ceiling of a flammable vapor area are allowed to be separated from the flammable vapor area by glass panels that are an integral part of the luminaire. Such luminaires shall be *listed* for use in Class I, Division 2, or Class II, Division 2, locations, whichever is applicable, and shall be suitable for accumulations of deposits of combustible residues. Such luminaires are allowed to be serviced from inside the flammable vapor area.~~

~~2404.8.2.4 Portable electric lamps.~~ ~~Portable electric lamps shall not be used in flammable vapor areas during spraying operations. Portable electric lamps used during cleaning or repairing operations shall be of a type *approved* for hazardous locations.~~

~~2404.9.1 Operation.~~ ~~Mechanical ventilation shall be kept in operation at all times while spraying operations are being conducted and for a sufficient time thereafter to allow vapors from drying coated articles and finishing material residue to be exhausted. Spraying equipment shall be interlocked with the ventilation of the flammable vapor areas such that spraying operations cannot be conducted unless the ventilation system is in operation.~~

~~2404.9.2 Recirculation.~~
~~Air exhausted from spraying operations shall not be recirculated.~~

~~Exceptions:~~

1. ~~Air exhausted from spraying operations is allowed to be recirculated as makeup air for unmanned spray operations, provided that all of the following conditions exist:~~
   1.1. ~~The solid particulate has been removed.~~
   1.2. ~~The vapor concentration is less than 25 percent of the LFL.~~
   1.3. ~~*Approved* equipment is used to monitor the vapor concentration.~~
   1.4. ~~When the vapor concentration exceeds 25 percent of the LFL, both of the following shall occur:~~
      1.4.1. ~~An alarm shall sound.~~
      1.4.2. ~~Spray operations shall automatically shut down.~~
   1.5. ~~In the event of shutdown of the vapor concentration monitor, 100 percent of the air volume specified in Section 509 of the International Mechanical Code is automatically exhausted.~~

2. ~~Air exhausted from spraying operations is allowed to be recirculated as makeup air to manned spraying operations where all of the conditions provided in Exception 1 are included in the installation and documents have been prepared to show that the installation does not pose a life safety hazard to personnel inside the spray booth, spraying space or spray room.~~

~~**2404.9.5 Independent ducts.** Each spray booth and spray room shall have an independent exhaust duct system discharging to the outside.~~

~~**Exceptions:**~~

1. ~~Multiple spray booths having a combined frontal area of 18 square feet (1.67 m^2) or less are allowed to have a common exhaust where identical spray finishing material is used in each booth. If more than one fan serves one booth, fans shall be interconnected such that all fans will operate simultaneously.~~
2. ~~Where treatment of exhaust is necessary for air pollution control or for energy conservation, ducts shall be allowed to be manifolded if all of the following conditions are met:~~
   2.1. ~~The sprayed materials used are compatible and will not react or cause ignition of the residue in the ducts.~~
   2.2. ~~Nitrocellulose-based finishing material shall not be used.~~
   2.3. ~~A filtering system shall be provided to reduce the amount of overspray carried into the duct manifold.~~
   2.4. ~~Automatic sprinkler protection shall be provided at the junction of each booth exhaust with the manifold, in addition to the protection required by this chapter.~~

~~**2404.9.6 Termination point.** The termination point for exhaust ducts discharging to the atmosphere shall be not less than the following distances:~~

1. ~~Ducts conveying explosive or flammable vapors, fumes or dusts: 30 feet (9144 mm) from the *lot line*; 10 feet (3048 mm) from openings into the building; 6 feet (1829 mm) from *exterior walls* and roofs; 30 feet (9144 mm) from combustible walls or openings into the building that are in the direction of the exhaust discharge; 10 feet (3048 mm) above adjoining grade.~~
2. ~~Other product-conveying outlets: 10 feet (3048 mm) from the *lot line*; 3 feet (914 mm) from *exterior walls* and roofs; 10 feet (3048 mm) from openings into the building; 10 feet (3048 mm) above adjoining grade.~~

~~**2404.9.7 Fan motors and belts.** Electric motors driving exhaust fans shall not be placed inside booths or ducts. Fan rotating elements shall be nonferrous or nonsparking or the casing shall consist of, or be lined with, such material. Belts shall not enter the duct or booth unless the belt and pulley within the duct are tightly enclosed.~~

~~**2404.9.8 Filters.**~~

~~Air intake filters that are part of a wall or ceiling assembly shall be *listed* as Class I or II in accordance with UL 900. Exhaust filters shall be required.~~

~~**2404.9.8.1 Supports.** Supports and holders for filters shall be constructed of noncombustible materials.~~

~~**2404.9.8.2 Attachment.** Overspray collection filters shall be readily removable and able to be accessed for cleaning or replacement.~~

~~**2404.9.8.3 Maintaining air velocity.** Visible gauges, audible alarms or pressure-activated devices shall be installed to indicate or ensure that the required air velocity is maintained.~~

~~**2404.9.8.5 Filter disposal.** Discarded filter pads shall be immediately removed to a safe, detached location or placed in a noncombustible container with a tight-fitting lid and disposed of properly.~~

~~**2404.9.8.6 Spontaneous ignition.** Spray booths using dry filters shall not be used for spraying materials that are highly susceptible to spontaneous heating and ignition. Filters shall be changed prior to spraying materials that could react with other materials previously collected. An example of a potentially reactive combination includes lacquer when combined with varnishes, stains or primers.~~

~~**2404.9.8.7 Waterwash spray booths.** Waterwash spray booths shall be of an *approved* design so as to prevent excessive accumulation of deposits in ducts and residue at duct outlets. Such booths shall be arranged so that air and overspray are drawn through a continuously flowing water curtain before entering an exhaust duct to the building exterior.~~

~~2404.10 Interlocks~~.
~~Interlocks for spray application finishes shall be in accordance with Sections 2404.10.1 through 2404.10.2.~~

~~2404.10.1 Automated spray application operations~~. ~~Where protecting automated spray application operations, *automatic fire-extinguishing systems* shall be equipped with an *approved* interlock feature that will, upon discharge of the system, automatically stop the spraying operations and workpiece conveyors into and out of the flammable vapor areas. Where the building is equipped with a *fire alarm system*, discharge of the *automatic fire-extinguishing system* shall also activate the building alarm notification appliances.~~

~~2404.10.1.1 Alarm station~~.
~~A manual fire alarm and emergency system shutdown station shall be installed to serve each flammable vapor area. When activated, the station shall accomplish the functions indicated in Section 2404.10.1.~~

~~2404.10.1.2 Alarm station location~~. ~~Not less than one manual fire alarm and emergency system shutdown station shall be provided with *ready access* for operating personnel. Where access to this station is likely to involve exposure to danger, an additional station shall be located adjacent to an *exit* from the area.~~

~~**2404.10.2 Ventilation interlock prohibited.** Air makeup and flammable vapor area exhaust systems shall not be interlocked with the fire alarm system and shall remain in operation during a fire alarm condition.~~

> ~~**Exception:** Where the type of fire-extinguishing system used requires such ventilation to be discontinued, air makeup and exhaust systems shall shut down and dampers shall close.~~

Revise as follows:

~~2404.11~~ 2403.4 Limited spraying spaces.
Limited spraying spaces shall comply with Sections ~~2404.11.1 through 2404.11.4~~ 2403.4.1 through 2403.4.4.

~~2404.11.1~~ 2403.4.1 Job size. The aggregate surface area to be sprayed shall not exceed 9 square feet (0.84 m^2).

~~2404.11.2~~ 2403.4.2 **Frequency.** Spraying operations shall not be of a continuous nature.

~~2404.11.3~~ 2403.4.3 **Ventilation.** Positive mechanical ventilation providing not fewer than six complete air changes per hour shall be installed. Such system shall meet the requirements of this code for handling flammable vapor areas. Explosion venting is not required.

~~2404.11.4~~ 2403.4.4 **Electrical wiring.**
Electrical wiring within 10 feet (3048 mm) of the floor and 20 feet (6096 mm) horizontally of the limited spraying space shall be designed for Class I, Division 2 locations in accordance with NFPA 70.

SECTION ~~2406~~ 2404
POWDER COATING

~~2406.1~~ 2404.1 **General.**
The design, construction, protection, operation and maintenance of powder coating operations and equipment shall be in accordance with NFPA 33.~~Operations using finely ground particles of protective finishing material applied in dry powder form by a fluidized bed, an electrostatic fluidized bed, powder spray guns or electrostatic powder spray guns shall comply with Sections 2406.2 through 2406.7. In addition, Section 2407 shall apply to fixed electrostatic equipment used in powder coating operations.~~

~~2406.2~~ 2404.2 **Location.** Powder coating operations shall be conducted in enclosed powder coating rooms, enclosed powder coating facilities that are ventilated or ventilated spray booths.

~~2406.4~~ 2404.2 **Fire protection.**
Areas used for powder coating shall be protected by an *approved automatic fire-extinguishing system* complying with Chapter 9 and NFPA 33.

~~**2406.3 Construction of powder coating rooms and booths**~~.
~~Powder coating rooms shall be constructed of noncombustible materials. Spray booths shall be constructed in accordance with Section 2404.5.3.~~

~~**Exception:** *Listed* spray-booth assemblies that are constructed of other materials shall be allowed.~~

~~**2406.4.1 Additional protection for fixed systems**~~. ~~Automated powder application equipment shall be protected by the installation of an *approved*, supervised flame detection apparatus that shall react to the presence of flame within 0.5 second and shall accomplish all of the following:~~

1. ~~Shutting down of energy supplies (electrical and compressed air) to conveyor, ventilation, application, transfer and powder collection equipment.~~
2. ~~Closing of segregation dampers in associated ductwork to interrupt airflow from application equipment to powder collectors.~~
3. ~~Activation of an alarm that is audible throughout the powder coating room or booth.~~

~~**2406.4.2 Fire extinguishers**~~.
~~Portable fire extinguishers complying with Section 906 shall be provided for areas used for powder coating in accordance with the requirements for an extra-hazard occupancy.~~

~~**2406.5 Operation and maintenance**~~. ~~Powder coating areas shall be kept free from the accumulation of powder coating dusts, including horizontal surfaces such as ledges, beams, pipes, hoods, booths and floors.~~

~~**2406.5.1 Cleaning.**~~ ~~Surfaces shall be cleaned in such a manner so as to avoid scattering dusts to other places or creating dust clouds. Vacuum sweeping equipment shall be of a type *approved* for use in hazardous locations.~~

~~**2406.6 Sources of ignition**~~.
~~Control of sources of ignition shall be in accordance with Section 2403.2 and Sections 2406.6.1 through 2406.6.4.~~

~~**2406.6.1 Drying, curing and fusion equipment**~~**.**

~~Drying, curing and fusion equipment shall comply with Chapter 30.~~

~~**2406.6.2 Spark-producing metals.** Iron or spark-producing metals shall be prevented from being introduced into the powders being applied by magnetic separators, filter-type separators or by other *approved* means.~~

~~**2406.6.3 Preheated parts.** When parts are heated prior to coating, the temperature of the parts shall not exceed the ignition temperature of the powder to be used.~~

~~**2406.6.4 Grounding and bonding**~~**.** ~~Precautions shall be taken to minimize the possibility of ignition by static electrical sparks through static bonding and grounding, where possible, of powder transport, application and recovery equipment.~~

~~**2406.7 Ventilation.** Exhaust ventilation shall be sufficient to maintain the atmosphere below one-half the minimum explosive concentration for the material being applied. Nondeposited, air-suspended powders shall be removed through exhaust ducts to the powder recovery system.~~

SECTION 2405
DIPPING OPERATIONS

Revise as follows:

2405.1 General.

The design, construction, protection, operation and maintenance of dipping operations and equipment~~Dip-tank operations~~ shall comply with the requirements of NFPA 34 ~~Section 2403 and Sections 2405.2 through 2405.11~~.

2405.2 Location of dip-tank operations.

Dip-tank operations conducted in buildings used for Group A, I or R occupancies shall be located in a room designed for that purpose, equipped with an *approved automatic sprinkler system* and separated vertically and horizontally from other areas in accordance with the *International Building Code*.

Revise as follows:

~~**2405.3 Construction of dip tanks**~~**.**

~~Dip tanks shall be constructed in accordance with Sections 2405.3.1 through 2405.3.4.3 and NFPA 34. Dip tanks, including drain boards, shall be constructed of noncombustible material and their supports shall be of heavy metal, reinforced concrete or masonry.~~

~~**2405.3.1 Overflow.** Dip tanks greater than 150 gallons (568 L) in capacity or 10 square feet (0.93 m^2) in liquid surface area shall be equipped with a trapped overflow pipe leading to an *approved* location outside the building. The bottom of the overflow connection shall be not less than 6 inches (152 mm) below the top of the tank.~~

~~**2405.3.2 Bottom drains.** Dip tanks greater than 500 gallons (1893 L) in liquid capacity shall be equipped with bottom drains that are arranged to automatically and manually drain the tank quickly in the event of a fire unless the viscosity of the liquid at normal atmospheric temperature makes this impractical. Access to the manual operation shall be from a safe location. Where gravity flow is not practicable, automatic pumps shall be provided. Such drains shall be trapped and discharged to a closed, vented salvage tank or to an *approved* outside location.~~

> ~~**Exception:** Dip tanks containing Class IIIB *combustible liquids* where the liquids are not heated above room temperature and the process area is protected by automatic sprinklers.~~

~~**2405.3.3 Dipping liquid temperature control.** Protection against the accumulation of vapors, self-ignition and excessively high temperatures shall be provided for dipping liquids that are heated directly or heated by the surfaces of the object being dipped.~~

~~**2405.3.4 Dip-tank covers**~~**.**

~~Dip-tank covers allowed by Section 2405.4.1 shall be capable of manual operation and shall be automatic closing by *approved* automatic-closing devices designed to operate in the event of a fire.~~

~~**2405.3.4.1 Construction.** Covers shall be constructed of noncombustible material or be of a tin-clad type with enclosing metal applied with locked joints.~~

~~**2405.3.4.2 Supports.** Chain or wire rope shall be utilized for cover supports or operating mechanisms.~~

~~**2405.3.4.3 Closed covers.** Covers shall be kept closed when tanks are not in use.~~

~~**2405.4 Fire protection.**~~

~~Dip-tank operations shall be protected in accordance with Sections 2405.4.1 through 2405.4.2.~~

~~**2405.4.1 Fixed fire-extinguishing equipment.**~~

~~An *approved automatic fire-extinguishing system* or dip-tank cover in accordance with Section 2405.3.4 shall be provided for the following dip tanks:~~

1. ~~Dip tanks less than 150 gallons (568 L) in capacity or 10 square feet (0.93 m²) in liquid surface area.~~
2. ~~Dip tanks containing a liquid with a *flash point* below 110°F (43°C) used in such manner that the liquid temperature could equal or be greater than its *flash point* from artificial or natural causes, and having both a capacity of more than 10 gallons (37.9 L) and a liquid surface area of more than 4 square feet (0.37 m²).~~

~~**2405.4.1.1 Fire-extinguishing system**~~**.**

~~An *approved automatic fire-extinguishing system* shall be provided for dip tanks with a 150-gallon (568 L) or more capacity or 10 square feet (0.93 m²) or larger in a liquid surface area. Fire-extinguishing system design shall be in accordance with NFPA 34.~~

~~**2405.4.2 Portable fire extinguishers**~~**.**

~~Areas in the vicinity of dip tanks shall be provided with portable fire extinguishers complying with Section 906 and suitable for *flammable* and *combustible liquid* fires as specified for extra (high) hazard occupancies.~~

~~**2405.5 Housekeeping, maintenance and storage of hazardous materials**~~**.**

~~Housekeeping, maintenance, storage and use of hazardous materials shall be in accordance with Sections 2403.3 and 2403.4.~~

~~**2405.6 Sources of ignition**~~**.**

~~Control of sources of ignition shall be in accordance with Section 2403.2.~~

~~**2405.7 Ventilation of flammable vapor areas.** Flammable vapor areas shall be provided with mechanical ventilation adequate to prevent the dangerous accumulation of vapors. Required ventilation systems shall be arranged such that the failure of any ventilating fan shall automatically stop the dipping conveyor system.~~

~~**2405.8 Conveyor interlock.** Dip tanks utilizing a conveyor system shall be arranged such that in the event of a fire, the conveyor system shall automatically cease motion and the required tank bottom drains shall open.~~

~~**2405.9 Hardening and tempering tanks**~~**.**

~~Hardening and tempering tanks shall comply with Sections 2405.3 through 2405.3.3, 2405.9.4 and 2405.8, but shall be exempt from other provisions of Section 2405.~~

~~**2405.9.1 Location.** Tanks shall be located as far as practical from furnaces and shall not be located on or near combustible floors.~~

~~**2405.9.2 Hoods.** Tanks shall be provided with a noncombustible hood and vent or other *approved* venting means, terminating outside of the structure to serve as a vent in case of a fire. Such vent ducts shall be treated as flues and proper clearances shall be maintained from~~

~~combustible materials.~~

~~**2405.9.3 Alarms.** Tanks shall be equipped with a high-temperature limit switch arranged to sound an alarm when the temperature of the quenching medium reaches 50°F (10°C) below the *flash point*.~~

~~**2405.9.4 Fire protection.**~~
~~Hardening and tempering tanks greater than 500 gallons (1893 L) in capacity or 25 square feet (2.3 m^2) in liquid surface area shall be protected by an *approved automatic fire-extinguishing system* complying with Chapter 9.~~

~~**2405.9.5 Use of air pressure.** Air under pressure shall not be used to fill or agitate oil in tanks.~~

~~**2405.10 Flow-coating operations.** Flow-coating operations shall comply with the requirements for dip tanks. The area of the sump and any areas on which paint flows shall be considered to be the area of a dip tank.~~

~~**2405.10.1 Paint supply.** Paint shall be supplied by a gravity tank not exceeding 10 gallons (38 L) in capacity or by direct low-pressure pumps arranged to shut down automatically in case of a fire by means of *approved* heat-actuated devices.~~

~~**2405.11 Roll-coating operations.**~~
~~Roll-coating operations shall comply with Section 2405.10. In roll-coating operations utilizing *flammable* or *combustible liquids*, sparks from static electricity shall be prevented by electrically bonding and grounding all metallic rotating and other parts of machinery and equipment and by the installation of static collectors, or by maintaining a conductive atmosphere such as a high relative humidity.~~

SECTION ~~2407~~ <u>2406</u>
ELECTROSTATIC APPARATUS

~~**2407.1**~~ <u>**2406.1**</u> **General.** Electrostatic apparatus and devices used in connection with paint-spraying and paint-*detearing* operations shall be ~~of an *approved* type~~ <u>in accordance with the requirements of NFPA 33</u>.

~~**2407.2 Location and clear space.** A space of not less than twice the sparking distance shall be maintained between goods being painted or *deteared* and electrodes, electrostatic atomizing heads or conductors. A sign stating the sparking distance shall be conspicuously posted near the assembly.~~

~~**Exception:** Portable electrostatic paint-spraying apparatus *listed* for use in Class I, Division 1, locations.~~

~~**2407.3 Construction of equipment.** Electrodes and electrostatic atomizing heads shall be of *approved* construction, rigidly supported in permanent locations and effectively insulated from ground. Insulators shall be nonporous and noncombustible.~~

~~**Exception:** Portable electrostatic paint-spraying apparatus *listed*for use in Class I, Division 1, locations.~~

~~**2407.3.1 Barriers.** Booths, fencing, railings or guards shall be placed about the equipment such that either by their location or character, or both, isolation of the process is maintained from plant storage and personnel. Railings, fencing and guards shall be of conductive material, adequately grounded, and not less than 5 feet (1524 mm) from processing equipment.~~

~~**Exception:** Portable electrostatic paint-spraying apparatus *listed* for use in Class I, Division 1, locations.~~

~~**2407.4 Fire protection.**~~
~~Areas used for electrostatic spray finishing with fixed equipment shall be protected with an *approved automatic fire-extinguishing system* complying with Chapter 9 and Section 2407.4.1.~~

~~**2407.4.1 Protection for automated liquid electrostatic spray application equipment.** Automated liquid electrostatic spray application equipment shall be protected by the installation of an *approved*, supervised flame detection apparatus that shall, in the event of ignition, react to the presence of flame within 0.5 second and shall accomplish all of the following:~~

1. ~~Activation of a local alarm in the vicinity of the spraying operation and activation of the building alarm system, if such a system is provided.~~
2. ~~Shutting down of the coating material delivery system.~~
3. ~~Termination of all spray application operations.~~
4. ~~Stopping of conveyors into and out of the flammable vapor areas.~~
5. ~~Disconnection of power to the high-voltage elements in the flammable vapor areas and disconnection of power to the system.~~

~~2407.5 Housekeeping, maintenance and storage of hazardous materials~~.
~~Housekeeping, maintenance, storage and use of hazardous materials shall be in accordance with Sections 2403.3, 2403.4 and Sections 2407.5.1 and 2407.5.2.~~

~~2407.5.1 Maintenance~~. ~~Insulators shall be kept clean and dry. Drip plates and screens subject to paint deposits shall be removable and taken to a safe place for cleaning. Grounds and bonding means for the paint-spraying apparatus and all associated equipment shall be periodically cleaned and maintained free of overspray.~~

~~2407.5.2 Signs~~. ~~Signs shall be posted to provide the following information:~~

1. ~~Designate the process zone as dangerous with respect to fire and accident.~~
2. ~~Identify the grounding requirements for all electrically conductive objects in the flammable vapor area, including persons.~~
3. ~~Restrict access to qualified personnel only.~~

~~2407.6 Sources of ignition~~.
~~Transformers, power packs, control apparatus and all other electrical portions of the equipment, except high-voltage grids and electrostatic atomizing heads and connections, shall be located outside of the flammable vapor areas or shall comply with Section 2403.2.~~

~~2407.7 Ventilation~~.
~~The flammable vapor area shall be ventilated in accordance with Section 2404.9.~~

~~2407.8 Emergency shutdown~~.
~~Electrostatic apparatus shall be equipped with automatic controls operating without time delay to disconnect the power supply to the high-voltage transformer and signal the operator under any of the following conditions:~~

1. ~~Stoppage of ventilating fans or failure of ventilating equipment from any cause.~~
2. ~~Stoppage of the conveyor carrying articles past the high-voltage grid.~~
3. ~~Occurrence of a ground or an imminent ground at any point of the high-voltage system.~~
4. ~~Reduction of clearance below that required in Section 2407.2.~~

~~2407.9 Ventilation interlock~~. ~~Hand electrostatic equipment shall be interlocked with the ventilation system for the spraying area so that the equipment cannot be operated unless the ventilating system is in operation.~~

SECTION ~~2408~~ 2407
ORGANIC PEROXIDES AND DUAL-COMPONENT COATINGS

~~2408.1~~ 2407.1 General.
Spraying operations involving the use of *organic peroxides* and other dual-component coatings shall be in accordance with the requirements of NFPA 33~~Section 2403 and Sections 2408.2 through 2408.5~~.

~~**2408.2 Use of organic peroxide coatings.**~~
~~Spraying operations involving the use of *organic peroxides* and other dual-component coatings shall be conducted in *approved* sprinklered spray booths complying with Section 2404.5.3.~~

~~**2408.3 Equipment.** Spray guns and related handling equipment used with *organic peroxides* shall be of a type manufactured for such use.~~

~~**2408.3.1 Pressure tanks.** Separate pressure vessels and inserts specifically for the application shall be used for the resin and for the *organic peroxide*, and shall not be interchanged. Organic peroxide pressure tank inserts shall be constructed of stainless steel or polyethylene.~~

~~**2408.4 Housekeeping, maintenance, storage and use of hazardous materials.**~~
~~Housekeeping, maintenance, storage and use of hazardous materials shall be in accordance with Sections 2403.3 and 2403.4 and Sections 2408.4.1 through 2408.4.7.~~

~~**2408.4.1 Contamination prevention.** *Organic peroxide* initiators shall not be contaminated with foreign substances.~~

~~**2408.4.2 Spilled material.** Spilled *organic peroxides* shall be promptly removed and any residue thereof promptly eliminated. Spilled material absorbed by using a noncombustible absorbent shall be promptly disposed of in accordance with the manufacturer's recommendation.~~

~~**2408.4.3 Residue control.** Materials shall not be contaminated by dusts and overspray residues resulting from the sanding or spraying of finishing materials containing *organic peroxides*.~~

~~**2408.4.4 Handling.** Handling of *organic peroxides* shall be conducted in a manner that avoids shock and friction that produces decomposition and violent reaction hazards.~~

~~**2408.4.5 Mixing.** *Organic peroxides* shall not be mixed directly with accelerators or promoters.~~

~~**2408.4.6 Personnel qualifications.** Personnel working with *organic peroxides* and dual-component coatings shall be specifically trained to work with these materials.~~

~~2408.4.7~~ 2407.2 Storage.
The storage of *organic peroxides* shall comply with Chapter 62.

~~**2408.5 Sources of ignition.** Only nonsparking tools shall be used in areas where *organic peroxides* are stored, mixed or applied.~~

SECTION ~~2409~~ 2408
INDOOR MANUFACTURING OF REINFORCED PLASTICS

~~2409.1~~ 2408.1 General.
Indoor manufacturing processes involving spray or hand application of reinforced plastics and using more than 5 gallons (19 L) of resin in a 24-hour period shall be in accordance with NFPA 33~~Sections 2409.2 through 2409.6.1~~.

~~**2409.2 Resin application equipment.**~~
~~Equipment used for spray application of resin shall be installed and used in accordance with Section 2408 and Sections 2409.3 through 2409.6.1.~~

~~**2409.3 Fire protection.** Resin application areas shall be protected by an *automatic sprinkler system*. The sprinkler system design shall be not less than that required for Ordinary Hazard, Group 2, with a minimum design area of 3,000 square feet (279 m²). Where the materials or storage arrangements are required by other regulations to be provided with a higher level of sprinkler system protection, the~~

~~higher level of sprinkler system protection shall be provided.~~

~~2409.4 Housekeeping, maintenance, storage and use of hazardous materials~~.
~~Housekeeping, maintenance, storage and use of hazardous materials shall be in accordance with Sections 2403.3 and 2403.4 and Sections 2409.4.1 through 2409.4.3.~~

~~2409.4.1 Handling of excess catalyzed resin.~~ ~~A noncombustible, open-top container shall be provided for disposal of excess catalyzed resin. Excess catalyzed resin shall be drained into the container while still in the liquid state. Enough water shall be provided in the container to maintain a minimum 2-inch (51 mm) water layer over the contained resin.~~

~~2409.4.2 Control of overchop.~~ ~~In areas where chopper guns are used, exposed wall and floor surfaces shall be covered with paper, polyethylene film or other *approved* material to allow for removal of overchop. Overchop shall be allowed to cure for not less than 4 hours prior to removal.~~

~~2409.4.2.1 Disposal~~.
~~Following removal, used wall and floor covering materials required by Section 2409.4.2 shall be placed in a noncombustible container and removed from the facility.~~

2408.2~~9.4.3~~ Storage ~~and use of hazardous materials~~.
Storage ~~and use of~~ *organic peroxides* shall be in accordance with ~~Section 2408 and~~Chapter 62. Storage and use of *flammable* and *combustible liquids* shall be in accordance with Chapter 57. Storage and use of unstable (reactive) materials shall be in accordance with Chapter 66.

~~2409.5 Sources of ignition in resin application areas~~.
~~Sources of ignition in resin application areas shall comply with Section 2403.2.~~

~~2409.6 Ventilation~~.
~~Mechanical ventilation shall be provided throughout resin application areas in accordance with Section 2404.9. The ventilation rate shall be adequate to maintain the concentration of flammable vapors in the resin application area at or below 25 percent of the LFL.~~

> **~~Exception:~~** ~~Mechanical ventilation is not required for buildings that have 75 percent of the perimeter unenclosed.~~

~~2409.6.1 Local ventilation~~. ~~Local ventilation shall be provided inside of workpieces where personnel will be under or inside of the workpiece.~~

SECTION ~~2410~~ 2409
FLOOR SURFACING AND FINISHING OPERATIONS

~~2410.1~~ 2409.1 Scope.
Floor surfacing and finishing operations exceeding 350 square feet (33 m^2) and using Class I or II liquids shall comply with Sections ~~2410.2 through 2410.5~~ 2409.2 through 2409.5.

~~2410.2~~ 2409.2 Mechanical system operation. Heating, ventilation and air-conditioning systems shall not be operated during resurfacing or refinishing operations or within 4 hours of the application of *flammable* or *combustible liquids*.

~~2410.3~~ 2409.3 Business operation. Floor surfacing and finishing operations shall not be conducted while an establishment is open to the public.

~~2410.4~~ 2409.4 Ignition sources. The power shall be shut down to all electrical sources of ignition within the flammable vapor area, unless those devices are classified for use in Class I, Division 1, hazardous locations.

~~2410.5~~ 2409.5 Ventilation. To prevent the accumulation of flammable vapors, mechanical ventilation at a minimum rate of 1 cubic foot per minute per square foot [0.00508 m^3 /(s × m^2)] of area being finished shall be provided. Such exhaust shall be by *approved* temporary or portable means. Vapors shall be exhausted to the exterior of the building.

SECTION ~~2403~~ 2410
STORAGE, HANDLING AND USE OF FLAMMABLE OR COMBUSTIBLE LIQUIDS ~~PROTECTION OF OPERATIONS~~

~~2403.3~~ 2410.1 Storage, use and handling of flammable and combustible liquids.
The storage, use and handling of *flammable* and *combustible liquids* shall be in accordance with this section~~, and~~ Chapter 57 and NFPA 33.

~~2403.3.1~~ 24010.1.1 Use. Containers supplying spray nozzles shall be of a closed type or provided with metal covers that are kept closed. Containers not resting on floors shall be on noncombustible supports or suspended by wire cables. Containers supplying spray nozzles by gravity flow shall not exceed 10 gallons (37.9 L) in capacity.

~~2403.3.2~~ 2410.1.2 Valves. Containers and piping to which a hose or flexible connection is attached shall be provided with a shutoff valve at the connection. Such valves shall be kept shut when hoses are not in use.

~~2403.3.3~~ 2410.1.3 Pumped liquid supplies. Where *flammable* or *combustible liquids* are supplied to spray nozzles by positive displacement pumps, pump discharge lines shall be provided with an *approved* relief valve discharging to pump suction or a safe detached location.

~~2404.3.4~~ 2410.1.4 Liquid transfer. Where a flammable mixture is transferred from one portable container to another, a bond shall be provided between the two containers. Not less than one container shall be grounded. Piping systems for Class I and II liquids shall be permanently grounded.

~~2403.3.5~~ 2410.1.5 Class I liquids as solvents.
Class I liquids used as solvents shall be used in spray gun and equipment cleaning machines that have been *listed* and *approved* for such purpose or shall be used in spray booths or spray rooms in accordance with Sections ~~2403.3.5.1 and 2403.3.5.2~~ 2410.1.5.1 and 2410.1.5.2.

~~2403.3.5.1~~ 2410.1.5.1 Listed devices. Cleaning machines for spray guns and equipment shall not be located in areas open to the public and shall be separated from ignition sources in accordance with their listings or by a distance of 3 feet (914 mm), whichever is greater. The quantity of solvent used in a machine shall not exceed the design capacity of the machine.

~~2403.3.5.2~~ 2410.1.5.2 Within spray booths and spray rooms. Where solvents are used for cleaning spray nozzles and auxiliary equipment within spray booths and spray rooms, the ventilating equipment shall be operated during cleaning.

~~2403.3.6~~ 2410.1.6 Class II and III liquids. Solvents used outside of spray booths, spray rooms or *listed* and *approved* spray gun and equipment cleaning machines shall be restricted to Class II and III liquids.

~~2403.1 General~~.
~~Operations covered by this chapter shall be protected as required by Sections 2403.2 through 2403.4.4.~~

~~2403.2 Sources of ignition~~.
~~Protection against sources of ignition shall be provided in accordance with Sections 2403.2.1 through 2403.2.8.~~

~~2403.2.1 Electrical wiring and equipment~~.
~~Electrical wiring and equipment shall comply with this chapter and NFPA 70.~~

~~2403.2.1.1 Flammable vapor areas~~.

~~Electrical wiring and equipment in flammable vapor areas shall be of an explosionproof type *approved* for use in such hazardous locations. Such areas shall be considered to be Class I, Division 1, or Class II, Division 1, hazardous locations in accordance with NFPA 70.~~

~~**2403.2.1.2 Areas subject to deposits of residues.**~~

~~Electrical equipment, flammable vapor areas or drying operations that are subject to splashing or dripping of liquids shall be specifically *approved* for locations containing deposits of readily ignitable residue and explosive vapors.~~

Exceptions:

1. ~~This provision shall not apply to wiring in rigid conduit, threaded boxes or fittings not containing taps, splices or terminal connections.~~
2. ~~This provision shall not apply to electrostatic equipment allowed by Section 2407.~~

~~In resin application areas, electrical wiring and equipment that is subject to deposits of combustible residues shall be *listed* for such exposure and shall be installed as required for hazardous (classified) locations. Electrical wiring and equipment not subject to deposits of combustible residues shall be installed as required for ordinary hazard locations.~~

~~**2403.2.1.3 Areas adjacent to spray booths.** Electrical wiring and equipment located outside of, but within 3 feet (914 mm) of openings in a spray booth or a spray room, shall be *approved* for Class I, Division 2, or Class II, Division 2, hazardous locations, whichever is applicable.~~

~~**2403.2.1.4 Areas subject to overspray deposits.**~~

~~Electrical equipment in flammable vapor areas located such that deposits of combustible residues could readily accumulate thereon shall be specifically *approved* for locations containing deposits of readily ignitable residue and explosive vapors in accordance with NFPA 70.~~

Exceptions:

1. ~~Wiring in rigid conduit.~~
2. ~~Boxes or fittings not containing taps, splices or terminal connections.~~
3. ~~Equipment allowed by Sections 2404 and 2407 and Chapter 30.~~

~~**2403.2.2 Open flames and sparks.**~~

~~Open flames and spark-producing devices shall not be located in flammable vapor areas and shall not be located within 20 feet (6096 mm) of such areas unless separated by a permanent partition.~~

~~**Exception:** Drying and baking apparatus complying with Section 2404.8.1.2.~~

~~**2403.2.3 Hot surfaces.**~~

~~Heated surfaces having a temperature sufficient to ignite vapors shall not be located in flammable vapor areas. Space-heating appliances, steam pipes or hot surfaces in a flammable vapor area shall be located such that they are not subject to accumulation of deposits of combustible residues.~~

~~**Exception:** Drying apparatus complying with Section 2404.8.1.2.~~

~~**2403.2.4 Equipment enclosures.** Equipment or apparatus that is capable of producing sparks or particles of hot metal that would fall into a flammable vapor area shall be totally enclosed.~~

~~**2403.2.5 Grounding.**~~

~~Metal parts of spray booths, exhaust ducts and piping systems conveying Class I or II liquids shall be electrically grounded in accordance with NFPA 70. Metallic parts located in resin application areas, including but not limited to exhaust ducts, ventilation fans, spray application equipment, workpieces and piping, shall be electrically grounded.~~

~~**2403.2.6 Smoking prohibited.**~~

~~Smoking shall be prohibited in flammable vapor areas and hazardous materials storage rooms associated with flammable finish~~

~~processes. "No Smoking" signs complying with Section 310 shall be conspicuously posted in such areas.~~

~~**2403.2.8 Powered industrial trucks.** Powered industrial trucks used in electrically classified areas shall be *listed* for such use.~~

~~**2403.2.7 Welding warning signs.** Welding, cutting and similar spark-producing operations shall not be conducted in or adjacent to flammable vapor areas or dipping or coating operations unless precautions have been taken to provide safety. Conspicuous signs with the following warning shall be posted in the vicinity of flammable vapor areas, dipping operations and paint storage rooms:~~

~~NO WELDING~~
~~THE USE OF WELDING OR CUTTING~~
~~EQUIPMENT IN OR NEAR THIS AREA~~
~~IS DANGEROUS BECAUSE OF FIRE~~
~~AND EXPLOSION HAZARDS. WELDING~~
~~AND CUTTING SHALL BE DONE ONLY~~
~~UNDER THE SUPERVISION OF THE~~
~~PERSON IN CHARGE.~~

~~**2403.4 Operations and maintenance.** Flammable vapor areas, exhaust fan blades and exhaust ducts shall be kept free from the accumulation of deposits of combustible residues. Where excessive residue accumulates in such areas, spraying operations shall be discontinued until conditions are corrected.~~

~~**2403.4.1 Tools.** Scrapers, spuds and other tools used for cleaning purposes shall be constructed of nonsparking materials.~~

~~**2403.4.2 Residue.** Residues removed during cleaning and debris contaminated with residue shall be immediately removed from the premises and properly disposed.~~

~~**2403.4.3 Waste cans.** *Approved* metal waste cans equipped with self-closing lids shall be provided wherever rags or waste are impregnated with finishing material. Such rags and waste shall be deposited therein immediately after being utilized. The contents of waste cans shall be properly disposed of not less than once daily and at the end of each shift.~~

~~**2403.4.4 Solvent recycling.**~~
~~Solvent distillation equipment used to recycle and clean dirty solvents shall comply with Section 5705.4.~~

NFPA

NFPA
NFPA
1 Batterymarch Park
Quincy, MA 02169-7471

33—~~21~~ 24	Standard for Spray Application Using Flammable or Combustible Materials
34— ~~21~~ 24	Standard for Dipping, Coating, and Printing Processes Using Flammable or Combustible Liquids

Staff Analysis: A review of the standard proposed for inclusion in the code as shown below with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

- ***Standard for Spray Application Using Flammable or Combustible Materials (NFPA 33-2024)***
- ***Standard for Dipping, Coating, and Printing Processes Using Flammable or Combustible Liquids (NFPA 34-2024)***

Reason: The current chapter includes some, but not all of the safety requirements for spray finishing, powder coating, and dipping. This edit removed items that are duplicated in NFPA 33 and NFPA 34 and directs the user to the complete set of safety requirements in the appropriate NFPA standard that would be challenging to repeat within this Chapter.

Specific fire protection requirements for the various operations and enclosures that involve spray and dipping operations can be found in the referenced NFPA documents and have been removed from this chapter.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The change is editorial in that the requirements removed already exist in an NFPA standard that fully addresses the hazards.

F184-24

F185-24

IFC: 2403.2.1.2, 2403.2.1.4

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Fire Code

Revise as follows:

2403.2.1.2 Areas subject to deposits of residues.
Electrical equipment, flammable vapor areas or drying operations that are subject to splashing or dripping of liquids shall be specifically *approved* for locations containing deposits of readily ignitable residue and flammable ~~explosive~~ vapors.

Exceptions:

1. This provision shall not apply to wiring in rigid conduit, threaded boxes or fittings not containing taps, splices or terminal connections.
2. This provision shall not apply to electrostatic equipment allowed by Section 2407.

In resin application areas, electrical wiring and equipment that is subject to deposits of combustible residues shall be *listed* for such exposure and shall be installed as required for hazardous (classified) locations. Electrical wiring and equipment not subject to deposits of combustible residues shall be installed as required for ordinary hazard locations.

2403.2.1.4 Areas subject to overspray deposits.
Electrical equipment in flammable vapor areas located such that deposits of combustible residues could readily accumulate thereon shall be specifically *approved* for locations containing deposits of readily ignitable residue and flammable ~~explosive~~ vapors in accordance with NFPA 70.

Exceptions:

1. Wiring in rigid conduit.
2. Boxes or fittings not containing taps, splices or terminal connections.
3. Equipment allowed by Sections 2404 and 2407 and Chapter 30.

Reason: The proposal is to change explosive to flammable to be consistent with the language used within each section. Flammable vapors or fumes is a defined term.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The code change proposal will not increase or decrease the cost of construction as the change just uses the correct term without changes to intent.

F185-24

F186-24

IFC: 2403.2.6

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Fire Code

Revise as follows:

2403.2.6 Smoking and vaping prohibited.
Smoking and vaping shall be prohibited in flammable vapor areas and hazardous materials storage rooms associated with flammable finish processes. “No Smoking or Vaping” signs complying with Section 310 shall be conspicuously posted in such areas.

Reason: The proposal is to include vaping as prohibited in areas where ignitable materials may be present. Vape pens may be a credible ignition source.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The code change proposal will not increase or decrease the cost of construction as the cost of the proposed sign does not appear to be significantly different than current no smoking signs.

F186-24

F187-24

IFC: 2404.2, 2404.5.5 (New), 2404.3, 2404.5.5, 2404.5.5.1, NFPA Chapter 80

Proponents: Geoffrey Raifsnider, Global Finishing Solutions, Self (graifsnider@globalfinishing.com)

2024 International Fire Code

Revise as follows:

~~**2404.2 Prohibited enclosures for spray application operations.**~~
~~Inflatable or portable enclosures shall not be used for spray application of flammable finishes.~~

> ~~**Exception:** Enclosures for the spray application of flammable finishes in marinas, dry docking areas or construction areas shall comply with Section 2404.3~~.

Add new text as follows:

2404.5.5 Inflatable Finishing Workstations. The design, construction, protection, operation and maintenance of inflatable finishing workstations shall be in accordance with NFPA 33. Inflatable finishing workstations shall be used outdoors only.

Revise as follows:

~~2404.3~~ 2404.5.6 Membrane enclosures.
The design, construction, protection, operation and maintenance of membrane enclosures shall be in accordance with NFPA 33.

~~2404.5.5~~ 2404.5.7 Spraying spaces.
Spraying spaces shall be designed and constructed in accordance with the *International Building Code*, and Section 2404.5.5.1 and Sections 2404.6 through 2404.10 of this code.

~~2404.5.5.1~~ 2404.5.7.1 Floor. Combustible floor construction in spraying spaces shall be covered by *approved*, noncombustible, nonsparking material, except where combustible coverings, such as thin paper or plastic and strippable coatings, are utilized over noncombustible materials to facilitate cleaning operations in spraying spaces.

NFPA

NFPA
NFPA
1 Batterymarch Park
Quincy, MA 02169-7471

33—~~21~~ 24 Standard for Spray Application Using Flammable or Combustible Materials

Staff Analysis: A review of the standard proposed for inclusion in the code, ***Standard for Spray Application Using Flammable or Combustible Materials (NFPA 33-2024)***, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: NFPA 33 2024 edition (Section 14.4) now includes new requirements for inflatable finishing workstations that this code can reference in a format similar to references to Limited Finishing Workstation (2404.5.4) and membrane enclosures (currently 2404.3).

This proposal also renumbers the sections for membrane enclosures and spraying spaces to group these other types of spray finishing environments together.

IFC had previously prohibited these enclosures as there had not been any guidance provided by NFPA 33.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The code change proposal will not increase or decrease the cost of construction as previously Inflatable Finishing Workstations were not allowed by the code.

F188-24

IFC: 2404.9.2; IMC®: [F] 502.7.3.2

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Fire Code

Revise as follows:

2404.9.2 Recirculation.
Air exhausted from spraying operations shall not be recirculated.

Exceptions:

1. Air exhausted from spraying operations is allowed to be recirculated as makeup air for unmanned spray operations, provided that all of the following conditions exist:
   1.1. The solid particulate has been removed.
   1.2. The vapor concentration is less than 25 percent of the LFL.
   1.3. *Approved* equipment is used to monitor the vapor concentration.
   1.4. When the vapor concentration exceeds 25 percent of the LFL, both of the following shall occur:
      1.4.1. An alarm shall sound.
      1.4.2. Spray operations shall automatically shut down.
   1.5. In the event of shutdown or failure of the vapor concentration monitor, ~~100 percent of the air volume specified in Section 510 of the *International Mechanical Code* is automatically exhausted~~ spray operations shall automatically shut down.
2. Air exhausted from spraying operations is allowed to be recirculated as makeup air to manned spraying operations where all of the conditions provided in Exception 1 are included in the installation and documents have been prepared to show that the installation does not pose a life safety hazard to personnel inside the spray booth, spraying space or spray room.

2024 International Mechanical Code

Revise as follows:

[F] 502.7.3.2 Recirculation. Air exhausted from spraying operations shall not be recirculated.

Exceptions:

1. Air exhausted from spraying operations shall be permitted to be recirculated as *makeup air* for unmanned spray operations provided that:
   1.1. The solid particulate has been removed.
   1.2. The vapor concentration is less than 25 percent of the lower flammable limit (LFL).
   1.3. *Approved equipment* is used to monitor the vapor concentration.
   1.4. An alarm is sounded and spray operations are automatically shut down if the vapor concentration exceeds 25 percent of the LFL.
   1.5. In the event of shutdown or failure of the vapor concentration monitor spray operations shall automatically shut down.~~,~~ ~~100 percent of the air volume specified in Section 509 is automatically exhausted~~.
2. Air exhausted from spraying operations is allowed to be recirculated as *makeup air* to manned spraying operations where all of the conditions provided in Exception 1 are included in the installation and documents have been prepared to show that the installation does not pose a life safety hazard to personnel inside the spray booth, spraying space or spray room.

Reason: Section 510.3 states “The design and operation of the exhaust system shall be such that flammable contaminants are diluted in noncontaminated air to maintain concentrations in the exhaust flow below 25 percent of the contaminant’s lower flammability limit.”

Exception 1.2 requires the vapor concentration in the exhaust to be less than 25% of the LFL. Monitoring to ensure this concentration is not exceeded is also a requirement.

Therefore, the current language does not provide any additional protection upon failure or shutdown of the monitoring system as it does not increase the air flow rate.

Current industry practice is to first set an alarm point to alert operations that there may be an issue with the ventilation system. The alarm point varies depending upon the specific spray operation variables. This practice is intended to address quality issues if the spray were to be shut down in the middle of an application. This alarm point is not a safety issue and the proposed change does not include addressing the alarm point. The shut down point is set to 25% as is required by exception 1.4.

The change to 1.5 addresses the lack of a functioning monitor and requires the source of vapors (spray operations) to be shut down.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The code change proposal will not increase or decrease the cost of construction as the change just clarifies the appropriate action that needs to occur.

F188-24

F189-24

IFC: 2406.7; IMC®: [F] 502.7.6

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Fire Code

Revise as follows:

2406.7 Ventilation. Exhaust ventilation shall be sufficient to maintain the atmosphere in the ductwork to a recovery system below one-half the minimum explosible ~~explosive~~ concentration for the material being applied. Nondeposited, air-suspended powders shall be removed through exhaust ducts to the powder recovery system.

2024 International Mechanical Code

Revise as follows:

[F] 502.7.6 Powder coating. Exhaust ventilation for powder-coating operations shall be sufficient to maintain the atmosphere in the ductwork to a recovery system below one-half of the minimum ~~explosive~~ explosible concentration for the material being applied. Nondeposited, air-suspended powders shall be removed through exhaust ducts to the powder recovery system.

Reason: The proposed change clarifies where the concentration needs to be diluted. In the powder spray pattern, which may be present anywhere in the spray booth or spray room, the concentration may be greater than 50% of the minimum explosible concentration.

Explosive has been replaced with explosible as it is the correct term in this context.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The code change proposal will not increase or decrease the cost of construction as the change just clarifies where the concentration is to be maintained.

F189-24

F190-24

IFC Chapter 27

Proponents: William Koffel, Koffel Associates, Inc., Semiconductor Industry Association (wkoffel@koffel.com)

2024 International Fire Code

CHAPTER 27 SEMICONDUCTOR FABRICATION FACILITIES

SECTION 2701 GENERAL

Revise as follows:

2701.1 Scope.
Semiconductor fabrication facilities and comparable research and development areas classified as Group H-5 shall comply with ~~this chapter~~NFPA 318 and the *International Building Code*. The use, storage and handling of hazardous materials in Group H-5 shall comply with NFPA 318, this chapter, other applicable provisions of this code and the *International Building Code*.

2701.2 Application. The requirements set forth in this chapter are requirements specific only to Group H-5 and shall be applied as exceptions or additions to applicable requirements set forth elsewhere in this code.

2701.3 Multiple hazards.
Where a material poses multiple hazards, all hazards shall be addressed in accordance with Section 5001.1.

2701.4 Existing buildings and existing fabrication areas.
Existing buildings and existing *fabrication areas* shall comply with this chapter, except that transportation and handling of HPM in *corridors* and enclosures for *stairways* and *ramps* shall be allowed where in compliance with Section 2705.3.2 and the *International Building Code*.

2701.5 Permits.
Permits shall be required as set forth in Section 105.5.

SECTION 2702 DEFINITIONS

2702.1 Definitions.
The following terms are defined in Chapter 2:

EMERGENCY CONTROL STATION.

FABRICATION AREA.

GAS DETECTION SYSTEM.

HAZARDOUS PRODUCTION MATERIAL (HPM).

HPM.

HPM ROOM.

PASS-THROUGH.

SEMICONDUCTOR FABRICATION FACILITY.

SERVICE CORRIDOR.

TOOL.

WORKSTATION.

SECTION 2703
GENERAL SAFETY PROVISIONS

Revise as follows:

2703.1 Emergency control station.
An *emergency control station* shall be provided in accordance with Sections 2703.1.1 through 2703.1.2.

2703.1.1 Location. ~~The *emergency control station* shall be located on the premises at an *approved* location outside the fabrication area.~~

2703.1.~~2~~1 Staffing. Trained personnel shall continuously staff the *emergency control station*.

2703.1.~~3~~2 Signals.
The *emergency control station* shall receive signals from emergency equipment and alarm and detection systems. Such emergency equipment and alarm and detection systems shall include, but not be limited to, the following where such equipment or systems are required to be provided either in this chapter or elsewhere in this code:

1. *Automatic sprinkler system* alarm and monitoring systems.
2. Manual fire alarm systems.
3. *Emergency alarm systems*.
4. *Gas detection systems*.
5. Smoke detection systems.
6. Emergency power systems.
7. Automatic detection and alarm systems for *pyrophoric* liquids and Class 3 water-reactive liquids required by Section 2705.2.3.4.
8. Exhaust ventilation flow alarm devices for *pyrophoric* liquids and Class 3 water-reactive liquids and cabinet exhaust ventilation systems required by Section 2705.2.3.4.

2703.2 Systems, equipment and processes.
Systems, equipment and processes shall be in accordance with Sections 2703.2.1 through 2703.2.3.2.

2703.2.1 Application. Systems, equipment and processes shall include, but not be limited to, containers, cylinders, tanks, piping, tubing, valves and fittings.

2703.2.2 General requirements.
In addition to the requirements in Section 2703.2, systems, equipment and processes shall comply with Section 5003.2, other applicable provisions of this code, the *International Building Code* and the *International Mechanical Code*.

2703.2.3 Additional requirements for HPM supply piping.
In addition to the requirements in Section 2703.2, HPM supply piping and tubing for HPM gases and liquids shall comply with this section.

2703.2.3.1 General requirements.
The requirements set forth in Section 5003.2.2.2 shall apply to supply piping and tubing for HPM gases and liquids.

2703.2.3.2 Health-hazard ranking 3 or 4 HPM. Supply piping and tubing for HPM gases and liquids having a health-hazard ranking of 3 or 4 shall be welded throughout, except for connections located within a ventilation enclosure if the material is a gas, or an *approved* method of drainage or containment provided for connections if the material is a liquid.

2703.3 Construction requirements.
Construction of semiconductor fabrication facilities shall be in accordance with Sections 2703.3.1 through 2703.3.9.

2703.3.1 Fabrication areas.
Construction and location of *fabrication areas* shall comply with the *International Building Code*.

2703.3.2 Pass-throughs in exit access corridors.
Pass-throughs in *exit access corridors* shall be constructed in accordance with the *International Building Code*.

2703.3.3 Liquid storage rooms.
Liquid storage rooms shall comply with Chapter 57 and the *International Building Code*.

2703.3.4 HPM rooms.
HPM rooms shall comply with the *International Building Code*.

2703.3.5 Gas cabinets.
Gas cabinets shall comply with Section 5003.8.6.

2703.3.6 Exhausted enclosures.
Exhausted enclosures shall comply with Section 5003.8.5.

2703.3.7 Gas rooms.
Gas rooms shall comply with Section 5003.8.4.

2703.3.8 Service corridors.
Service corridors shall comply with Section 2705.3 and the *International Building Code*.

2703.3.9 Cabinets containing pyrophoric liquids or water-reactive Class 3 liquids.
Cabinets in *fabrication areas* containing *pyrophoric* liquids or Class 3 water-reactive liquids in containers or in amounts greater than $^1/_2$ gallon (2 L) shall comply with Section 2705.2.3.4.

2703.4 Emergency plan.
An emergency plan shall be established as set forth in Section 403.6.1.

2703.5 Maintenance of equipment, machinery and processes.
Maintenance of equipment, machinery and processes shall comply with Section 5003.2.6.

2703.6 Security of areas.
Areas shall be secured in accordance with Section 5003.9.2.

Delete without substitution:

~~2703.7 Electrical wiring and equipment~~.
~~Electrical wiring and equipment in HPM facilities shall comply with Sections 2703.7.1 through 2703.7.3.~~

~~2703.7.1 Fabrication areas~~.
~~Electrical wiring and equipment in *fabrication areas* shall comply with NFPA 70.~~

~~**2703.7.2 Workstations**~~**.**

~~Electrical equipment and devices within 5 feet (1524 mm) of workstations in which flammable or *pyrophoric* gases or *flammable liquids* are used shall comply with NFPA 70 for Class I, Division 2 hazardous locations. Workstations shall not be energized without adequate exhaust ventilation in accordance with Section 2703.14.~~

> ~~**Exception:** Class I, Division 2 hazardous electrical equipment is not required where the air removal from the workstation or dilution will prevent the accumulation of flammable vapors and fumes on a continuous basis.~~

~~**2703.7.3 Hazardous production material (HPM) rooms, gas rooms and liquid storage rooms**~~**.**

~~Electrical wiring and equipment in HPM rooms, gas rooms and liquid storage rooms shall comply with NFPA 70.~~

2703.8 Corridors and enclosures for stairways and ramps. Hazardous materials shall not be used or stored in *corridors* or enclosures for *stairways* and *ramps*.

2703.9 Service corridors. Hazardous materials shall not be used in an *open-system* use condition in service corridors.

Delete without substitution:

~~**2703.10 Automatic sprinkler system**~~**.**

~~An *approved automatic sprinkler system* shall be provided in accordance with Sections 2703.10.1 through 2703.10.5 and Chapter 9.~~

~~**2703.10.1 Workstations and tools.** The design of the sprinkler system in the area shall take into consideration the spray pattern and the effect on the equipment.~~

~~**2703.10.1.1 Combustible workstations.** A sprinkler head shall be installed within each branch exhaust connection or individual plenums of workstations of combustible construction. The sprinkler head in the exhaust connection or plenum shall be located not more than 2 feet (610 mm) from the point of the duct connection or the connection to the plenum. Where necessary to prevent corrosion, the sprinkler head and connecting piping in the duct shall be coated with *approved* or *listed* corrosion-resistant materials. Access to the sprinkler head shall be provided for periodic inspection.~~

> ~~**Exceptions:**~~
>
> 1. ~~*Approved* alternative *automatic fire-extinguishing systems* are allowed. Activation of such systems shall deactivate the related processing equipment.~~
> 2. ~~Process equipment that operates at temperatures exceeding 932°F (500°C) and is provided with automatic shutdown capabilities for hazardous materials.~~
> 3. ~~Exhaust ducts 10 inches (254 mm) or less in diameter from flammable gas storage cabinets that are part of a workstation.~~
> 4. ~~Ducts *listed* or *approved* for use without internal automatic sprinkler protection.~~

~~**2703.10.1.2 Combustible tools**~~**.**

~~Where the horizontal surface of a combustible tool is obstructed from ceiling sprinkler discharge, automatic sprinkler protection that covers the horizontal surface of the tool shall be provided.~~

> ~~**Exceptions:**~~
>
> 1. ~~An automatic gaseous fire-extinguishing local surface application system shall be allowed as an alternative to sprinklers. Gaseous-extinguishing systems shall be actuated by infrared (IR) or ultraviolet/infrared (UV/IR) optical detectors.~~
> 2. ~~Tools constructed of materials that are *listed* as Class 1 or Class 2 in accordance with UL 2360 or *approved* for use without internal fire-extinguishing system protection.~~

~~**2703.10.2 Gas cabinets and exhausted enclosures.** An *approved automatic sprinkler system* shall be provided in gas cabinets and exhausted enclosures containing HPM *compressed gases.*~~

~~**Exception:** Gas cabinets located in an HPM room other than those cabinets containing *pyrophoric* gases.~~

~~**2703.10.3 Pass-throughs in existing exit access corridors.** Pass-throughs in existing *exit access corridors* shall be protected by an *approved automatic sprinkler system.*~~

~~**2703.10.4 Exhaust ducts for HPM.**~~

~~An *approved automatic sprinkler system* shall be provided in exhaust ducts conveying gases, vapors, fumes, mists or dusts generated from HPM in accordance with this section and the *International Mechanical Code*.~~

~~**2703.10.4.1 Metallic and noncombustible nonmetallic exhaust ducts.** An *approved automatic sprinkler system* shall be provided in metallic and noncombustible nonmetallic exhaust ducts where all of the following conditions apply:~~

1. ~~Where the largest cross-sectional diameter is equal to or greater than 10 inches (254 mm).~~
2. ~~The ducts are within the building.~~
3. ~~The ducts are conveying flammable gases, vapors or fumes.~~

~~**2703.10.4.2 Combustible nonmetallic exhaust ducts.** An *approved automatic sprinkler system* shall be provided in combustible nonmetallic exhaust ducts where the largest cross-sectional diameter of the duct is equal to or greater than 10 inches (254 mm).~~

~~**Exceptions:**~~

1. ~~Ducts *listed* or *approved* for applications without *automatic sprinkler system* protection.~~
2. ~~Ducts not more than 12 feet (3658 mm) in length installed below ceiling level.~~

~~**2703.10.4.3 Exhaust connections and plenums of combustible workstations.**~~

~~*Automatic fire-extinguishing system* protection for exhaust connections and plenums of combustible workstations shall comply with Section 2703.10.1.1.~~

~~**2703.10.4.4 Exhaust duct sprinkler system requirements.** Automatic sprinklers installed in exhaust duct systems shall be hydraulically designed to provide 0.5 gallon per minute (gpm) (1.9 L/min) over an area derived by multiplying the distance between the sprinklers in a horizontal duct by the width of the duct. Minimum discharge shall be 20 gpm (76 L/min) per sprinkler from the five hydraulically most remote sprinklers.~~

~~**2703.10.4.4.1 Sprinkler locations.** Automatic sprinklers shall be installed at 12-foot (3658 mm) intervals in horizontal ducts and at changes in direction. In vertical runs, automatic sprinklers shall be installed at the top and at alternate floor levels.~~

~~**2703.10.4.4.2 Control valve.** A separate indicating control valve shall be provided for sprinklers installed in exhaust ducts.~~

~~**2703.10.4.4.3 Drainage.** Drainage shall be provided to remove sprinkler water discharged in exhaust ducts.~~

~~**2703.10.4.4.4 Corrosive atmospheres.** Where corrosive atmospheres exist, exhaust duct sprinklers and pipe fittings shall be manufactured of corrosion-resistant materials or coated with *approved* materials.~~

~~**2703.10.4.4.5 Maintenance and inspection.** Access to sprinklers in exhaust ducts shall be provided for periodic inspection and maintenance.~~

~~**2703.10.5 Sprinkler alarms and supervision.**~~

~~*Automatic sprinkler systems* shall be electrically supervised and provided with alarms in accordance with Chapter 9. *Automatic sprinkler system* alarm and supervisory signals shall be transmitted to the *emergency control station*.~~

~~**2703.11 Manual fire alarm system.**~~

~~A manual *fire alarm system* shall be installed throughout buildings containing a Group H-5 occupancy. Activation of the alarm system shall initiate a local alarm and transmit a signal to the *emergency control station*. Manual fire alarm systems shall be designed and installed in accordance with Section 907.~~

2703.12 Emergency alarm system.

Emergency alarm systems shall be provided in accordance with Sections 2703.12.1 through 2703.12.3, Section 5004.9 and Section 5005.4.4. The *maximum allowable quantity per control area* provisions of Section 5004.1 shall not apply to *emergency alarm systems* required for HPM.

2703.12.1 Where required.

Emergency alarm systems shall be provided in the areas indicated in Sections 2703.12.1.1 through 2703.12.1.3.

2703.12.1.1 Service corridors. An *approved emergency alarm system* shall be provided in service corridors, with not less than one alarm device in the service corridor.

2703.12.1.2 Corridors and interior exit stairways and ramps.

Emergency alarms for *corridors*, *interior exit stairways* and *ramps* and *exit passageways* shall comply with Section 5005.4.4.

2703.12.1.3 Liquid storage rooms, HPM rooms and gas rooms.

Emergency alarms for liquid storage rooms, HPM rooms and gas rooms shall comply with Section 5004.9.

2703.12.2 Alarm-initiating devices. An *approved* emergency telephone system, local alarm manual pull stations, or other *approved* alarm-initiating devices are allowed to be used as emergency alarm-initiating devices.

2703.12.3 Alarm signals. Activation of the *emergency alarm system* shall sound a local alarm and transmit a signal to the *emergency control station*.

2703.13 Gas detection systems.

A *gas detection system* complying with Section 916 shall be provided for HPM gases where the physiological warning threshold level of the gas is at a higher level than the accepted permissible exposure limit (PEL) for the gas and for flammable gases in accordance with Sections 2703.13.1 through 2703.13.2.2.

2703.13.1 Where required.

A *gas detection system* shall be provided in the areas identified in Sections 2703.13.1.1 through 2703.13.1.4.

2703.13.1.1 Fabrication areas. A *gas detection system* shall be provided in *fabrication areas* where HPM gas is used in the *fabrication area*.

2703.13.1.2 HPM rooms. A *gas detection system* shall be provided in HPM rooms where HPM gas is used in the room.

2703.13.1.3 Gas cabinets, exhausted enclosures and gas rooms. A *gas detection system* shall be provided in gas cabinets and exhausted enclosures for HPM gas. A *gas detection system* shall be provided in gas rooms where HPM gases are not located in gas cabinets or exhausted enclosures.

2703.13.1.4 Corridors. Where HPM gases are transported in piping placed within the space defined by the walls of a *corridor* and the floor or roof above the *corridor*, a *gas detection system* shall be provided where piping is located and in the *corridor*.

Exception: A *gas detection system* is not required for occasional transverse crossings of the *corridors* by supply piping that is enclosed in a ferrous pipe or tube for the width of the *corridor*.

2703.13.2 Gas detection system operation.

The *gas detection system* shall be capable of monitoring the room, area or equipment in which the HPM gas is located at or below all the following gas concentrations:

1. Immediately dangerous to life and health (IDLH) values where the monitoring point is within an exhausted enclosure, ventilated enclosure or gas cabinet.
2. Permissible exposure limit (PEL) levels where the monitoring point is in an area outside an exhausted enclosure, ventilated enclosure or gas cabinet.
3. For flammable gases, the monitoring detection threshold level shall be vapor concentrations in excess of 25 percent of the lower flammable limit (LFL) where the monitoring is within or outside an exhausted enclosure, ventilated enclosure or gas cabinet.
4. Except as noted in this section, monitoring for highly toxic and toxic gases shall also comply with Chapter 60.

2703.13.2.1 Alarms. The *gas detection system* shall initiate a local alarm and transmit a signal to the *emergency control station* when a short-term hazard condition is detected. The alarm shall be both visible and audible and shall provide warning both inside and outside the area where the gas is detected. The audible alarm shall be distinct from all other alarms.

2703.13.2.2 Shut off of gas supply. The *gas detection system* shall automatically close the shutoff valve at the source on gas supply piping and tubing related to the system being monitored for which gas is detected when a short-term hazard condition is detected. Automatic closure of shutoff valves shall comply with the following:

1. Where the gas-detection sampling point initiating the *gas detection system* alarm is within a gas cabinet or exhausted enclosure, the shutoff valve in the gas cabinet or exhausted enclosure for the specific gas detected shall automatically close.
2. Where the gas-detection sampling point initiating the *gas detection system* alarm is within a room and *compressed gas* containers are not in gas cabinets or exhausted enclosure, the shutoff valves on all gas lines for the specific gas detected shall automatically close.
3. Where the gas-detection sampling point initiating the *gas detection system* alarm is within a piping distribution manifold enclosure, the shutoff valve supplying the manifold for the *compressed gas* container of the specific gas detected shall automatically close.

Exception: Where the gas-detection sampling point initiating the *gas detection system* alarm is at the use location or within a gas valve enclosure of a branch line downstream of a piping distribution manifold, the shutoff valve for the branch line located in the piping distribution manifold enclosure shall automatically close.

2703.14 Exhaust ventilation systems for HPM.

Exhaust ventilation systems and materials for exhaust ducts utilized for the exhaust of HPM shall comply with Sections 2703.14.1 through 2703.14.3, other applicable provisions of this code, the *International Building Code* and the *International Mechanical Code*.

2703.14.1 Where required.

Exhaust ventilation systems shall be provided in the following locations in accordance with the requirements of this section and the *International Building Code*:

1. *Fabrication areas*: Exhaust ventilation for *fabrication areas* shall comply with the *International Building Code*. The *fire code official* is authorized to require additional manual control switches.
2. Workstations: A ventilation system shall be provided to capture and exhaust gases, fumes and vapors at workstations.
3. Liquid storage rooms: Exhaust ventilation for liquid storage rooms shall comply with Section 5004.3.1 and the *International Building Code*.
4. HPM rooms: Exhaust ventilation for HPM rooms shall comply with Section 5004.3.1 and the *International Building Code*.

5. Gas cabinets: Exhaust ventilation for gas cabinets shall comply with Section 5003.8.6.2. The gas cabinet ventilation system is allowed to connect to a workstation ventilation system. Exhaust ventilation for gas cabinets containing highly toxic or toxic gases shall also comply with Chapter 60.
6. Exhausted enclosures: Exhaust ventilation for exhausted enclosures shall comply with Section 5003.8.5.2. Exhaust ventilation for exhausted enclosures containing highly toxic or toxic gases shall also comply with Chapter 60.
7. Gas rooms: Exhaust ventilation for gas rooms shall comply with Section 5003.8.4.2. Exhaust ventilation for gas rooms containing highly toxic or toxic gases shall also comply with Chapter 60.
8. Cabinets containing *pyrophoric* liquids or Class 3 water-reactive liquids: Exhaust ventilation for cabinets in *fabrication areas* containing *pyrophoric* liquids or Class 3 water-reactive liquids shall be as required in Section 2705.2.3.4.

2703.14.2 Penetrations.
Exhaust ducts penetrating *fire barriers* constructed in accordance with Section 707 of the International Building Code or *horizontal assemblies* constructed in accordance with Section 711 of the International Building Code shall be contained in a shaft of equivalent *fire-resistance-rated* construction. Exhaust ducts shall not penetrate *fire walls*. *Fire dampers* shall not be installed in exhaust ducts.

2703.14.3 Treatment systems.
Treatment systems for highly toxic and toxic gases shall comply with Chapter 60.

Delete without substitution:

~~2703.15 Emergency power system~~.
~~An emergency power system shall be provided in Group H-5 occupancies in accordance with Section 1203. The emergency power system shall supply power automatically to the electrical systems specified in Section 2703.15.1 when the normal supply system is interrupted.~~

~~2703.15.1 Required electrical systems~~.
~~Emergency power shall be provided for electrically operated equipment and connected control circuits for the following systems:~~

~~1. HPM exhaust ventilation systems.~~
~~2. HPM gas cabinet ventilation systems.~~
~~3. HPM exhausted enclosure ventilation systems.~~
~~4. HPM gas room ventilation systems.~~
~~5. HPM *gas detection systems*.~~
~~6. *Emergency alarm systems*.~~
~~7. Manual fire alarm systems.~~
~~8. *Automatic sprinkler system* monitoring and alarm systems.~~
~~9. Automatic alarm and detection systems for *pyrophoric* liquids and Class 3 water-reactive liquids required in Section 2705.2.3.4.~~
~~10. Flow alarm switches for *pyrophoric* liquids and Class 3 water-reactive liquids cabinet exhaust ventilation systems required in Section 2705.2.3.4.~~
~~11. Electrically operated systems required elsewhere in this code or in the *International Building Code* applicable to the use, storage or handling of HPM.~~

~~2703.15.2 Exhaust ventilation systems.~~ ~~Exhaust ventilation systems are allowed to be designed to operate at not less than one-half the normal fan speed on the emergency power system where it is demonstrated that the level of exhaust will maintain a safe atmosphere.~~

~~**2703.16 Sub-atmospheric pressure gas systems.**~~
~~Sub-atmospheric pressure gas systems (SAGS) shall be in accordance with NFPA 318.~~

SECTION 2704
STORAGE

2704.1 General.
Storage of hazardous materials shall comply with Section 2703 and this section and other applicable provisions of this code.

2704.2 Fabrication areas.
Hazardous materials storage and the maximum quantities of hazardous materials in use and storage allowed in *fabrication areas* shall be in accordance with Sections 2704.2.1 through 2704.2.2.1.

2704.2.1 Location of HPM storage in fabrication areas.
Storage of HPM in *fabrication areas* shall be within *approved* or *listed* storage cabinets, gas cabinets, exhausted enclosures or within a workstation as follows:

1. *Flammable* and *combustible liquid* storage cabinets shall comply with Section 5704.3.2.
2. Hazardous materials storage cabinets shall comply with Section 5003.8.7.
3. Gas cabinets shall comply with Section 5003.8.6. Gas cabinets for highly toxic or toxic gases shall also comply with Section 6004.1.2.
4. Exhausted enclosures shall comply with Section 5003.8.5. Exhausted enclosures for highly toxic or toxic gases shall also comply with Section 6004.1.3.
5. Workstations shall comply with Section 2705.2.3.

2704.2.2 Maximum aggregate quantities in fabrication areas.
The aggregate quantities of hazardous materials stored or used in a single *fabrication area* shall be limited as specified in this section.

> **Exception:** *Fabrication areas* containing quantities of hazardous materials not exceeding the maximum allowable quantities per control area established by Sections 5003.1.1, 5704.3.4 and 5704.3.5.

Revise as follows:

2704.2.2.1 Storage and use in fabrication areas.
The maximum quantities of hazardous materials stored or used in a single *fabrication area* shall not exceed the quantities set forth in NFPA 318.~~Table 2704.2.2.1.~~

Delete without substitution:

~~**TABLE 2704.2.2.1 QUANTITY LIMITS FOR HAZARDOUS MATERIALS IN A SINGLE FABRICATION AREA IN GROUP H-5[a]**~~

HAZARD CATEGORY	SOLIDS (pounds per square foot)	LIQUIDS (gallons per square foot)	GAS (cubic feet @ NTP per square foot)
Physical-Hazard Materials			
Combustible dust	Note b	Not Applicable	Not Applicable
Combustible fiber Loose Baled	 Note b Notes b and c	Not Applicable	Not Applicable
Combustible liquid Class II Class IIIA Class IIIB Combination Class I, II and IIIA	Not Applicable	 0.02 0.04 Not Limited 0.08	Not Applicable

HAZARD CATEGORY	SOLIDS (pounds per square foot)	LIQUIDS (gallons per square foot)	GAS (cubic feet @ NTP per square foot)
Cryogenic gas	Not Applicable	Not Applicable	
Flammable			Note d
Oxidizing			2.5
Explosives	Note b	Note b	Note b
Flammable gas	Not Applicable	Not Applicable	
Gaseous			Note d
Liquefied			Note d
Flammable liquid	Not Applicable		Not Applicable
Class IA		0.005	
Class IB		0.05	
Class IC		0.05	
Combination Class IA, IB and IC		0.05	
Combination Class I, II and IIIA		0.08	
Flammable solid	0.002	Not Applicable	Not Applicable
Organic peroxide			Not Applicable
Unclassified detonable	Note b	Note b	
Class I	Note b	Note b	
Class II	0.05	0.0025	
Class III	0.2	0.02	
Class IV	Not Limited	Not Limited	
Class V	Not Limited	Not Limited	
Oxidizing gas	Not Applicable	Not Applicable	
Gaseous			2.5
Liquefied			2.5
Combination of gaseous and liquefied			2.5
Oxidizer			Not Applicable
Class 4	Note b	Note b	
Class 3	0.006	0.06	
Class 2	0.006	0.06	
Class 1	0.006	0.06	
Combination Class 1, 2, 3	0.006	0.06	
Pyrophoric materials	Note b	0.0025	Notes d and e
Unstable (reactive)			
Class 4	Note b	Note b	Note b
Class 3	0.05	0.005	Note b
Class 2	0.2	0.02	Note b
Class 1	Not Limited	Not Limited	Not Limited
Water reactive			Not Applicable
Class 3	0.02[f]	0.0025	
Class 2	0.5	0.05	
Class 1	Not Limited	Not Limited	
Health-Hazard Materials			
Corrosives	Not Limited	Not Limited	Not Limited
Highly toxic	Not Limited	Not Limited	Note d
Toxics	Not Limited	Not Limited	Note d

~~For SI: 1 pound = 0.454 kg, 1 pound per square foot = 4.882 kg/m², 1 gallon per square foot = 40.7 L/m², 1 cubic foot @ NTP/square foot = 0.305 m³ @ NTP/m², 1 cubic foot = 0.02832 m³.~~

a. ~~Hazardous materials within piping shall not be included in the calculated quantities.~~

b. ~~Quantity of hazardous materials in a single fabrication area shall not exceed the maximum allowable quantities per control area in Tables 5003.1.1(1) and 5003.1.1(2).~~

c. ~~Densely packed baled cotton that complies with the packing requirements of ISO 8115 shall not be included in this material class.~~

d. ~~The aggregate quantity of flammable, pyrophoric, toxic and highly toxic gases shall not exceed the greater of 0.2 cubic feet at NTP/square foot or 9,000 cubic feet at NTP.~~

e. ~~The aggregate quantity of pyrophoric gases in the building shall not exceed the amounts set forth in Table 5003.8.2.~~

f. ~~Quantity of Class 3 water-reactive solids in a single tool shall not exceed 1 pound.~~

2704.3 Indoor storage outside of fabrication areas.
The indoor storage of hazardous materials outside of *fabrication areas* shall be in accordance with Sections 2704.3.1 through 2704.3.3.

2704.3.1 HPM storage.
The indoor storage of HPM in quantities greater than those listed in Sections 5003.1.1 and 5704.3.4 shall be in a room complying with the requirements of the *International Building Code* and this code for a liquid storage room, HPM room or gas room as appropriate for the materials stored.

2704.3.2 Other hazardous materials storage.
The indoor storage of other hazardous materials shall comply with Sections 5001, 5003 and 5004 and other applicable provisions of this code.

2704.3.3 Separation of incompatible hazardous materials.
Incompatible hazardous materials in storage shall be separated from each other in accordance with Section 5003.9.8.

SECTION 2705
USE AND HANDLING

2705.1 General.
The use and handling of hazardous materials shall comply with this section, Section 2703 and other applicable provisions of this code.

2705.2 Fabrication areas.
The use of hazardous materials in *fabrication areas* shall be in accordance with Sections 2705.2.1 through 2705.2.3.4.

2705.2.1 Location of HPM in use in fabrication areas. Hazardous production materials in use in *fabrication areas* shall be within *approved* or *listed* gas cabinets, exhausted enclosures or a workstation.

Revise as follows:

2705.2.2 Maximum aggregate quantities in fabrication areas.
The aggregate quantities of hazardous materials in a single *fabrication area* and the quantity of HPM in use at a workstation shall comply with NFPA 318. ~~Section 2704.2.2 and Table 2704.2.2.1. The quantity of HPM in use at a workstation shall not exceed the quantities listed in Table 2705.2.2.~~

Delete without substitution:

~~TABLE 2705.2.2 MAXIMUM QUANTITIES OF HPM AT A WORKSTATION[d]~~

HPM CLASSIFICATION	STATE	MAXIMUM QUANTITY
Flammable, highly toxic, pyrophoric and toxic combined	Gas	Combined aggregate volume of all cylinders at a workstation shall not exceed an internal cylinder volume of 39.6 gallons or 5.29 cubic feet
Flammable	Liquid	15 gallons[a, b]
	Solid	5 pounds[a, b]
Corrosive	Gas	Combined aggregate volume of all cylinders at a workstation shall not exceed an internal cylinder volume of 39.6 gallons or 5.29 cubic feet
	Liquid	Use-open system: 25 gallons[b] Use-closed system: 150 gallons[b, e]
	Solid	20 pounds[a, b]
Highly toxic	Liquid	15 gallons[a, b]
	Solid	5 pounds[a, b]
Oxidizer	Gas	Combined aggregate volume of all cylinders at a workstation shall not exceed an internal cylinder volume of 39.6 gallons or 5.29 cubic feet
	Liquid	Use-open system: 12 gallons[b] Use-closed system: 60 gallons[b]
	Solid	20 pounds[a, b]
Pyrophoric	Liquid	0.5 gallon[c, f]
	Solid	4.4 pounds[c, f]
Toxic	Liquid	Use-open system: 15 gallons[b] Use-closed system: 60 gallons[b]
	Solid	5 pounds[a, b]
Unstable reactive Class 3	Liquid	0.5 gallon[a, b]
	Solid	5 pounds[a, b]
Water-reactive Class 3	Liquid	0.5 gallon[c, f]
	Solid	See Table 2704.2.2.1

~~For SI: 1 pound = 0.454 kg, 1 gallon = 3.785 L.~~

- ~~a. Maximum allowable quantities shall be increased 100 percent for closed system operations. Where Note b applies, the increase for both notes shall be allowed.~~
- ~~b. Quantities shall be allowed to be increased 100 percent where workstations are internally protected with an *approved* automatic fire-extinguishing or suppression system complying with Chapter 9. Where Note a applies, the increase for both notes shall be allowed. Where Note e applies, the maximum increase allowed for both Notes b and e shall not exceed 100 percent.~~
- ~~c. Allowed only in workstations that are internally protected with an *approved* automatic fire-extinguishing or fire protection system complying with Chapter 9 and compatible with the reactivity of materials in use at the workstation.~~
- ~~d. The quantity limits apply only to materials classified as HPM.~~
- ~~e. Quantities shall be allowed to be increased 100 percent for nonflammable, noncombustible corrosive liquids where the materials of construction for workstations are listed or *approved* for use without internal fire-extinguishing or suppression system protection. Where Note b applies, the maximum increase allowed for both Notes b and e shall not exceed 100 percent.~~
- ~~f. A maximum quantity of 5.3 gallons of liquids and 44 pounds of total liquids and solids shall be allowed at a workstation where conditions are in accordance with Section 2705.2.3.4.~~

2705.2.3 Workstations.
Workstations in *fabrication areas* shall be in accordance with Sections 2705.2.3.1 through 2705.2.3.4.

2705.2.3.1 Construction. Workstations in *fabrication areas* shall be constructed of materials compatible with the materials used and stored at the workstation. The portion of the workstation that serves as a cabinet for HPM gases, Class I *flammable liquids* or Class II or Class IIIA *combustible liquids* shall be noncombustible and, if of metal, shall be not less than 0.0478-inch (18 gage) (1.2 mm) steel.

2705.2.3.2 Protection of vessels.
Vessels containing hazardous materials located in or connected to a workstation shall be protected as follows:

1. HPM: Vessels containing HPM shall be protected from physical damage and shall not project from the workstation.
2. Hazardous *cryogenic fluids*, gases and liquids: Hazardous *cryogenic fluid*, gas and liquid vessels located within a workstation shall be protected from seismic forces in an *approved* manner in accordance with the *International Building Code*.
3. *Compressed gases*: Protection for *compressed gas* vessels shall also comply with Section 5303.5.
4. *Cryogenic fluids*: Protection for *cryogenic fluid* vessels shall also comply with Section 5503.5.

2705.2.3.3 Drainage and containment for HPM liquids. Each workstation utilizing HPM liquids shall have all of the following:

1. Drainage piping systems connected to a compatible system for disposition of such liquids.
2. The work surface provided with a slope or other means for directing spilled materials to the containment or drainage system.
3. An *approved* means of containing or directing spilled or leaked liquids to the drainage system.

2705.2.3.4 Pyrophoric solids, liquids and Class 3 water-reactive liquids. *Pyrophoric* liquids and Class 3 water-reactive liquids in containers greater than 0.5-gallon (2 L) but not exceeding 5.3-gallon (20 L) capacity and *pyrophoric* solids in containers greater than 4.4 pounds (2 kg) but not exceeding 44 pounds (20 kg) shall be allowed at workstations where located inside cabinets and the following conditions are met:

1. Maximum amount per cabinet: The maximum amount per cabinet shall be limited to 5.3 gallons (20 L) of liquids and 44 pounds (20 kg) of total liquids and solids.

2. Cabinet construction: Cabinets shall be constructed in accordance with the following:
   2.1. Cabinets shall be constructed of not less than 0.097-inch (2.5 mm) (12 gage) steel.
   2.2. Cabinets shall be permitted to have self-closing limited access ports or noncombustible windows that provide access to equipment controls.
   2.3. Cabinets shall be provided with self- or manual-closing doors. Manual-closing doors shall be equipped with a door switch that will initiate local audible and visual alarms when the door is in the open position.
3. Cabinet exhaust ventilation system: An exhaust ventilation system shall be provided for cabinets and shall comply with the following:
   3.1. The system shall be designed to operate at a negative pressure in relation to the surrounding area.
   3.2. The system shall be equipped with monitoring equipment to ensure that required exhaust flow or static pressure is provided.
   3.3. Low-flow or static pressure conditions shall send an alarm to the on-site *emergency control station*. The alarm shall be both visual and audible.
4. Cabinet spill containment: Spill containment shall be provided in each cabinet, with the spill containment capable of holding the contents of the aggregate amount of liquids in containers in each cabinet.
5. Valves: Valves in supply piping between the product containers in the cabinet and the workstation served by the containers shall fail in the closed position upon power failure, loss of exhaust ventilation and upon actuation of the fire control system.
6. Fire detection system: Each cabinet shall be equipped with an automatic fire detection system complying with the following conditions:
   6.1. Automatic detection system: UV/IR, high-sensitivity smoke detection (HSSD) or other *approved* detection systems shall be provided inside each cabinet.
   6.2. Automatic shutoff: Activation of the detection system shall automatically close the shutoff valves at the source on the liquid supply.
   6.3. Alarms and signals: Activation of the detection system shall initiate a local alarm within the *fabrication area* and transmit a signal to the *emergency control station*. The alarms and signals shall be both visual and audible.

2705.3 Transportation and handling.
The transportation and handling of hazardous materials shall comply with Sections 2705.3.1 through 2705.3.4.1 and other applicable provisions of this code.

2705.3.1 Corridors and enclosures for stairways and ramps.
Corridors and enclosures for *exit stairways* and *ramps* in new buildings or serving new *fabrication areas* shall not contain HPM, except as permitted in *corridors* by Section 415.11.7.4 of the International Building Code and Section 2705.3.2 of this code.

2705.3.2 Transport in corridors and enclosures for stairways and ramps.
Transport in *corridors* and enclosures for *stairways* and *ramps* shall be in accordance with Sections 2705.3.2.1 through 2705.3.3.

2705.3.2.1 Fabrication area alterations.
Where existing *fabrication areas* are altered or modified in existing buildings, HPM is allowed to be transported in existing *corridors* where such *corridors* comply with Section 5003.10 of this code and Section 415.11.2 of the International Building Code.

2705.3.2.2 HPM transport in corridors and enclosures for stairways and ramps.
Nonproduction HPM is allowed to be transported in *corridors* and enclosures for *stairways* and *ramps* where utilized for maintenance, lab work and testing when the transportation is in accordance with Section 5003.10.

2705.3.3 Service corridors.
Where a new *fabrication area* is constructed, a service corridor shall be provided where it is necessary to transport HPM from a liquid

storage room, HPM room, gas room or from the outside of a building to the perimeter wall of a *fabrication area*. Service corridors shall be designed and constructed in accordance with the *International Building Code*.

2705.3.4 Carts and trucks.
Carts and trucks used to transport HPM in *corridors* and enclosures for *stairways* and *ramps* shall comply with Section 5003.10.3.

2705.3.4.1 Identification. Carts and trucks shall be marked to indicate the contents.

Reason: The overall intent of this proposal is to be more reliant on the nationally recognized standard, NFPA 318. For the most part, provisions in this chapter that are design and construction related are proposed for deletion unless the provisions refer to additional requirements in another I-code or another section of the IFC, that may not be in NFPA 318. With the exception of the MAQ tables, storage, use, and handling requirements have been retained for several reasons, one of which is that the requirements of NFPA 318 do not apply to existing facilities. The MAQ tables are being proposed for deletion since proposals are submitted almost every cycle to correlate the tables in the IFC with the tables in NFPA 318. Due to the different revision cycles, the tables in a particular edition of the IFC will not necessarily correlate with the tables in the edition of NFPA 318 that is referenced. Lastly, the deletion of text will reduce the likelihood of potential claims regarding copyright infringement issues.

For the most part, the proposal is not intended to be a technical change. The text that is proposed for deletion is covered in NFPA 318 or other sections of the IFC or IBC. For example, sprinkler protection will still be required for semiconductor facilities based upon the requirements of NFPA 318. The installation requirements that currently are contained in the IFC are also contained in either NFPA 318 or NFPA 13, which also references NFPA 318. NFPA 318 requires electrical systems to comply with NFPA 70 in addition to a requirement in the IFC for electrical systems to comply with NFPA 70.

In addition to better correlation with NFPA 318, the proposal should result in a Chapter that is easier to enforce by focusing on use and operational requirements, while relying on the IBC and NFPA 318 for design and construction requirements.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

While not editorial or a clarification, the proposal does result in better correlation between the IFC and NFPA 318. The proposal may decrease the cost of construction in instances where NFPA 318 contains a provision that is not currently specifically permitted by the IFC.

F190-24

F191-24

IFC: 2703.14.1; IMC®: [F] 502.10.1

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Fire Code

Revise as follows:

2703.14.1 Where required.
Mechanical exhaust ~~Exhaust~~ ventilation systems shall be provided in the following locations in accordance with the requirements of this section and the *International Building Code*:

1. *Fabrication areas*: Mechanical exhaust ~~Exhaust~~ ventilation for *fabrication areas* shall comply with the *International Building Code*. The *fire code official* is authorized to require additional manual control switches.
2. Workstations: A mechanical exhaust ventilation system shall be provided to capture and exhaust gases, fumes and vapors at workstations.
3. Liquid storage rooms: Mechanical exhaust ~~Exhaust~~ ventilation for liquid storage rooms shall comply with Section 5004.3.1 and the *International Building Code*.
4. HPM rooms: Mechanical exhaust ~~Exhaust~~ ventilation for HPM rooms shall comply with Section 5004.3.1 and the *International Building Code*.
5. Gas cabinets: Mechanical exhaust ~~Exhaust~~ ventilation for gas cabinets shall comply with Section 5003.8.6.2. The gas cabinet ventilation system is allowed to connect to a workstation ventilation system. Mechanical exhaust ~~Exhaust~~ ventilation for gas cabinets containing highly toxic or toxic gases shall also comply with Chapter 60.
6. Exhausted enclosures: Mechanical exhaust ~~Exhaust~~ ventilation for exhausted enclosures shall comply with Section 5003.8.5.2. Mechanical exhaust ~~Exhaust~~ ventilation for exhausted enclosures containing highly toxic or toxic gases shall also comply with Chapter 60.
7. Gas rooms: Mechanical exhaust ~~Exhaust~~ ventilation for gas rooms shall comply with Section 5003.8.4.2. Mechanical exhaust ~~Exhaust~~ ventilation for gas rooms containing highly toxic or toxic gases shall also comply with Chapter 60.
8. Cabinets containing *pyrophoric* liquids or Class 3 water-reactive liquids: Mechanical exhaust ~~Exhaust~~ ventilation for cabinets in *fabrication areas* containing *pyrophoric* liquids or Class 3 water-reactive liquids shall be as required in Section 2705.2.3.4.
9. Where materials having a hazard ranking of 3 or 4 in accordance with NFPA 704 are used or dispensed, mechanical exhaust ventilation that captures gases, fumes, mists or vapors at the point of generation shall be provided in accordance with Sections 5005.2.1.1 and 5005.2.2.1.

2024 International Mechanical Code

Revise as follows:

[F] 502.10.1 Where required. Exhaust ventilation systems shall be provided in the following locations in accordance with the requirements of this section and the *International Building Code* .

1. Fabrication areas: Mechanical exhaust ~~Exhaust~~ ventilation for fabrication areas shall comply with the *International Building Code* . Additional manual control switches shall be provided where required by the code official.
2. Workstations: A mechanical exhaust ventilation system shall be provided to capture and exhaust gases, fumes and vapors at workstations.
3. Liquid storage rooms: Mechanical exhaust ~~Exhaust~~ ventilation for liquid storage rooms shall comply with Section 502.8.1.1 and the *International Building Code* .

4. HPM rooms: Mechanical exhaust ~~Exhaust~~ ventilation for HPM rooms shall comply with Section 502.8.1.1 and the *International Building Code* .
5. Gas cabinets: Mechanical exhaust ~~Exhaust~~ ventilation for gas cabinets shall comply with Section 502.8.2. The gas cabinet ventilation system is allowed to connect to a workstation ventilation system. Mechanical exhaust ~~Exhaust~~ ventilation for gas cabinets containing highly toxic or toxic gases shall also comply with Sections 502.9.7 and 502.9.8.
6. Exhausted enclosures: Mechanical exhaust ~~Exhaust~~ ventilation for exhausted enclosures shall comply with Section 502.8.2. Mechanical exhaust ~~Exhaust~~ ventilation for exhausted enclosures containing highly toxic or toxic gases shall also comply with Sections 502.9.7 and 502.9.8.
7. Gas rooms: Mechanical exhaust ~~Exhaust~~ ventilation for gas rooms shall comply with Section 502.8.2. Mechanical exhaust ~~Exhaust~~ ventilation for gas rooms containing highly toxic or toxic gases shall also comply with Sections 502.9.7 and 502.9.8.
8. Cabinets containing pyrophoric liquids or Class 3 water-reactive liquids: Mechanical exhaust ~~Exhaust~~ ventilation for cabinets in fabrication areas containing pyrophoric liquids shall be as required in Section 2705.2.3.4 of the International Fire Code.
9. Where materials having a hazard ranking of 3 or 4 in accordance with NFPA 704 are used or dispensed, mechanical exhaust ventilation that captures gases, fumes, mists or vapors at the point of generation shall be provided in accordance with Sections 502.8.4 and 502.8.5.

Reason: This proposal updates the term 'exhaust ventilation' to 'mechanical exhaust ventilation' throughout the section to clarify that exhaust ventilation in these specific locations must be mechanical in nature. Also, a new item (9) is proposed to help ensure that the general mechanical exhaust ventilation requirements found in IFC Sections 5005.2.1.1 and 5005.2.2.1 are also applied to HPM wherever HPM is located in semiconductor facilities. Because Section 2703.14.1 specifically addresses where mechanical exhaust ventilation is required, it could be interpreted that the general provisions in Chapter 50 do not apply. This type of exhaust ventilation, capturing gases, fumes, mists, vapors at the point of generation, is sometimes referred to as ‘point-source’ ventilation and is distinguished from general exhaust systems that serve an entire room or area.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

There is no intended change to the current technical requirements. The proposal clarifies that 1) exhaust ventilation must be mechanical and 2) the general provision in Chapter 50 requiring point-source ventilation for HPM is required. Approving this proposal highlights existing requirements and will have no impact of construction.

F191-24

F192-24

IFC: TABLE 2704.2.2.1; IBC: [F]TABLE 415.11.1.1

Proponents: William Koffel, Koffel Associates, Inc., Semiconductor Industry Association (wkoffel@koffel.com)

2024 International Fire Code

Revise as follows:

TABLE 2704.2.2.1 QUANTITY LIMITS FOR HAZARDOUS MATERIALS IN A SINGLE FABRICATION AREA IN GROUP H-5[a]

HAZARD CATEGORY	SOLIDS (pounds per square foot)	LIQUIDS (gallons per square foot)	GAS (cubic feet @ NTP per square foot)
Physical-Hazard Materials			
Combustible dust	Note b	Not Applicable	Not Applicable
Combustible fiberLooseBaled	 Note b Notes b and c	Not Applicable	Not Applicable
Combustible liquidClass IIClass IIIAClass IIIBCombination Class I, II and IIIA	Not Applicable	 0.02 0.04 Not Limited 0.08	Not Applicable
Cryogenic gasFlammableOxidizing	Not Applicable	Not Applicable	 Note d 2.5
Explosives	Note b	Note b	Note b
Flammable gasGaseousLiquefied	Not Applicable	Not Applicable	 Note d Note d
Flammable liquidClass IAClass IBClass ICCombination Class IA, IB and ICCombination Class I, II and IIIA	Not Applicable	 0.005 0.05 0.05 0.05 0.08	Not Applicable
Flammable solid	0.002	Not Applicable	Not Applicable
Organic peroxideUnclassified detonableClass IClass IIClass IIIClass IVClass V	 Note b Note b 0.05 0.2 Not Limited Not Limited	 Note b Note b 0.0025 0.02 Not Limited Not Limited	Not Applicable
Oxidizing gasGaseousLiquefiedCombination of gaseous and liquefied	Not Applicable	Not Applicable	 2.5 2.5 2.5
OxidizerClass 4Class 3Class 2Class 1Combination Class 1, 2, 3	 Note b 0.006 0.006 0.006 0.006	 Note b 0.06 0.06 0.06 0.06	Not Applicable
Pyrophoric materials	Note b	0.0025	Notes d and e
Unstable (reactive)Class 4Class 3Class 2Class 1	 Note b 0.05 0.2 Not Limited	 Note b 0.005 0.02 Not Limited	 Note b Note b Note b Not Limited
Water reactiveClass 3Class 2Class 1	 0.02 [f] 0.5 Not Limited	 0.0025 0.05 Not Limited	Not Applicable
Health-Hazard Materials			
Corrosives	Not Limited	Not Limited	Not Limited
Highly toxic	Not Limited	Not Limited	Note d
Toxics	Not Limited	Not Limited	Note d

For SI: 1 pound = 0.454 kg, 1 pound per square foot = 4.882 kg/m^2, 1 gallon per square foot = 40.7 L/m^2, 1 cubic foot @ NTP/square foot

= 0.305 m^3 @ NTP/m^2, 1 cubic foot = 0.02832 m^3.

a. Hazardous materials within piping shall not be included in the calculated quantities.

b. Quantity of hazardous materials in a single fabrication area shall not exceed the maximum allowable quantities per control area in Tables 5003.1.1(1) and 5003.1.1(2).

c. Densely packed baled cotton that complies with the packing requirements of ISO 8115 shall not be included in this material class.

d. The aggregate quantity of flammable, pyrophoric, toxic and highly toxic gases shall not exceed the greater of 0.2 cubic feet at NTP/square foot or 9,000 cubic feet at NTP. The total quantity of a gas in the fabrication area contributes once to the aggregate quantity, even if the gas presents more than one of the noted hazards.

e. The aggregate quantity of pyrophoric gases in the building shall not exceed the amounts set forth in Table 5003.8.2.

f. Quantity of Class 3 water-reactive solids in a single tool shall not exceed 1 pound.

2024 International Building Code

Revise as follows:

[F]TABLE 415.11.1.1 QUANTITY LIMITS FOR HAZARDOUS MATERIALS IN A SINGLE FABRICATION AREA IN GROUP H-5[a]

HAZARD CATEGORY		SOLIDS (pounds per square foot)	LIQUIDS (gallons per square foot)	GAS (cubic feet @ NTP/square foot)
PHYSICAL-HAZARD MATERIALS				
Combustible dust		Note b	Not Applicable	Not Applicable
Combustible fiber	Loose	Note b	Not Applicable	Not Applicable
	Baled	Notes b and c		
Combustible liquid	II	Not Applicable	0.02	Not Applicable
	IIIA		0.04	
	IIIB		Not Limited	
Combination Class	I, II and IIIA		0.08	
Cryogenic gas	Flammable	Not Applicable	Not Applicable	Note d
	Oxidizing			2.5
Explosives		Note b	Note b	Note b
Flammable gas	Gaseous	Not Applicable	Not Applicable	Note d
	Liquefied			Note d
Flammable liquid	IA	Not Applicable	0.005	Not Applicable
	IB		0.05	
	IC		0.05	
Combination Class	IA, IB and IC		0.05	
Combination Class	I, II and IIIA		0.08	
Flammable solid		0.002	Not Applicable	Not Applicable
Organic peroxide	Unclassified detonable	Note b	Note b	Not Applicable
	Class I	Note b	Note b	

HAZARD CATEGORY		SOLIDS (pounds per square foot)	LIQUIDS (gallons per square foot)	GAS (cubic feet @ NTP/square foot)
	Class II	0.05	0.0025	
	Class III	0.2	0.02	
	Class IV	Not Limited	Not Limited	
	Class V	Not Limited	Not Limited	
Oxidizing gas	Gaseous	Not Applicable	Not Applicable	2.5
	Liquefied			2.5
Combination of gaseous and liquefied				2.5
Oxidizer	Class 4	Note b	Note b	Not Applicable
	Class 3	0.006	0.06	
	Class 2	0.006	0.06	
	Class 1	0.006	0.06	
Combination Class	1, 2, 3	0.006	0.06	
Pyrophoric materials		Note b	0.0025	Notes d and e
Unstable (reactive)	Class 4	Note b	Note b	Note b
	Class 3	0.05	0.005	Note b
	Class 2	0.2	0.02	Note b
	Class 1	Not Limited	Not Limited	Not Limited
Water reactive	Class 3	0.02 [f]	0.0025	Not Applicable
	Class 2	0.5	0.05	
	Class 1	Not Limited	Not Limited	
HEALTH-HAZARD MATERIALS				
Corrosives		Not Limited	Not Limited	Not Limited
Highly toxic		Not Limited	Not Limited	Note d
Toxics		Not Limited	Not Limited	Note d

For SI: 1 pound = 0.454 kg, 1 pound per square foot = 4.882 kg/m^2, 1 gallon per square foot = 40.7 L/m^2, 1 cubic foot @ *NTP*/square foot = 0.305 m^3 @ *NTP*/m^2, 1 cubic foot = 0.02832 m^3.

a. Hazardous materials within piping shall not be included in the calculated quantities.

b. Quantity of hazardous materials in a single fabrication shall not exceed the maximum allowable quantities per control area in Tables 307.1(1) and 307.1(2).

c. Densely packed baled cotton that complies with the packing requirements of ISO 8115 shall not be included in this material class.

d. The aggregate quantity of flammable, pyrophoric, toxic and highly toxic gases shall not exceed the greater of 0.2 cubic feet at *NTP*/square foot or 9,000 cubic feet at *NTP*. <u>The total quantity of a gas in the fabrication area contributes once to the aggregate quantity, even if the gas presents more than one of the noted hazards.</u>

e. The aggregate quantity of pyrophoric gases in the building shall not exceed the amounts set forth in Table 415.6.5.

f. Quantity of Class 3 water-reactive solids in a single tool shall not exceed 1 pound.

Reason: There can be confusion on how to consider gases with multiple hazards when applying IFC Table 2704.2.2.1, QUANTITY LIMITS FOR HAZARDOUS MATERIALS IN A SINGLE FABRICATION AREA IN GROUP H-5 Footnote d, which limits the aggregate quantity of flammable, pyrophoric, toxic, and highly toxic gases in a single fabrication area. Where a gas meets the definition of more than one of the noted hazard classes, users may attempt to include the quantity in each applicable hazard class when determining the aggregate quantity. This proposal clarifies that the code intends for the quantity of a gas to contribute to the aggregate quantity only once, even if it presents more than one of the noted hazards.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

While there are some who have interpreted the application of the Table differently, the proposal intends to clarify the original intent of the Code.

F192-24

F193-24

IFC: TABLE 2705.2.2

Proponents: William Koffel, Koffel Associates, Inc., Semiconductor Industry Association (wkoffel@koffel.com)

2024 International Fire Code

Revise as follows:

TABLE 2705.2.2 MAXIMUM QUANTITIES OF HPM AT A WORKSTATION[d]

HPM CLASSIFICATION	STATE	MAXIMUM QUANTITY
Flammable, highly toxic, pyrophoric and toxic combined	Gas	Combined aggregate volume of all cylinders at a workstation shall not exceed an internal cylinder volume of 39.6 gallons or 5.29 cubic feet
Flammable	Liquid	15 gallons[a, b]
	Solid	5 pounds[a, b]
Corrosive	Gas	Combined aggregate volume of all cylinders at a workstation shall not exceed an internal cylinder volume of 39.6 gallons or 5.29 cubic feet
	Liquid	Use-open system: 25 gallons[b] Use-closed system: 150 gallons[b, e]
	Solid	~~20~~ 400 pounds[~~a,~~ b, e]
Highly toxic	Liquid	15 gallons[a, b]
	Solid	5 pounds[a, b]
Oxidizer	Gas	Combined aggregate volume of all cylinders at a workstation shall not exceed an internal cylinder volume of 39.6 gallons or 5.29 cubic feet
	Liquid	Use-open system: 12 gallons[b] Use-closed system: 60 gallons[b]
	Solid	20 pounds[a, b]
Pyrophoric	Liquid	0.5 gallon[c, f]
	Solid	4.4 pounds[c, f]
Toxic	Liquid	Use-open system: 15 gallons[b] Use-closed system: 60 gallons[b]
	Solid	5 pounds[a, b]
Unstable reactive Class 3	Liquid	0.5 gallon[a, b]
	Solid	5 pounds[a, b]
Water-reactive Class 3	Liquid	0.5 gallon[c, f]
	Solid	See Table 2704.2.2.1

For SI: 1 pound = 0.454 kg, 1 gallon = 3.785 L.

a. Maximum allowable quantities shall be increased 100 percent for closed system operations. Where Note b applies, the increase for both notes shall be allowed.

b. Quantities shall be allowed to be increased 100 percent where workstations are internally protected with an *approved* automatic fire-extinguishing or suppression system complying with Chapter 9. Where Note a applies, the increase for both notes shall be allowed. Where Note e applies, the maximum increase allowed for both Notes b and e shall not exceed 100 percent.

c. Allowed only in workstations that are internally protected with an *approved* automatic fire-extinguishing or fire protection system complying with Chapter 9 and compatible with the reactivity of materials in use at the workstation.

d. The quantity limits apply only to materials classified as HPM.

e. Quantities shall be allowed to be increased 100 percent for nonflammable, noncombustible corrosive liquids where the materials of construction for workstations are listed or *approved* for use without internal fire-extinguishing or suppression system protection. Where Note b applies, the maximum increase allowed for both Notes b and e shall not exceed 100 percent.

f. A maximum quantity of 5.3 gallons of liquids and 44 pounds of total liquids and solids shall be allowed at a workstation where conditions are in accordance with Section 2705.2.3.4.

Reason: The proposal does two things:

- The MAQ for solid corrosives is increased from 20 to 400 pounds
- For solid corrosives, footnote a is proposed to be deleted but footnote e is proposed to be added

The net effect of the change is to more closely align the MAQs for solid corrosives at a workstation and liquid corrosives at a workstation. If all increases are applied, the current code would restrict the quantity of solid corrosives at a workstation to 80 pounds while the quantity of liquid corrosives at a workstation would be permitted to be 300 gallons (approximately 2500 pounds).

Solid corrosives have a low vapor pressure that required a vacuum to sublime the material in order to produce enough vapor for use in manufacturing. Therefore, the solid corrosive needs to be located close to the point of use. The current MAQ for solid corrosives at a workstation is not realistic for consistent operation of a manufacturing process. Furthermore, the highest risk is associated with changing out a solid corrosive vessel.When comparing the risk of liquid corrosives versus solid corrosives, liquid corrosives generally present a higher risk than solid corrosives for the following reasons:

- Liquids can disseminate across the floor and to lower levels in the event of a leak.
- Solids are of a low vapor pressure resulting in a lower risk of vapor exposure as compared to liquids.
- In the event of a container breach or leak, a liquid can escape to the surrounding area with the potential for a liquid exposure as well as a vapor exposure.
- Vapors are controlled by the exhausted enclosure as well as the area exhaust. Solids are less likely to escape the exhausted enclosure as compared to liquids.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0.00. The cost of construction and operation should decrease

Estimated Immediate Cost Impact Justification (methodology and variables):

Increasing the MAQ permitted at the workstation reduces the need to change out solid corrosive vessels. This is also not related to construction.

F193-24

F194-24

IFC: TABLE 2705.2.2

Proponents: William Koffel, Koffel Associates, Inc., Semiconductor Industry Association (wkoffel@koffel.com)

2024 International Fire Code

Revise as follows:

TABLE 2705.2.2 MAXIMUM QUANTITIES OF HPM AT A WORKSTATION[d]

HPM CLASSIFICATION	STATE	MAXIMUM QUANTITY
Flammable, highly toxic, pyrophoric and toxic combined	Gas	Combined aggregate volume of all cylinders at a workstation shall not exceed an internal cylinder volume of 39.6 gallons or 5.29 cubic feet
Flammable	Liquid	15 gallons[a, b]
	Solid	5 pounds[a, b]
Corrosive	Gas	Combined aggregate volume of all cylinders at a workstation shall not exceed an internal cylinder volume of 39.6 gallons or 5.29 cubic feet
	Liquid	Use-open system: 25 gallons[b] Use-closed system: 150 gallons[b, e]
	Solid	20 pounds[a, b]
Highly toxic	Liquid	15 gallons[a, b]
	Solid	5 pounds[a, b]
Oxidizing	Gas	Combined aggregate volume of all cylinders at a workstation shall not exceed an internal cylinder volume of 39.6 gallons or 5.29 cubic feet
Oxidizer Class 3 and Class 4 (aggregate)	~~Gas~~	~~Combined aggregate volume of all cylinders at a workstation shall not exceed an internal cylinder volume of 39.6 gallons or 5.29 cubic feet~~
	Liquid	Use-open system: 12 gallons[b] Use-closed system: 60 gallons[b]
	Solid	20 pounds[a, b]
Oxidizer Class 4	Liquid Solid	Maximum Allowable Quantity Maximum Allowable Quantity
Pyrophoric	Liquid	0.5 gallon[c, f]
	Solid	4.4 pounds[c, f]
Toxic	Liquid	Use-open system: 15 gallons[b] Use-closed system: 60 gallons[b]
	Solid	5 pounds[a, b]
Unstable reactive Class 3	Liquid	0.5 gallon[a, b]
	Solid	5 pounds[a, b]
Unstable reactive Class 4	Liquid Solid	Maximum allowable quantity Maximum allowable quantity
Water-reactive Class 3	Liquid	0.5 gallon[c, f]
	Solid	See Table 2704.2.2.1

For SI: 1 pound = 0.454 kg, 1 gallon = 3.785 L.

a. Maximum allowable quantities shall be increased 100 percent for closed system operations. Where Note b applies, the increase for both notes shall be allowed.

b. Quantities shall be allowed to be increased 100 percent where workstations are internally protected with an *approved* automatic fire-extinguishing or suppression system complying with Chapter 9. Where Note a applies, the increase for both notes shall be allowed. Where Note e applies, the maximum increase allowed for both Notes b and e shall not exceed 100 percent.

c. Allowed only in workstations that are internally protected with an *approved* automatic fire-extinguishing or fire protection system complying with Chapter 9 and compatible with the reactivity of materials in use at the workstation.

d. The quantity limits apply only to materials classified as HPM.

e. Quantities shall be allowed to be increased 100 percent for nonflammable, noncombustible corrosive liquids where the materials of construction for workstations are listed or *approved* for use without internal fire-extinguishing or suppression system protection. Where Note b applies, the maximum increase allowed for both Notes b and e shall not exceed 100 percent.

f. A maximum quantity of 5.3 gallons of liquids and 44 pounds of total liquids and solids shall be allowed at a workstation where conditions are in accordance with Section 2705.2.3.4.

Reason: The Table is reconfigured to isolate Oxidizing Gas, which is not further classified, from Class 3 and Class 4 liquid and solid oxidizers which are defined as HPM. This reconfiguration also clarifies for the reader that Class 1 and Class 2 liquid and solid oxidizers are not considered, which is consistent with the treatment of Unstable (reactives) and Water Reactives in this Table.

It is presumed that the current quantities allowed for Liquid and Solid Oxidizers in Table 2705.2.2 is the aggregate of both Class 3 and 4 Oxidizers at a workstation. Class 4 Oxidizers are defined as materials that have the potential to undergo an explosive reaction and they are limited by Table 2704.2.2.1 in a single fabrication area to the Maximum Allowable Quantity provided for in Table 5003.1.1(1), which is 0.25 pounds and 0.25 pounds (0.025 gallons), respectively. Without clarification, the reader can misinterpret IFC Table 2705.2.2 to allow for 12 gallons of Class 4 Oxidizer liquids in open use and 60 gallons of Class 4 Oxidizer liquids in closed use in a single workstation in Group H-5. And similarly, 20 pounds of Class 4 Oxidizer solids.

This proposal does not intend to make any changes to the quantities currently allowed, but it does:

1)Align the hazard categories for oxidizing materials with IFC Table 5003.1.1(1),2)Clarify that the quantities listed apply to the aggregate of Class 3 and Class 4 Oxidizer liquids and solids, and3)Adds a new row for Class 4 Oxidizer liquids and solids with maximum quantity limits aligned with the maximum quantities allowed in a single fabrication area in Group H-5 by IFC Table 2704.2.2.1.

The quantity of Class 4 Unstable reactive liquids and solids allowed at a workstation in Group H-5 is also clarified. Both Class 3 and Class 4 Unstable (reactive) liquids and solids are defined as HPM, but only Class 3 Unstable reactive is listed in Table 2705.2.2. IFC Table 2704.2.2.1 currently allows up to the Maximum Allowable Quantity (MAQ) of Class 4 Unstable liquids and solids listed in IFC Table 5003.1.1(1) in a single fabrication area in Group H-5. But, because the Class 4 Unstable (reactive) hazard classification does not appear in Table 2705.2.2, the reader is led to question whether Class 4 Unstable (reactive) materials are allowed at workstations in Group H-5.

The proposal clarifies the code by adding the Class 4 Unstable (reactive) hazard category to Table 2705.2.2 and aligns the maximum quantities for Class 4 Unstable (reactive) liquids and solids with the maximum quantities currently allowed by IFC Table 2704.2.2.1 for these materials in a single fabrication area.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

As noted in the Reason Statement, the proposal clarifies the intent of the current code requirements.

F194-24

F195-24

IFC: 2705.4 (New), NFPA Chapter 80

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Fire Code

Add new text as follows:

<u>**2705.4 Waste recovery, handling and treatment systems.** Effluent gas or vapor that is toxic or highly toxic shall be handled and treated in accordance with Chapter 60. Waste recovery, handling and treatment systems for other hazardous materials shall comply with NFPA 318.</u>

Revise as follows:

NFPA

National Fire Protection Association
1 Batterymarch Park
Quincy, MA 02169-7471

318—22 Standard for the Protection of Semiconductor Fabrication Facilities
2703.16, <u>2705.4</u>

Reason: IFC Chapter 27 does not currently include specific requirements for the recovery, handling, or treatment of hazardous material waste although these activities are typically integral to every semiconductor manufacturing facility. Chapter 50 and the material-specific chapter requirements are applicable, but still do not specifically address protections and controls that apply to waste recovery, handling, and treatment. NFPA 318 Chapter 10 includes numerous requirements for designing and protecting the various activities and types of waste streams one is likely to encounter at a semiconductor facility. The topics covered by NFPA 318 include waste recovery and handling systems, acid waste treatment systems, organic waste treatment, waste liquid handling, effluent treatment systems, scrubbers, vapor recovery, and vapor processing systems. This proposal sends the user to NFPA 318 Chapter 10 to ensure appropriate safeguards are in place, but because Chapter 50 adequately addresses treatment systems for toxic and highly toxic gas and vapor, there is no need to refer to NFPA 318 for these systems.

The applicable update to NFPA 318 reference standard is proposed to include the new section, 2705.4.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Minimal or no increased cost of construction, operation, or maintenance is anticipated. Although the IFC does not specifically address waste handling, recovery and treatment currently, the costs associated with these processes are likely already being incurred based on the hazard class(es) of the materials, waste streams and industry best practices. Treatment is also likely to already be occurring to meet state and local environmental waste disposal regulations.

F195-24

F196-24

IFC: SECTION 3005, 3005.1

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Fire Code

Delete without substitution:

~~SECTION 3005~~
~~INTERLOCKS~~

~~**3005.1 Shut down.** Interlocks shall be provided for Class A ovens so that conveyors or sources of flammable or combustible materials shall shut down if either the exhaust or recirculation air supply fails.~~

Reason: There are over a hundred references to interlocks in NFPA 86. There is currently only one interlock mentioned in Chapter 30. This may give the false impression that this is the only interlock that is required. It would be clearer to remove this single requirement, which is already addressed in NFPA 86, and direct users to NFPA 86 for the appropriate requirements for interlocks. Renumber remaining sections.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The code change proposal will not increase or decrease the cost of construction as the change just clarifies where the interlock requirements can be found.

F196-24

F197-24

IFC: 3006.1, 3006.2 (New)

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Fire Code

Revise as follows:

3006.1 Protection study~~Required protection~~.
The *owner* shall conduct a study of the oven in accordance with Section 9.1 of NFPA 86 to determine the need for a fire protection system in Class A ~~and B~~ ovens ~~that contain, or are utilized for the processing of, combustible materials shall be protected by an *approved automatic fire-extinguishing system* complying with Chapter 9~~where any of the following conditions exist.

1. Oven is constructed of combustible materials.
2. Workpieces are constructed of combustible materials.
3. Devices for moving or supporting the workpiece are constructed of combustible materials.
4. Ancillary materials applied to or within the workpiece are combustible.

Exceptions:

1. Small tabletop ovens used in laboratory facilities.
2. Nonwalk-in ovens that are less than 4 feet (1219 mm) in length and width.

Add new text as follows:

3006.2 Required protection. Where the study in Section 3006.1 indicated that fire protection is required, the fire protection system shall be in accordance with Chapter 9.

Reason: Changes are based upon FM guidance (FM Datasheet 6-9), current requirements in NFPA 86 and response from ICC Staff (see attached). The requirement for fire protection is based upon the combustibility of the contents of the oven, or the oven itself. A study would determine if there is sufficient combustibles on, or in, the workpiece to require fire protection. Some liquid and powder coated workpieces do not contain enough ignitible material to require fire protection. Class B oven was removed as, by definition, there are no combustibles. The proposed language also identifies who is responsible for the study and points to the appropriate section in NFPA 86 which includes requirements and supporting information in the annex.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is a clarification where fire protection is required. With the revised language it may be possible that this would reduce the cost as the hazard is more specifically addressed.

F197-24

F198-24

IFC: SECTION 105, 105.5.51, [A] 105.6.25, SECTION 3103, 3103.4

Proponents: Jonathan Siu, Jon Siu Consulting, LLC, Self

2024 International Fire Code

SECTION 105
PERMITS

Revise as follows:

105.5.51 Temporary membrane structures, special event structures and tents. An operational permit is required to operate ~~an air-supported~~ a temporary membrane structure, a temporary *special event structure* or a tent having an area in excess of 400 square feet (37 m^2).

Exceptions:

1. Tents used exclusively for recreational camping purposes.
2. Tents, curtains and extensions attached thereto, when used for funeral services.
3. Tents open on all sides, which comply with all of the following:
   - 3.1. Individual tents having a maximum size of 700 square feet (65 m^2).
   - 3.2. The aggregate area of multiple tents placed side by side without a fire break clearance of not less than 12 feet (3658 mm) shall not exceed 700 square feet (65 m^2) total.
   - 3.3. A minimum clearance of 12 feet (3658 mm) to structures and other tents shall be provided.

[A] 105.6.25 Temporary membrane structures and tents. A construction permit is required to erect ~~an air-supported~~ a temporary membrane structure, a temporary special event structure or a tent in accordance with Section 105.5.51.

SECTION 3103
TEMPORARY TENTS AND MEMBRANE STRUCTURES

Revise as follows:

3103.4 Use period.

Temporary *tents*, air-supported, air-inflated or ~~tensioned~~ tensile *membrane structures* shall not be erected for a period of more than 180 days within a 12-month period on a single premises.

Reason: This proposal is intended to make the IFC internally consistent, with respect to its application to temporary structures.

In the process of investigating the application of the building code and the fire code to temporary structures for a separate proposal, it became apparent that there were some discrepancies in the provisions in the 2024 IFC:

- Sections 105.5.51 and 105.6.25 require construction and operational permits for air supported temporary membrane structures. However, Section 3101.1 appears to scope in all membrane structures:

  3101.1 Scope. *Tents*, temporary special event structures and *membrane structures* shall comply with this chapter. The provisions of Section 3103 are applicable only to temporary *tents* and *membrane structures*. The provisions of Sections 3104 and 3108 are applicable to temporary and permanent *tents* and *membrane structures*. The provisions of Section 3105 are applicable to temporary special event structures. The provisions of Section 3106 are applicable to inflatable amusement devices. The provisions of Section 3107are applicable to outdoor assembly events. Other temporary structures shall comply with the *International Building Code*.

- In addition, Section 3103.4 prohibits "tensioned" membrane structures from being permitted for more than 180 days within 12 months. However, since neither Section 105.5.51 nor 105.6.25 require permits for these, they aren't really regulated by the IFC--there is no "code path" (i.e., legal authority) that gets someone to 3101 or 3103.4.

This proposal revises Sections 105.5.51 and 105.6.25 to encompass all membrane structures, consistent with Section 3101.1. This takes the "lowest common denominator" approach, i.e., takes the broadest interpretation as to what is regulated by the IFC. The changes to Sections 105.5.51 and 105.6.25 will also resolve the code path issue in Section 3103.4. A more strict approach (not taken in this proposal) would have been to revise Sections 3101.1 and 3103.4 to only apply to air-supported temporary membrane structures, consistent with the current provisions in Sections 105.5.51 and 105.6.25.

Finally, Section 3103.4 refers to "tensioned" membrane structures, but the defined term is "tensile" membrane structures. This proposal revises Section 3103.4 to refer to the defined term.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal just makes the IFC internally consistent as far as its scoping of temporary structures is concerned. There are sections in the 2024 IFC that appear to regulate temporary structures more broadly than a tight technical reading of the code would indicate, and jurisdictions who have been enforcing the code with that broad view will see no change in how they approach permits for these structures.

F198-24

F199-24

IFC: 3103.1, 3103.6.1, 3103.8, 3103.8.2, 3103.8.3, 3103.8.4, 3104.1, 3105.1, 3105.4

Proponents: Jennifer Goupil, Structural Engineering Institute of ASCE, American Society of Civil Engineers (jgoupil@asce.org); Don Scott, Don Scott Consulting, PLLC, ASCE/SEI Ad Hoc Committee for Loads on Temporary Structures (don@donscottconsulting.com)

2024 International Fire Code

Revise as follows:

3103.1 General.
Tents and *membrane structures* used for temporary periods shall comply with this section~~, and~~Section 3107, and with the *International Building Code* as applicable. Other temporary structures erected for a period of 180 days or less shall comply with the *International Building Code*.

3103.6.1 Inspection report. Where required by the *fire code official* or *building official*, an inspection report shall be provided and shall consist of maintenance, anchors and fabric inspections.

3103.8 Structural stability and anchorage required. *Tents* or *membrane structures* and their appurtenances shall be designed and installed ~~to withstand the elements of weather and prevent collapsing~~ in accordance with Sections 3103.8.1 through 3103.8.4. Documentation of structural stability shall be furnished to the *fire code official*.

3103.8.2 Tents and membrane structures greater than one story.
Tents and *membrane structures* exceeding one story shall be designed and constructed to comply with ~~Sections 1606 through 1609 of~~ the International Building Code.

3103.8.3 Tents and membrane structures greater than 7,500 square feet.
Tents and *membrane structures* greater than 7,500 square feet (697 m^2) shall be designed and constructed to comply ~~with Sections 1606 through 1609 of~~ the International Building Code.

3103.8.4 Tents and membrane structures with an occupant load greater than 1,000.
Tents and *membrane structures* with an occupant capacity greater than 1,000 persons shall be designed and constructed to comply with ~~Sections 1606 through 1609 of~~ the International Building Code.

3104.1 General.
Tents and *membrane structures*, both temporary and permanent, shall be in accordance with this section and Sections 3107 and 3108, and~~. Permanent *tents* and *membrane structures*~~ shall also comply with the *International Building Code*.

3105.1 General.
Temporary special event structures shall comply with Section 3104, Sections 3105.2 through 3105.8 and ~~ANSI E1.21~~the *International Building Code*.

3105.4 Required documents.
The following documents shall be submitted to the *fire code official* and the building official for review before a permit is *approved*:

1. Construction documents: *Construction documents* shall be prepared by a *registered design professional* in accordance with Section 3103 of the *International Building Code* ~~and ANSI E1.21~~ where applicable. *Construction documents* shall include:
   1.1. A summary sheet showing the building code used, design criteria, loads and support reactions.
   1.2. Detailed construction and installation drawings.
   1.3. Design calculations.
   1.4. Operating limits of the structure explicitly outlined by the *registered design professional* including environmental conditions and physical forces.
   1.5. Effects of additive elements such as video walls, supported scenery, audio equipment, vertical and horizontal coverings.
   1.6. Means for adequate stability including specific requirements for guying and cross-bracing, ground anchors or ballast for different ground conditions.

2. Designation of responsible party: The *owner* of the temporary special event structure shall designate in writing a person to have responsibility for the temporary special event structure on the site. The designated person shall have sufficient knowledge of the *construction documents*, manufacturer's recommendations and operations plan to make judgments regarding the structure's safety and to coordinate with the *fire code official*.
3. Operations plan: The operations plan shall reflect manufacturer's operational guidelines, procedures for environmental monitoring and actions to be taken under specified conditions consistent with the *construction documents*.

Reason: This code change proposal is being submitted to align the IFC with the current provisions in the IBC regarding temporary structures.

In Group B of the last cycle, a committee organized by ASCE/SEI submitted code change proposal S116-22, which was approved as modified by public comments by the membership. S116-22 added provisions for modified loads on public-occupancy temporary structures into 2024 IBC 3103. The provisions also included requirements for installation and maintenance inspections, controlled occupancy procedures, and durability. The industry standards for these types of structures (ANSI E1.21 and ANSI ES1.7) were adopted by reference in IBC Chapter 35.

This proposal will align the next edition of the IFC with the new IBC provisions by:

- Pointing to the IBC or the building official as needed (Sections 3103.1 and 3103.6.1);
- Clarifying that larger tents and membrane structures must comply with more than just the listed sections in the IBC (Sections 3103.8.2 through 3103.8.4);
- Clarifying that compliance with the IBC is required for both temporary and permanent tents and membrane structures (Section 3104.1); and
- Deleting a now-unnecessary reference to ANSI E1.21 and pointing to the IBC (Sections 3105.1 and 3105.5 Item 1);

The ad hoc group that worked on the IBC last cycle, continuted this effort with this coordinating code change for this cycle. This code change will align the IFC with what is currently in the 2024 IBC for temporary structures.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Since this is just aligning the 2027 IFC with the requirements already in the 2024 IBC, there will be no impact on the cost of construction. (A cost impact statement for the IBC changes was included in S116-22.)

F199-24

F200-24

IFC: SECTION 3103, 3103.8, SECTION 3105, 3105.5.2

Proponents: Jonathan Siu, Jon Siu Consulting, LLC, Self

2024 International Fire Code

SECTION 3103
TEMPORARY TENTS AND MEMBRANE STRUCTURES

Revise as follows:

3103.8 Structural stability and anchorage required. *Tents* or *membrane structures* and their appurtenances shall be designed and installed to withstand the elements of weather and prevent collapsing. Documentation of structural stability shall be furnished to the *fire code official* <u>and the building official</u>.

SECTION 3105
TEMPORARY SPECIAL EVENT STRUCTURES

Revise as follows:

3105.5.2 Inspection report. The inspecting agency or individual shall furnish an inspection report to the *fire code official* <u>and the building official</u>. The inspection report shall indicate that the temporary special event structure was inspected and was or was not installed in accordance with the *approved construction documents*. Discrepancies shall be brought to the immediate attention of the installer for correction. Where any discrepancy is not corrected, it shall be brought to the attention of the *fire code official*<u>, the building official, </u>and the designated responsible party.

Reason: The purpose of this proposal is to clarify in the IFC that the building official should also receive appropriate permit and inspection documentation, for the benefit of permit applicants who mostly work with the IFC.

IFC Section 3103.8 states that "documentation of structural stability" for temporary tents or membrane structures must be submitted to the fire code official. However, temporary tents and membrane structures that are regulated by the IFC also require building permits (compare IFC Sections 105.5.51 and 105.6.25 with IBC Section 3103.1.3). It stands to reason that the same documentation submitted to the fire code official for structural stability should be also submitted to the building official.

Similarly, IFC Section 3105.5.2 requires what is essentially a special inspector's report to be submitted to the fire code official, but temporary special event structures also require a building permit (IFC Section 3105.2). The building official will also need the special inspection report to close out the permit, and should be notified of any discrepancies between what was constructed and what was approved on the plans.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal only clarifies in the IFC what is already required by the IBC. As such, there is no impact on the cost of construction or enforcement.

F200-24

F201-24

IFC: 3104.1, 3104.2, 3104.3, 3104.4

Proponents: Marcelo Hirschler, GBH International, GBH International (mmh@gbhint.com); Kevin Scott, KH Scott & Associates LLC, self (khscottassoc@gmail.com)

2024 International Fire Code

3104.1 General.
Tents and *membrane structures*, both temporary and permanent, shall be in accordance with this section and Sections 3107 and 3108. Permanent *tents* and *membrane structures* shall also comply with the *International Building Code*.

Revise as follows:

3104.2 Flame propagation performance testing and certification.
Before a permit is granted, the *owner* or agent shall file with the *fire code official* ~~a certificate~~ <u>an affidavit</u> provided by the product manufacturer to verify that the materials have been tested and certified by an *approved* testing laboratory. The <u>affidavit</u> ~~certificate~~ shall indicate that the floor coverings, *tents*, *membrane structures* and their appurtenances, which include sidewalls, drops and tarpaulins, are composed of materials meeting the flame propagation performance of Test Method 2 of NFPA 701. Additionally, it shall indicate that the bunting and combustible decorative materials and effects are composed of material meeting the flame propagation performance criteria of Test Method 1 or Test Method 2 of NFPA 701, as applicable. Alternatively, the materials shall be treated with a flame retardant in an *approved* manner and meet the flame propagation performance criteria of the applicable test method of NFPA 701. The <u>affidavit</u> ~~certificate~~ shall indicate compliance with the testing requirements of NFPA 701, Chapter 16. The flame propagation performance criteria shall be effective for the period specified by the permit.

3104.3 Label.
Membrane structures or *tents* shall have a permanently affixed label bearing the following information:

1. The identification of size and fabric or material.
2. The names and addresses of the manufacturers of the *tent* or air-supported structure.
3. A statement that the fabric or material meets the requirements of Section 3104.2.
4. If treated, the date when a flame-retardant treatment was last applied to the fabric or material, the trade name or kind of chemical used in treatment, name of person or firm treating the fabric or material, and name of testing agency and test standard by which the fabric or material was tested.
5. If untreated, a statement that no treatment was applied when the fabric or material met the requirements of Section 3104.2.

3104.4 Affidavit.
The affidavit required by Section 3104.2 shall contain all of the information specified in Section 3104.3.

Reason: Section 3104.4 states that the "affidavit" required in section 3104.2 shall contain certain information. In actual fact, section 3104.2 does not contain the word "affidavit" but the word "certificate" and requires that a certificate provide all the relevant information. Clearly the two words are intended to have the same meaning. Since the requirement for an "affidavit" associated with this testing is also called for in the section on inflatables (in 3106), this proposal simply changes the word "certificate" for the word "affidavit" in section 3104.2. The use of the word "affidavit" in section 3104.4 was originally proposed by the industry using these types of tents for events.

Grammatically, the use of the word "certificate" in the same sentence as the word "certified" is relatively poor use of language: "Before a permit is granted, the owner or agent shall file with the fire code official a **certificate** provided by the product manufacturer to verify that the materials have been tested and **certified** by an approved testing laboratory."

This is not the sole location where the term "affidavit" is used in ICC codes. It is actually also used in the IBC and in the IRC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Simply changes words meaning the same.

F201-24

F202-24

IFC: 3104.2, 3104.4, 3104.3, 3106.3

Proponents: Kevin Scott, KH Scott & Associates LLC, self (khscottassoc@gmail.com)

2024 International Fire Code

3104.2 Flame propagation performance testing and certification.
Before a permit is granted, the *owner* or agent shall file with the *fire code official* a certificate provided by the product manufacturer to verify that the materials have been tested and certified by an *approved* testing laboratory. The certificate shall indicate that the floor coverings, *tents*, *membrane structures* and their appurtenances, which include sidewalls, drops and tarpaulins, are composed of materials meeting the flame propagation performance of Test Method 2 of NFPA 701. Additionally, it shall indicate that the bunting and combustible decorative materials and effects are composed of material meeting the flame propagation performance criteria of Test Method 1 or Test Method 2 of NFPA 701, as applicable. Alternatively, the materials shall be treated with a flame retardant in an *approved* manner and meet the flame propagation performance criteria of the applicable test method of NFPA 701. The certificate shall indicate compliance with the testing requirements of NFPA 701, Chapter 16. The flame propagation performance criteria shall be effective for the period specified by the permit.

Revise as follows:

~~3104.4~~ 3104.2.1 ~~Affidavit~~Certificate.
The ~~affidavit~~certificate required by Section 3104.2 shall contain all of the information specified in Section 3104.3.

3104.3 Label.
Membrane structures ~~or~~and *tents* shall have a permanently affixed label bearing the following information:

Exception: A certificate or documentation from the manufacturer is acceptable for existing membrane structures and tents not provided with a label at the time of manufacturing.

1. The identification of size and fabric or material.
2. The names and addresses of the manufacturers of the *tent* or air-supported structure.
3. A statement that the fabric or material meets the requirements of Section 3104.2.
4. If treated, the date when a flame-retardant treatment was last applied to the fabric or material, the trade name or kind of chemical used in treatment, name of person or firm treating the fabric or material, and name of testing agency and test standard by which the fabric or material was tested.
5. If untreated, a statement that no treatment was applied when the fabric or material met the requirements of Section 3104.2.

3106.3 Combustible materials.
The materials used in the construction of the inflatable amusement device shall meet the flame propagation criteria of Test Method 2 of NFPA 701. ~~Additionally, a~~A label ~~and affidavit~~ containing the information required in ~~Sections~~Section 3104.3 ~~and 3104.4 of this code~~ shall be permanently affixed to the device.

Reason: Sections 3104.4 and 3106.3 refer to an “affidavit”. Section 3104.2 requires an affidavit as specified in Section 3104.2. But, Section 3104.2 does not require an affidavit, nor does it even refer to an affidavit. This proposal is intended to clarify the requirements in these sections.

An affidavit is a "sworn statement made under oath". Affidavit is not the appropriate term for this requirement. The code official is looking for documentation that the item has met specific criteria. Section 3104.2 requires a certificate to be submitted to the fire code official at the time the permit is applied for. Additionally, Section 3104.3 requires a permanent label to be affixed to membrane structure. Therefore, a certificate and label are both required for the membrane structure. The revision will eliminate confusion as to the affidavit which can be construed as a 3rd piece of documentation.

There are existing membrane structures which do not bear a label, however they do have a certificate stating acceptable flammability requirements. For those situations, an exception is added to allow use of these older membrane structures when they can produce a certificate, but don’t have a label.

Section 3104.4 is relocated to Section 3104.2.1. This section is revised to refer to the certificate and state the criteria for the certificate is listed in 3104.3. The certificate and label contain the information needed to determine compliance with flammability requirements.

Section 3104.3 is also revised to clarifies the provisions apply to membrane structures and tents.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal does not add any requirements. It provides an optional method to identify the flame resistance of materials, and clarifies what type of "affidavit" is acceptable.

F202-24

F203-24

IFC: SECTION 202, 3105.3, 3105.4, 3107.4.1, ANSI Chapter 80 (New)

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Richard Nix, Entertainment Services and Technology Association (ESTA), ESTA, and the Event Safety Alliance (ESA) (rnix@zoomtown.com)

2024 International Fire Code

Revise as follows:

TEMPORARY SPECIAL EVENT STRUCTURE. Any temporary ground-supported structure, platform, stage, stage scaffolding or rigging, canopy, tower, ~~upporting audio or visual effects equipment~~ or similar structures supporting entertainment-related equipment or signage for a special event. ~~not regulated within the scope of the *International Building Code*.~~

3105.3 Use period.
Temporary special event structures erected in accordance with ANSI E1.21 shall not be erected for a period of more than 180 days. ~~six consecutive weeks.~~

3105.4 Required documents.
The following documents shall be submitted to the *fire code official* and the building official for review before a permit is *approved*:

1. Construction documents: *Construction documents* shall be prepared by a *registered design professional* in accordance with the *International Building Code* and ANSI E1.21 where applicable. *Construction documents* shall include:
   1.1. A summary sheet showing the building code used, design criteria, loads and support reactions.

   1.2. Detailed construction and installation drawings.

   1.3. Design calculations.

   1.4. Operating limits of the structure explicitly outlined by the *registered design professional* including environmental conditions and physical forces.

   1.5. Effects of additive elements such as video walls, supported scenery, audio equipment, vertical and horizontal coverings.

   1.6. Means for adequate stability including specific requirements for guying and cross-bracing, ground anchors or ballast for different ground conditions.

2. Designation of responsible party: The *owner* of the temporary special event structure shall designate in writing a person to have responsibility for the temporary special event structure on the site. The designated person shall have sufficient knowledge of the *construction documents*, manufacturer's recommendations and operations plan to make judgments regarding the structure's safety and to coordinate with the *fire code official*.
3. Operations management plan: The operations management plan shall comply with the requirements of ANSI E1.21, and shall reflect manufacturer's operational guidelines, procedures for environmental monitoring and actions to be taken under specified conditions consistent with the *construction documents*.

3107.4.1 Public safety plan for gatherings.
A public safety plan shall be prepared where required by Section 403.11.2. The public safety plan shall include the operations management plan required by Section 3105.4 item 3, and a weather preparedness plan in accordance with ANSI ES1.7. The public safety plan shall be submitted to the *fire code official* with the application for an operational permit as required by Section 3107.2.2.

Add new standard(s) as follows:

ANSI

American National Standards Institute
25 West 43rd Street, 4th Floor
New York, NY 10036

ES1.7-2021	Event Safety Requirements - Weather Preparedness 3107.4.1

Staff Analysis: The proposed referenced standard, ***Event Safety Requirements - Weather Preparedness (ANSI ES1.7-2021)***, is currently referenced in the ***IBC***.

Reason:

FCAC:

1. The revised definition harmonizes with the IBC definition.

   [BG]SPECIAL EVENT STRUCTURE. Any ground-supported *structure*, *platform, stage, stage* scaffolding or rigging, *canopy*, tower or similar *structure* supporting entertainment-related equipment or signage.

   [BS]TEMPORARY EVENT.A single use during the *service life* of a *public-occupancy temporary structure* at a given location that includes its installation, inspection, use and occupancy, and dismantling.

   [BS]TEMPORARY STRUCTURE.Any *building* or *structure* erected for a period of 180 days or less to support *temporary events*. *Temporary structures* include a range of *structure* types (*public-occupancy temporary structures*, temporary *special event structures*, *tents*, umbrellas and other membrane *structures*, *relocatable buildings*, temporary *bleachers*, etc.) for a range of purposes (storage, equipment protection, dining, workspace, assembly, etc.).
2. The change in use period is now consistent with both IBC and ANSI E1.21. ANSI E1.21 has been revised to incorporate the new IBC design load requirements, thereby eliminating the 6-week limitation.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the FCAC Website.

Richard Nix:

1. The revised definition harmonizes with the IBC definition.
2. The change in use period is now consistent with both IBC and ANSI E1.21. ANSI E1.21 has been revised to incorporate the new IBC design load requirements, thereby eliminating the 6-week limitation.
3. The change in operational requirements enhances the public safety plan, if required, by including the Operations Management Plan information, and the weather preparedness plan information, providing an approved ANSI standard as a reference for the weather preparedness details.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The definition change is in coordination with the IBC 2024 requirements. The change from '6weeks' to '180 days' will reduce costs. The adoption of ANSI ES1.7 Event Safety - Weather Preparedness may increase costs of compliance but is considered industry practice and is not related to construction costs.

F203-24

F204-24

IFC: 3106.3, ASTM Chapter 80

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Fire Code

Revise as follows:

3106.3 Combustible materials.
The materials used in the construction of the inflatable amusement device shall comply with the requirements of ASTM F2374 ~~meet the flame propagation criteria of Test Method 2 of NFPA 701~~. Additionally, a label and affidavit containing the information required in Sections 3104.3 and 3104.4 of this code shall be permanently affixed to the device.

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428-2959

F2374—22 ~~19~~ Standard Practice for Design, Manufacture, Operation, and Maintenance of Inflatable Amusement Devices

Staff Analysis: A review of the standard proposed for inclusion in the code, ***Standard Practice for Design, Manufacture, Operation, and Maintenance of Inflatable Amusement Devices (ASTM F2374—22 ~~19~~)***, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: The requirements in this section are based on the requirements for fire testing in ASTM F2374 (Standard Practice for Design, Manufacture, Operation, and Maintenance of Inflatable Amusement Devices). When this IFC section was approved, ASTM F2374 required all fabrics in these inflatable devices to comply with the fire test in NFPA 701. Since then, ASTM F2374 has been updated, in 2022, to exclude internal gusset fabrics from being required to be tested to NFPA 701 test method 2. The reason that ASTM F2374 was changed is that the fabrics used for internal gusset are always very lightweight fabrics and they typically cannot comply with the flame propagation requirements of NFPA 701 Test Method 2 (which is much more severe than NFPA 701 Test Method 1). Furthermore, as a consequence, in actual practice several ahjs are just recommending to manufacturers that they should just meet NFPA 705 (which is just a match test) and ignore the actual requirement. NFPA 705 is in no way an appropriate fire test.

The change in fire safety requirements within ASTM E2574 reflects actual practice but is not expected to adversely affect the safety of the inflatable device.In fact, since ASTM F2374 contains the actual requirements for the combustible materials to be used in these inflatable devices, there is no need for the IFC to repeat the requirements in the code.FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the FCAC Website

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0.00

Estimated Immediate Cost Impact Justification (methodology and variables):

This change has the potential to decrease the cost of compliance and is not related to construction. The revised standard allows some (lightweight fabric) materials to be tested to a less severe fire test (NFPA 701 test method 1 instead of test method 2) for compliance. Generally these are the fabrics that are in use now so the cost savings is probably minimal.

F204-24

F205-24

IFC: 3203.9, 3203.9.1, 3203.9.2, FIGURE 3203.9(1), SECTION 202 (New)

Proponents: Kevin Scott, KH Scott & Associates LLC, self (khscottassoc@gmail.com)

2024 International Fire Code

Revise as follows:

3203.9 ~~Limited quantities of~~ Commodities containing Group A plastics ~~in mixed commodities~~.

~~Figures 3203.9(1) and 3203.9(2) shall be used to determine the commodity classification based on the quantity of Group A plastics in the following situations:~~

1. ~~The product is not listed in Table 3203.8 and contains Group A plastics.~~
2. ~~The commodity contains Group A plastics and is not classified as high hazard in Table 3203.8.~~
3. ~~The product listing in Table 3203.8 does not specifically include packaging, and the packaging material includes Group A plastics.~~

Commodities containing any amount of Group A plastics shall be classified as a Group A plastic commodity, unless either of the following apply:

1. The product is listed in Table 3203.8 and the listing specifically includes Group A plastics or packaging material of Group A plastics.
2. The commodity is evaluated in accordance with Section 3203.9.1 based on the amount of Group A plastics contained in the commodity and the result is other than Group A plastics.

3203.9.1 Classifying mixed commodities with limited Group A plastics.

The percentage of Group A plastics determined in accordance with Section 3203.9.2 shall be used in Figures 3203.9(1) and 3203.9(2). ~~Results from Figure 3203.9(1) must be compared to results from Figure 3203.9(2) and the commodity will be classified with the highest commodity classification.~~ Commodities with products in cartons, boxes or crates shall use Figure 3203.9(1). Commodities with exposed Group A plastics shall use Figure 3203.9(1).

Figures 3203.9(1) and 3203.9(2) shall not be used to reduce the commodity classification shown in Table 3203.8.

3203.9.2 Percentage of Group A plastics.

The pallet, if any, shall not be included when measuring the weight of the commodity (W_{PU} ~~or W_{PE}~~) or the volume of the commodity (V_{PE}). The pallet, if any, shall be included when measuring the weight of the entire load (W_L) or the volume of the entire load (V_L).

Exception: Where noncombustible pallets are used, the pallets shall not be included in the volume and weight calculations.

The percentage by weight of Group A unexpanded plastics in the load shall be calculated in accordance with Equation 32-1.

The percentage by volume of Group A expanded plastics in the load shall be calculated in accordance with Equation 32-2.

~~The percentage by weight of Group A expanded plastics in the load shall be calculated in accordance with Equation 32-3.~~

$$P_{WU} = W_{PU} / W_L \qquad \textbf{(Equation-32-1)}$$

where:

P_{WU} = Percentage by weight of Group A unexpanded plastic.

W_{PU} = Weight of Group A unexpanded plastic in the commodity, not including the weight of the pallet, if any.

W_L = Weight of the entire load, including the weight of the pallet, if any.

$$P_{VE} = V_{PE} / V_L \qquad \textbf{(Equation-32-1)}$$

where:

P_{VE} = Percentage by volume of Group A expanded plastic.

V_{PE} = Volume of Group A expanded plastic in the commodity, not including the volume of the pallet, if any.

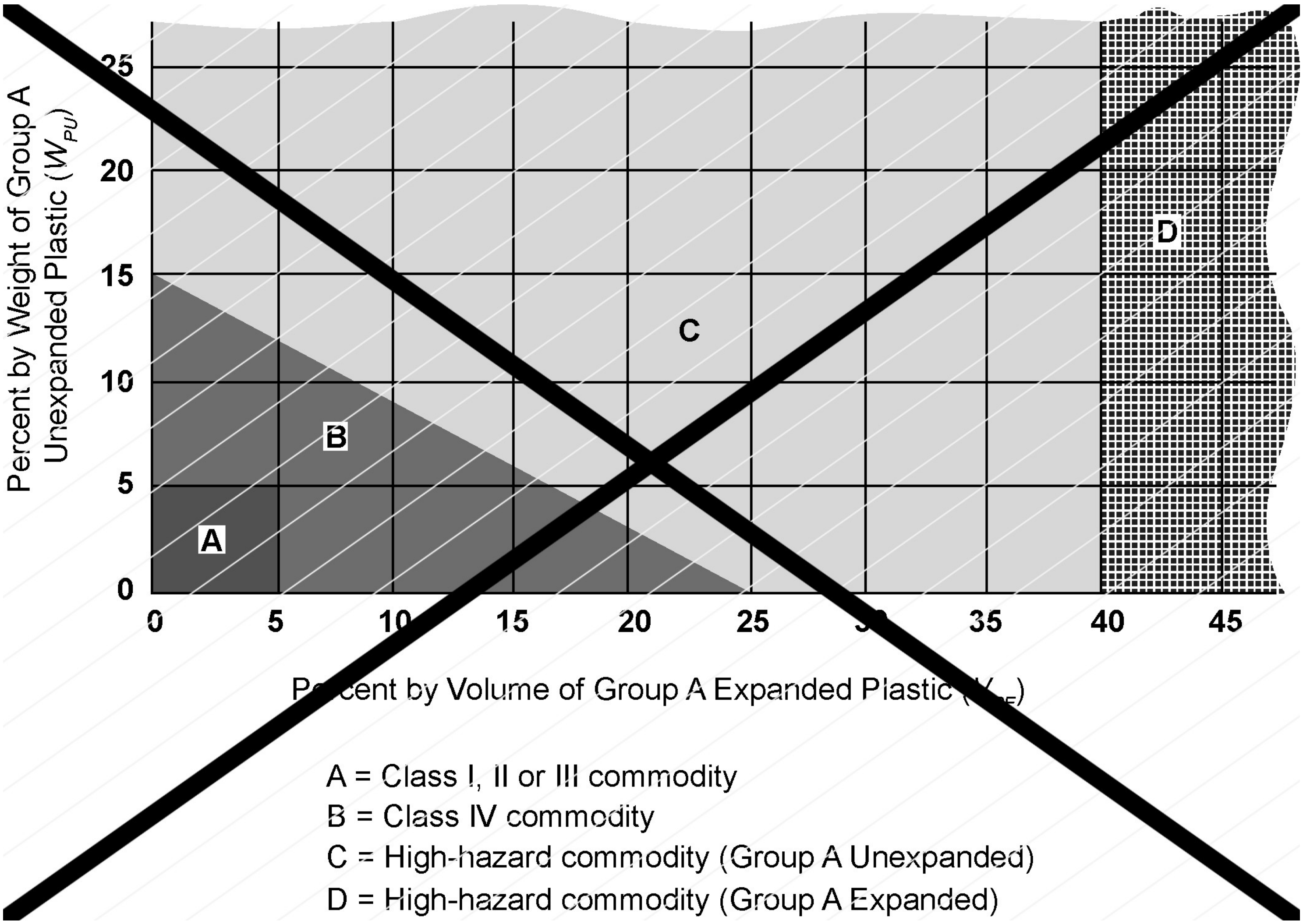
V_L = Volume of the entire load, including the volume of the pallet, if any.

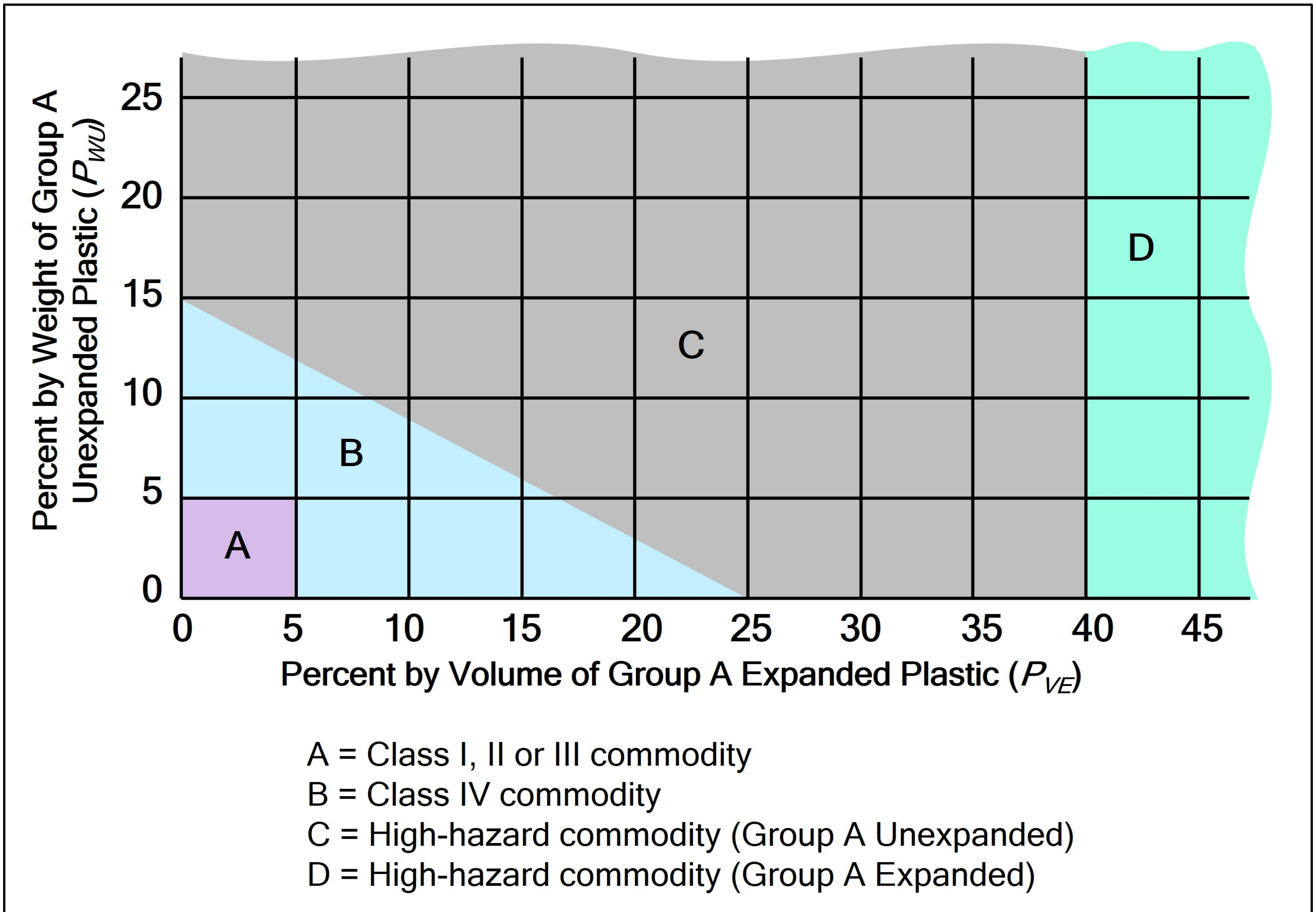
~~$P_{WE} = W_{PE} / W_L$~~ **~~(Equation 32-3)~~**~~where:~~

~~P_{WE} = Percentage by weight of Group A expanded plastic.~~

~~W_{PE} = Weight of Group A expanded plastic in the commodity, not including the weight of the pallet, if any.~~

~~W_L = Weight of the entire load, including the weight of the pallet, if any.~~





a. This figure is used to determine the commodity classification of a mixed commodity with Group A plastics in a package or crate.

b. The following is an example of how to apply Figure 3203.9(1): A pallet load consists of a Class III commodity in cardboard boxes with components of unexpanded Group A plastic and packing material of expanded Group A plastic. Using Equation 32-1, the weight of unexpanded Group A plastic is 5 percent. Using Equation 32-2, the volume of expanded Group A plastic is 15 percent. This commodity is classified as a Class IV commodity. If the volume of the expanded Group A plastic is increased to 20 percent, the classification changes to a high-hazard (Group A unexpanded) commodity. Where the load is stored on a plastic pallet, the requirements in Section 3203.10 also apply.

FIGURE 3203.9(1) EVALUATION OF CARTONED COMMODITIES CONTAINING GROUP A PLASTICS[a, b]

Add new definition as follows:

EXPOSED GROUP A PLASTIC. Commodities containing any amount of Group A plastics that are not within packaging, cartons or coverings that can absorb water to affect the burning hazard of the commodity. Encapsulated loads containing Group A plastic shall be considered exposed Group A plastic. Products containing Group A plastic with a single-thickness paper wrapping shall be considered exposed Group A plastic.

Reason: This proposal clarifies the method for determining whether limited quantities of Group A plastics affect the classification of the commodity.

Section 2303.9 is revised with no technical change. The section is revised to say that commodities containing Group A plastics shall be classified as Group A plastics. This provision has two options: 1) the listing in Table 3203.8 includes a description of the commodity and includes the Group A plastics, and 2) the subsequent figures are used to evaluate the quantity of Group A plastics and determine the impact provided by those limited quantities.

Figures 3203.9(1) and (2) were revised in the 2021 IFC to alter their use. However, some of the code text needing revision to correlate was missed. This proposal correlates the text with the figures.

Figure 3203.9(1) is revised. The only changes are the parenthetic acronyms for Percentage by Weight of Expanded plastic (PWE) and Percentage by Volume of Unexpanded plastic (PVU). This is done to correlate with the terms in Equations 32-1 and 32-2.

Only one figure is required to complete the calculation of the impact of Group A plastic. Figure 3203.9(1) is used for classifying commodities which are cartoned, boxed, or crated. Figure 3203.9(2) is used for classifying commodities which are exposed. To facilitate this difference, a new definition is added for exposed Group A plastics. This definition is consistent with the definition in NFPA 13.

Both figures compare the weight of unexpanded plastic (Y axis) to the volume of expanded plastic (X axis). The weight of expanded plastics is no longer used in the figures. Equation 32-3 was used to determine the weight of expanded plastics and is no longer needed, so Equation 32-3 is deleted.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposal correlates the requirements and terms in these sections and adds a definition to assist in their application. It also corrects an editorial error in the 2024 IFC.

F205-24

F206-24

IFC: 3203.9.2

Proponents: Kevin Scott, KH Scott & Associates LLC, self (khscottassoc@gmail.com)

2024 International Fire Code

Revise as follows:

3203.9.2 Percentage of Group A plastics.
The pallet, if any, shall not be included when measuring the weight of the commodity (W_{PU} or W_{PE}) or the volume of the commodity (V_{PE}). The pallet, if any, shall not be included when measuring the weight of the entire load (W_L) or the volume of the entire load (V_L).

~~**Exception:** Where noncombustible pallets are used, the pallets shall not be included in the volume and weight calculations.~~

The percentage by weight of Group A unexpanded plastics in the load shall be calculated in accordance with Equation 32-1.
The percentage by volume of Group A expanded plastics in the load shall be calculated in accordance with Equation 32-2.
The percentage by weight of Group A expanded plastics in the load shall be calculated in accordance with Equation 32-3.

$$P_{WU} = W_{PU} / W_L \qquad \textbf{(Equation-32-1)}$$

where:

P_{WU} = Percentage by weight of Group A unexpanded plastic.

W_{PU} = Weight of Group A unexpanded plastic in the commodity, not including the weight of the pallet, if any.

W_L = Weight of the entire load, not including the weight of the pallet, if any.

$$P_{VE} = V_{PE} / V_L \qquad \textbf{(Equation 32-2)}$$

where:

P_{VE} = Percentage by volume of Group A expanded plastic.

V_{PE} = Volume of Group A expanded plastic in the commodity, not including the volume of the pallet, if any.

V_L = Volume of the entire load, not including the volume of the pallet, if any.

$$P_{WE} = W_{PE} / W_L \qquad \textbf{(Equation 32-3)}$$

where:

P_{WE} = Percentage by weight of Group A expanded plastic.

W_{PE} = Weight of Group A expanded plastic in the commodity, not including the weight of the pallet, if any.

W_L = Weight of the entire load, not including the weight of the pallet, if any.

Reason: This proposal removes the pallet from the calculation of the volume and weight when determining the percentages of Group A plastics. The pallet should not be included in these calculations, because a separate section addresses the pallet, if pallets are utilized.

When calculating the percentage of Group A plastics, the commodity only is to be addressed. The commodity includes the products and the packaging components. Once the commodity is classified, that classification is applicable whether a wooden pallet is used or not. For example, consider a Class IV commodity consisting of boxes stacked to 15' high. The commodity is still considered Class IV when wooden pallets are added in the storage configuration. This is evidenced in the descriptions of the commodity classifications which state "…with or without wood pallets."

Therefore, when calculating the impact of Group A materials within the commodity, the pallet is not included. The sections have been revised to state that the pallet is not included.

However, if plastic pallets are utilized, then Section 3203.10 applies which deals with plastic pallets. Even if the pallets are of a Group A plastic material, they are not included in the commodity classification. Once the commodity classification is determined, Section 3203.10 will be used to determine if the plastic pallets further modify the commodity classification.

Cost Impact: Increase

Estimated Immediate Cost Impact:

$0.00 or more depending on the increase in water flow required per square foot if the commodity changes to a higher commodity classification. It is possible that the water flow required per square foot could increase 10% or more. This will only result in an increase in cost if the water system or piping distribution system cannot accommodate the increased flows.

Estimated Immediate Cost Impact Justification (methodology and variables):

This proposal could result in a slight cost increase because the percentage of Group A plastics by weight and by volume will change. Based on the number of variables involved in the final design it is not feasible to provide a reasonable estimate of the possible increase.

F206-24

F207-24

IFC: TABLE 3206.2

Proponents: John Swanson, National Fire Sprinkler Association, NFSA (swanson@nfsa.org); Jeffrey M Hugo, CBO, NFSA, National Fire Sprinkler Association (hugo@nfsa.org)

2024 International Fire Code

Revise as follows:

TABLE 3206.2 GENERAL FIRE PROTECTION AND LIFE SAFETY REQUIREMENTS

COMMODITY CLASS	SIZE OF HIGH-PILED STORAGE AREA[a] (square feet) (see Sections 3206.2 and 3206.3)	ALL STORAGE AREAS (see Sections 3206, 3207 and 3208)[b]				SOLID-PILED STORAGE, SHELF STORAGE AND PALLETIZED STORAGE (see Section 3207.3)		
		Automatic sprinkler system ~~fire-extinguishing system (see Section 3206.4)~~	Fire detection system (see Section 3206.5)	Fire department access doors (see Section 3206.7)	Smoke and heat removal (see Section 3206.8)	Maximum pile dimension[c] (feet)	Maximum permissible storage height[d] (feet)	Maximum pile volume (cubic feet)
I–IV	0–500	Not Required[a]	Not Required	Not Required	Not Required	Not Required	Not Required	Not Required
	501–2,500	Not Required[a]	Yes[g]	Not Required	Not Required	120	40	100,000
	2,501–12,000 Open to the public	Yes	Not Required	Not Required	Not Required	120	40	400,000
	2,501–12,000 Not open to the public (Option 1)	Yes	Not Required	Not Required	Not Required	120	40	400,000
	2,501–12,000 Not open to the public (Option 2)	Not Required[a]	Yes	Yes	Yes[h, i]	120	30[e]	200,000
	12,001–500,000	Yes	Not Required	Yes	Yes[h, i]	120	40	400,000
	Greater than 500,000[f]	Yes	Not Required	Yes	Yes[h, i]	120	40	400,000
High hazard	0–500	Not Required[a]	Not Required	Not Required	Not Required	60	Not Required	Not Required
	501–2,500 Open to the public	Yes	Not Required	Not Required	Not Required	60	30	75,000
	501–2,500 Not open to the public (Option 1)	Yes	Not Required	Not Required	Not Required	60	30	75,000
	501–2,500 Not open to the public (Option 2)	Not Required[a]	Yes[g]	Yes	Yes[h, i]	60	20	50,000
	2,501–300,000	Yes	Not Required	Yes	Yes[h, i]	60	30	75,000
	Greater than 300,000[f]	Yes	Not Required	Yes	Yes[h, i]	60	30	75,000

For SI: 1 foot = 304.8 mm, 1 cubic foot = 0.02832 m^3, 1 square foot = 0.0929 m^2.

a. Where automatic sprinklers are required for reasons other than those in Chapter 32, the portion of the sprinkler system protecting the high-piled storage area shall be designed and installed in accordance with Sections 3207 and 3208.

b. For aisles, see Section 3206.10.

c. Piles shall be separated by aisles complying with Section 3206.10.

d. For storage in excess of the height indicated, special fire protection shall be provided in accordance with Note f where required by the fire code official. See Chapters 51 and 57 for special limitations for aerosols and flammable and combustible liquids, respectively.

e. For storage exceeding 30 feet in height, Option 1 shall be used.

f. Special fire protection provisions including, but not limited to, fire protection of exposed steel columns; increased sprinkler density; additional in-rack sprinklers, without associated reductions in ceiling sprinkler density; or fire department hose connections shall be provided where required by the fire code official.

g. Not required where an automatic fire-extinguishing system is designed and installed to protect the high-piled storage area in accordance with Sections 3207 and 3208.

h. Not required where storage areas are protected by either early suppression fast response (ESFR) sprinkler systems or control mode special application sprinklers with a response time index of 50 (meters-seconds)$^{1/2}$ or less that are listed to control a fire in the stored commodities with 12 or fewer sprinklers, installed in accordance with NFPA 13.

i. Not required in frozen food warehouses used solely for storage of Class I and II commodities where protected by an *approved* automatic sprinkler system.

Reason: Over the past several code cycles NFSA has worked to correlate the terminology used for automatic sprinkler system in the International codes. Previously, the codes used terms such as "automatic extinguishing system", "automatic sprinkler system", "fire suppression system", and "fire sprinklers" when referring to fire sprinklers. This change is trying to correlate the terminology since the codes define "automatic sprinkler system".

Bibliography: John Swanson, National Fire Sprinkler Association

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

No cost impact. Change is made for correlation purposes when the code requires an "automatic sprinkler system" to be installed so the same terminology is being used.

F207-24

F208-24

IFC: 3206.4

Proponents: John Swanson, National Fire Sprinkler Association, NFSA (swanson@nfsa.org); Jeffrey M Hugo, CBO, NFSA, National Fire Sprinkler Association (hugo@nfsa.org)

2024 International Fire Code

Revise as follows:

3206.4 Automatic sprinkler~~s~~ system.
Automatic sprinkler systems shall be provided in accordance with Sections 3207, 3208 and 3209.

Reason: Over the past several code cycles NFSA has worked to correlate the terminology used for automatic sprinkler system in the International codes. Previously, the codes used terms such as "automatic extinguishing system", "automatic sprinkler system", "fire suppression system", and "fire sprinklers" when referring to fire sprinklers. This change is trying to correlate the terminology since the codes define "automatic sprinkler system".

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

There is no cost impact to this change. Change is intended to bring correlation and consistency to the IFC when referring to automatic sprinkler systems and when they are required.

F208-24

F209-24

IFC: 3206.7, 3206.7.1, 3206.7.2, 3206.7.3, 3206.7.4, 3206.7.5, 3206.7.6, 3206.7.7, 3206.7.8

Proponents: Kevin Scott, KH Scott & Associates LLC, self (khscottassoc@gmail.com)

2024 International Fire Code

Revise as follows:

3206.7 Fire department access doors.
Where fire department access doors are required by Table 3206.2, fire department access doors shall be provided in accordance Sections 3206.7.1 through ~~3206.7.8~~3206.7.7.

Delete without substitution:

~~**3206.7.1 Exterior walls without fire department access doors**~~.
~~Fire department access doors are not required in an *exterior wall* that does not face a fire apparatus access road provided that all of the following conditions occur:~~

1. ~~The opposite *exterior wall* faces a fire apparatus access road.~~
2. ~~The opposite *exterior wall* is provided with fire department access doors.~~
3. ~~The entire interior surface of the *exterior wall* is less than 150 feet (45 720 mm) away from a fire department access door.~~
4. ~~The building is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1.~~

Revise as follows:

~~**3206.7.2**~~ **3206.7.1 Where located.** Where *exterior walls* surrounding *high-piled storage areas* face fire apparatus access roads, such walls shall be provided with fire department access doors.

Exception: Fire department access doors are not required in an exterior wall provided that all of the following conditions occur:

1. The opposite exterior wall faces a fire apparatus access road.
2. The opposite exterior wall is provided with fire department access doors.
3. The entire interior surface of the exterior wall is less than 150 feet (45 720 mm) away from a fire department access door in the opposite wall.
4. The building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

~~**3206.7.3**~~**3206.7.2 Access to doors.** Fire department access doors shall be able to be accessed without the use of a ladder.

~~**3206.7.4**~~**3206.7.3 Marking on fire department access doors.** Fire department access doors shall be labeled on the exterior side with the following sign or other *approved* sign:

FIRE DEPARTMENT ACCESS DOOR
DO NOT BLOCK

The lettering shall be in a contrasting color to the background. Letters shall have a minimum height of 2 inches (51 mm) with a minimum stroke of $^{3}/_{8}$ inch (10 mm).

~~**3206.7.5**~~**3206.7.4 Number of doors required.** The required fire department access doors shall be distributed such that the lineal distance between adjacent fire department access doors does not exceed 125 feet (38 100 mm) measured center to center.

Exception: The linear distance between adjacent access doors shall not exceed 200 feet (60 960 mm) in existing buildings where change in occupancy is not proposed.

~~**3206.7.6**~~**<u>3206.7.5</u> Door size and type.** Fire department access doors shall be not less than 3 feet (914 mm) in width and 6 feet 8 inches (2032 mm) in height. Roll-up doors shall not be considered fire department access doors unless *approved*.

~~**3206.7.7**~~**<u>3206.7.6</u> Locking devices.** Locking devices on fire department access doors shall be *approved*.

~~**3206.7.8**~~**<u>3206.7.</u> Key box.**
Where fire department access doors are required, a key box shall be installed in accordance with Section 506.1. The key box shall contain keys or devices to allow for entry through the fire department access doors.

Reason: This code change accomplishes two things: 1) reorders the requirements for fire department access doors, and 2) clarifies where FD access can be eliminated.

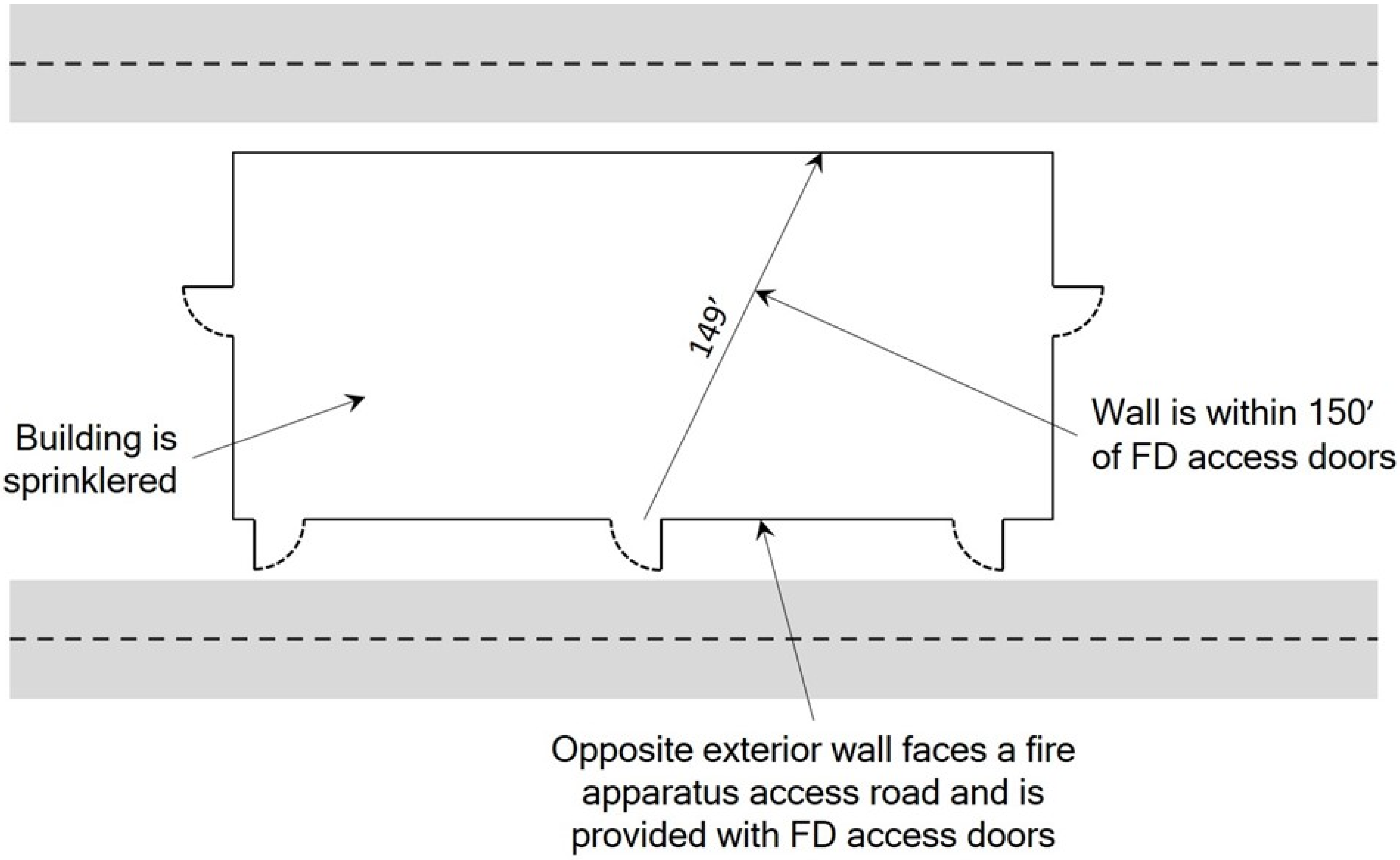
These sections are reordered to place the requirement to provide FD access doors as the initial provision in Section 3206.7.1. Then Section 3206.7.2 becomes an exception for where FD access doors are not required.

The current language in these two sections is confusing. It states that exterior walls facing a fire apparatus access road must have FD access doors. In other words, if the exterior wall does not face a fire apparatus access road, the FD access doors are not required. But the current requirements in Section 3206.7.1 of the 2024 IFC state that walls that don't face a fire apparatus road can only eliminate doors if the four criteria are met. These two sections contradict each other. The proposal specifies where the FD access doors are required, and where they can be eliminated.

With this proposal, Section 3206.7.1 states that all exterior walls surrounding high-piled storage areas must be provided with FD access doors. The exception indicates where FD access doors are not required.

As a result, the provisions as a whole will be applied as follows:
1. Section 3206.7.1 – exterior wall facing a fire apparatus access road shall be provided with FD access doors.
2. Exception – even where the exterior wall faces a fire apparatus access road, FD access doors are not required if the building is narrow and the four criteria are met.

The criteria specify that a wall does not need FD access doors if the opposite wall is provided with FD access doors and that wall faces a fire apparatus access road. Additionally, all portions of the wall without FD access doors must be within 150' of a fire department access door located in the opposite wall, and the building must be sprinklered. See graphic.



Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is a section reordering to place the requirement to provide FD access doors as the initial provision in Section 3206.7.1.

F209-24

F210-24

IFC: 3303.1.1, 3303.5, 3303.5.1, 3303.5.2, 3303.5.2.1, 3303.5.2.2, 3303.5.2.3, 3303.5.3, 3303.5.4; IBC: 3302.1.1; IEBC: [F] 1502.1.1

Proponents: Steven Orlowski, Sundowne Building Code Consultants, LLC, Self (sorlowski@sbcc.codes)

2024 International Fire Code

Revise as follows:

3303.1.1 Components of site safety plans.
Site safety plans shall include the following as applicable:

1. Name and contact information of site safety director.
2. Documentation of the training of the site safety director and fire watch personnel.
3. Procedures for reporting emergencies.
4. Fire department vehicle access routes.
5. Location of fire protection equipment, including portable fire extinguishers, standpipes, fire department connections and fire hydrants.
6. Smoking and cooking policies, designated areas to be used where *approved*, and signage locations in accordance with Section 3305.7.
7. Location and safety considerations for temporary heating equipment.
8. Hot work permit plan.
9. Plans for control of combustible waste material.
10. Locations and methods for storage and use of *flammable* and *combustible liquids* and other hazardous materials.
11. Provisions for site security ~~and where required, for a fire watch~~.
12. Changes that affect this plan.
13. Other site-specific information required by the *fire code official*.
14. Provision for a fire watch, where required.

3303.5 Fire watch.
Where required by the *fire code official* or the *site safety plan* established in accordance withSection 3303.1, a fire watch shall be provided for building construction, alteration, or demolition and in accordance with Section 3303.6 ~~for building construction~~.

3303.5.1 Fire watch during construction. A fire watch shall be provided during nonworking hours for ~~new construction~~ that exceeds 40 feet (12 192 mm) in height above the lowest adjacent grade at any point along the building perimeter, for new multistory construction with an aggregate area exceeding 50,000 square feet (4645 m^2) per story or as required by the *fire code official.*

~~**3303.5.2**~~ 3303.6 **Fire watch personnel.** Fire watch personnel shall be ~~provided~~ in accordance with this section.

~~**3303.5.2.1**~~3303.6.1 **Duties.** ~~The primary duty~~ Duties of the fire watch personnel shall be to perform constant patrols, ~~and~~ watch for the occurrence of fire, attempt to control an an incipient stage fire and report the fire in accordance with the site safety plan. The combination of fire watch duties and site security duties shall be permissible. ~~is acceptable.~~

~~**3303.5.2.2**~~ 3303.6.2 **Training.**
Personnel shall be trained to serve as a~~n on-site~~ fire watch. Training shall include the appropriate type and use of portable fire extinguishers. ~~Fire extinguishers and fire reporting shall be in accordance with Section 3303.6.~~

~~**3303.5.2.3**~~**3303.6.3** **Means of notification.** Fire watch personnel shall be provided with not fewer than one *approved* means for notifying the fire department.

~~**3303.5.3**~~ **3303.6.4** **Fire watch location** ~~**and records**~~**.**
The fire watch shall include areas specified by the *site safety plan* established in accordance with Section 3303.

~~**3303.5.4**~~**3303.6.5** **Fire watch records.** Fire watch personnel shall keep a record of all time periods of duty, including the log entry for each time the site was patrolled and each time a structure was entered and inspected. Records shall be made available for review by the *fire code official* upon request.

2024 International Building Code

Revise as follows:

3302.1.1 Components of site safety plans.
Site safety plans shall include the following, as applicable:

1. Name and contact information of site safety director.
2. Documentation of the training of the site safety director and fire watch personnel.
3. Procedures for reporting emergencies.
4. Fire department vehicle access routes.
5. Location of fire protection equipment, including portable fire extinguishers, *standpipes*, fire department connections and fire hydrants.
6. Smoking and cooking policies, designated areas to be used where *approved*, and signage locations in accordance with the *International Fire Code.*
7. Location and safety considerations for temporary heating equipment.
8. Hot-work permit plan.
9. Plans for control of combustible waste material.
10. Locations and methods for storage and use of *flammable* and *combustible liquids* and other *hazardous materials*.
11. Provisions for site security ~~and, where required, for a fire watch.~~
12. Changes that affect this plan.
13. Other site-specific information required by the *International Fire Code* .
14. Provision for a fire watch, where required.

2024 International Existing Building Code

Revise as follows:

[F] 1502.1.1 Components of site safety plans.
Site safety plans shall include the following as applicable:

1. Name and contact information of site safety director.
2. Documentation of the training of the site safety director and fire watch personnel.
3. Procedures for reporting emergencies.
4. Fire department vehicle access routes.
5. Location of fire protection equipment, including portable fire extinguishers, standpipes, fire department connections and fire hydrants.

6. Smoking and cooking policies, designated areas to be used where approved and signage locations in accordance with the International Fire Code.
7. Location and safety considerations for temporary heating equipment.
8. Hot work permit plan.
9. Plans for control of combustible waste material.
10. Locations and methods for storage and use of flammable and combustible liquids and other hazardous materials.
11. Provisions for site security ~~and, where required, for a fire watch~~.
12. Changes that affect this plan.
13. Other site-specific information required by the International Fire Code.
14. Provision for a fire watch, where required.

Reason: The intent of this proposal is to provide additional information and clarification for the duties of the fire watch, when it is required by the AHJ or the site safety plan. Currently, the fire watch is listed as a subset of the site security under the site safety plan list of components, which to some didn't seem like an appropriate place for it to be listed. It is important to note, that while the term alterations is being added to section 3303.5, the entire chapter already applies to alterations so there is no substantive changes being made in this proposal. The remaining editorial changes to section 3303.5 through 3303.6.5 are to coordinate with other changes that are being proposed to Chapter 33 of both the International Building Code and the International Fire Code and to clarify the duties and responsibilities of the fire watch personnel.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

As stated in the reason statement, the changes in this proposal are editorial in nature.

F210-24

F211-24

IFC: 3303.1.1, 3307.2; IBC: [A] 112.2, 3302.1.1, [F] 3313.1; IEBC: [F] 1502.1.1, [F] 1512.1

Proponents: Jeffrey M Hugo, CBO, NFSA, National Fire Sprinkler Association (hugo@nfsa.org)

2024 International Fire Code

Revise as follows:

3303.1.1 Components of site safety plans.
Site safety plans shall include the following as applicable:

1. Name and contact information of site safety director.
2. Documentation of the training of the site safety director and fire watch personnel.
3. Procedures for reporting emergencies.
4. Fire department vehicle access routes.
5. Location of fire protection equipment, including portable fire extinguishers, standpipes, fire department connections and fire hydrants.
6. Smoking and cooking policies, designated areas to be used where *approved*, and signage locations in accordance with Section 3305.7.
7. Location and safety considerations for temporary <u>provisions, including</u> heating equipment <u>and utility connections</u>.
8. Hot work permit plan.
9. Plans for control of combustible waste material.
10. Locations and methods for storage and use of *flammable* and *combustible liquids* and other hazardous materials.
11. Provisions for site security and where required, for a fire watch.
12. Changes that affect this plan.
13. Other site-specific information required by the *fire code official*.

3307.2 Water supply for fire protection.
A~~n *approved*~~ water supply for fire protection<u>, *approved* by the fire code official,</u> either temporary or permanent, shall be made available as soon as combustible building materials arrive on the site, on commencement of vertical combustible construction and on installation of a standpipe system in buildings under construction, in accordance with Sections 3307.2.1through 3307.4.

Exception: The *fire code official* is authorized to reduce the fire-flow requirements for isolated buildings or a group of buildings in rural areas or small communities where the development of full fire-flow requirements is impractical.

2024 International Building Code

Revise as follows:

[A] 112.2 Temporary connection.
The *building official* shall have the authority to authorize the temporary connection of the building or system to the utility, the source of energy, fuel, or power, or the water system or sewer system for the purpose of testing systems or for use under a temporary approval. <u>Temporary connections for construction shall be indicated on the site safety plan in Section 3302.1.</u>

3302.1.1 Components of site safety plans.
Site safety plans shall include the following, as applicable:

1. Name and contact information of site safety director.

2. Documentation of the training of the site safety director and fire watch personnel.
3. Procedures for reporting emergencies.
4. Fire department vehicle access routes.
5. Location of fire protection equipment, including portable fire extinguishers, *standpipes*, fire department connections and fire hydrants.
6. Smoking and cooking policies, designated areas to be used where *approved*, and signage locations in accordance with the *International Fire Code.*
7. Location and safety considerations for temporary provisions, including heating equipment and utility connections.
8. Hot-work permit plan.
9. Plans for control of combustible waste material.
10. Locations and methods for storage and use of *flammable* and *combustible liquids* and other *hazardous materials*.
11. Provisions for site security and, where required, for a fire watch.
12. Changes that affect this plan.
13. Other site-specific information required by the *International Fire Code* .

[F] 3313.1 Where required.
A~~n *approved*~~ water supply for fire protection, approved by the fire code official, either temporary or permanent, shall be made available as soon as combustible *building* materials arrive on the site, on commencement of vertical combustible construction, and on installation of a *standpipe system* in *buildings* under construction, in accordance with Sections 3313.2 through 3313.5.

Exception: The *fire code official* is authorized to reduce the fire-flow requirements for isolated *buildings* or a group of *buildings* in rural areas or small communities where the development of full fire-flow requirements is impractical.

2024 International Existing Building Code

[F] 1502.1.1 Components of site safety plans.
Site safety plans shall include the following as applicable:

1. Name and contact information of site safety director.
2. Documentation of the training of the site safety director and fire watch personnel.
3. Procedures for reporting emergencies.
4. Fire department vehicle access routes.
5. Location of fire protection equipment, including portable fire extinguishers, standpipes, fire department connections and fire hydrants.
6. Smoking and cooking policies, designated areas to be used where approved and signage locations in accordance with the International Fire Code.
7. Location and safety considerations for temporary heating equipment.
8. Hot work permit plan.
9. Plans for control of combustible waste material.
10. Locations and methods for storage and use of flammable and combustible liquids and other hazardous materials.
11. Provisions for site security and, where required, for a fire watch.
12. Changes that affect this plan.
13. Other site-specific information required by the International Fire Code.

Revise as follows:

[F] 1512.1 When required.
A~~n approved~~ water supply for fire protection approved by the fire code official, either temporary or permanent, shall be made available as soon as combustible building material arrives on the site, on commencement of vertical combustible construction, and on installation of a standpipe system in buildings under construction, in accordance with Sections 1512.1 through 1512.5.

Exception: The fire code official is authorized to reduce the fire-flow requirements for isolated buildings or a group of buildings in rural areas or small communities where the development of full fire-flow requirements is impractical.

Reason: Currently there is no link for the service utility connections and the safeguards during construction in the IBC, IFC, and IEBC. This proposal adds the temporary utility connections to the site safety plan in IBC 3302.1.1, IFC, 3303.1.1, and IEBC 1502.1.1. These sections should address any temporary connections and locations on site. In the proposed change to IBC Section 3313.1, IFC Section 3307.2 and IEBC 1512.1, the fire code official is specifically addressed because of their authority, during construction, to approve either temporary or permanent water supplies for temporary or permanent fire protection systems.

The other portion of this gang of proposals will be in Group B under the Admin Committee. This committee will address the proposed changes to IBC, Section 112.2. The proposed language for the IBC, Group B is:

[A] 112.2 Temporary connection. The building official shall have the authority to authorize the temporary connection of the building or system to the utility, the source of energy, fuel, or power, or the water system or sewer system for the purpose of testing systems or for use under a temporary approval.
Temporary connections for construction shall be indicated on the site safety plan in Section 3302.1.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Utilities, such as the water supply is part of the construction process. The code already allows for temporary means, or the installation of the permanent utility connection.

F211-24

F212-24

IFC: 3303.6 (New), 3303.6

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Fire Code

Add new text as follows:

3303.6 Fire department emergency contact information.. The fire department emergency telephone number and construction site address shall be posted at the main entrance to the site, in guard shacks, in the construction site office and adjacent to an emergency telephone, where provided in accordance with Section 3303.6.1.

Revise as follows:

~~**3303.6**~~ **3303.6.1 Emergency telephone.** Emergency telephone facilities with *ready access* shall be provided in an *approved* location ~~at the construction site,~~ or an *approved* equivalent means of communication shall be provided. ~~The street address of the construction site and the emergency telephone number of the fire department shall be posted adjacent to the telephone. Alternatively, where an equivalent means of communication has been *approved*, the site address and fire department emergency telephone number shall be posted at the main entrance to the site, in guard shacks and in the construction site office.~~

Reason: The existing paragraph has been revised to focus primarily on the need the fire department emergency contact information to be posted in key areas of the job site. In its current form of the 2024 IFC, the information is located in a section focusing on the emergency telephone and is not as prevalent as it should be for the user. The task group believes that the emergency contact information should be listed separately and that the emergency telephone requirements is a subset of the emergency contact information.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

As stated in the reason statement, this is an editorial change moving existing language from one section into its own section and renumbering the remaining existing content. No new requirements have been added to the code.

F212-24

F213-24

IFC: 3304.1.3

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Fire Code

Revise as follows:

~~3304.1.3~~3304.1.2.1 ~~Rubbish~~Combustible waste material containers.
Where provided rubbish containers with a capacity exceeding 5.33 cubic feet (40 gallons) (0.15 m^3) ~~are~~ used during work shift for temporary storage of combustible debris, rubbish and waste material~~, they~~ shall have tight-fitting or self-closing lids. Such rubbish containers shall be constructed entirely of materials that comply with either of the following:

1. Noncombustible materials.
2. Materials that meet a peak rate of heat release not exceeding 300 kW/m^2 when tested in accordance with ASTM E1354 at an incident heat flux of 50 kW/m^2 in the horizontal orientation.

Reason: The proposal was developed to clarify that the containers referenced in this section are those containers that are used by construction workers that are emptied throughout the day and at the end of every shift. The requirement in this section are not intended to apply to the combustible waster container outside of the building and this added language clarifies that the section applies to the temporary containers used inside the building during work hours. The other editorial change made was to renumber section and revise the title, to continue to use the terms combustible waster material as mentioned in the preceding sections.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

There are no anticipated additional costs associated with this change as it is editorial only. This simply clarifies which containers are to be used and is only applicable for combustible debris, rubbish and waste materials that are required to be removed after each work shift.

F213-24

F214-24

IFC: 3305.1, 3305.5, 3305.10.2

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Fire Code

Revise as follows:

3305.1 Listed. Temporary heating devices shall be *listed* and *labeled* for the intended use. ~~The installation, maintenance and use of temporary~~ Temporary heating devices shall be installed, used and maintained in accordance with the listing and the manufacturer's instructions.

3305.5 ~~Cutting and welding~~ Welding and other hot work.
Welding, cutting, open torches and other hot work operations and equipment shall comply with Chapter 35.

3305.10.2 Fire extinguishers for roofing operations.
Fire extinguishers shall comply with Section 906. There shall be not less than one multiple-purpose portable fire extinguisher with a minimum ~~3-A 40-B:C~~ 2A 20 BC rating on the roof being covered or repaired.

Reason: The first two changes are editorial clean up of the language in section 3305.1 to clarify that the temporary heating devices must be listed and labeled for their intended use and restructured the second sentence to match the first sentence, leading off with the temporary heating devices. The next editorial change is retitling 3305.5 to hot works, instead of cutting and welding, as the section talks about more than just the two actions. The last change, is changing the fire extinguisher rating from a 3-A 40 B:C to the 2 A 20BC rating to correlate the requirements with fire extinguishers rating requirements for ordinary hazards in accordance with Table 906.3(1) and Table 906.3(2).

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: Increase

Estimated Immediate Cost Impact:

The cost increase is focused on the cost increase for a different extinguisher type which would be an increase of $25-$50 dollars per extinguisher.

Estimated Immediate Cost Impact Justification (methodology and variables):

Most of the proposed changes are purely editorial in nature, except for the change from requiring a 3-A 40 B:C to now referencing a 2A 20BC fire Extinguisher. Based on an internet search, the cost difference between the two types would be an increase of $25-$50 dollars per extinguisher. The total impact to the cost of construction would vary on the number of extinguishers needed to comply based on the size and number of stories being constructed.

F214-24

F215-24

IFC: 3305.10, 3305.10.1, 3305.10.2 (New), 3305.10.2

Proponents: Mark S. Graham, National Roofing Contractors Association (NRCA) (mgraham@nrca.net)

2024 International Fire Code

3305.10 Safeguarding roofing operations.
Roofing operations utilizing heat-producing systems or other ignition sources shall be conducted in accordance with Sections 3305.10.1 and 3305.10.2 and Chapter 35.

3305.10.1 Asphalt and tar kettles.
Asphalt and tar kettles shall be operated in accordance with Section 303.

Add new text as follows:

<u>3305.10.2</u> <u>Open-flame roof torch devices</u>. <u>Roofing operations utilizing open-flame roof torch devices shall be conducted in accordance with *approved* open-flame torch device safety training and Section 105.5.25. There shall be lot less than two multiple-purpose portable fire extinguishers with a minimum 3-A 40-B:C rating within 10 feet (3 m) of each lit torch.</u>

Revise as follows:

~~3305.10.2~~ <u>3305.10.3</u> Fire extinguishers for roofing operations.
Fire extinguishers shall comply with Section 906. There shall be not less than one multiple-purpose portable fire extinguisher with a minimum 3-A 40-B:C rating on the roof being covered or repaired.

Reason: This code change proposal is intended to add additional safety requirements for open-flame roof torch devices used in the application of torch-applied, polymer-modified bitumen membrane roof systems and membrane flashings. Use of these membranes is permitted in IBC Section 1507.11 and IRC Section R905.11.

Various safety training programs exist for the use of open-flame roof torch devices, including training by torch device manufacturers, roof membrane product manufacturers, roofing apprentice and labor union programs, and roofing industry trade associations. For example, the Midwest Roofing Contractors Association/National Roofing Contractors Association's CERTA (certified roof torch applicator) program has trained more than 42,000 roofing workers on the safe use of open-flame roof torch devices since the program's inception in 2004. In that time, the fire safety record for torch-applied polymer-modified bitumen membrane roof systems and membrane flashings has improved dramatically. The CERTA program includes a 3-year re-training requirement and trained applicators carry a "CERTA card" documenting their training and current status.

The proposed code change also references an existing requirement in Section 105.5.25 for an operational permit for hot work.

Cost Impact: Increase

Estimated Immediate Cost Impact:

The cost of complying with the additional training requirement will vary based on the specific training program implemented. Some of the training is available free-of-charge, built into the cost of purchasing open-flame roof troch devices or torch applied, polymer-modified bitumen membrane and membrane flashing products. The cost of the CERTA program is $210 per applicator for three-years of training recognition. Re-training cost for additional three years is $210 per applicator.

Estimated Immediate Cost Impact Justification (methodology and variables):

Assuming a six person roofing crew installing torch applied, polymer-modified bitumen membrane and membrane flashing products, only two of the crew members will likely concentrate their efforts on torch application. Assuming that crew performs 20 torch-applied, polymer-modified bitumen membrane and membrane flashing product job installations per year, 60 over the three-year training period, the training cost is only $7 per job.

F216-24

IFC: 3306.1, 3306.3, 3306.5, 3306.5.1; IBC: SECTION 3312, [F] 3312.1, [F] 3312.2; IEBC: SECTION 1510, [F] 1510.1, [F] 1510.2

Proponents: Steven Orlowski, Sundowne Building Code Consultants, LLC, Self (sorlowski@sbcc.codes)

2024 International Fire Code

Revise as follows:

3306.1 Fire protection devices. The site safety director shall ensure that all fire protection equipment is maintained, ~~and~~ serviced, and inspected in accordance with this code. ~~Fire protection equipment shall be inspected in accordance with the fire protection program.~~

3306.3 Smoke detectors and smoke alarms. Smoke detectors and smoke alarms located in an area where airborne construction dust is expected shall be ~~covered~~ protected in accordance with the manufacturer's instructions and NFPA 72 to prevent exposure to dust or shall be temporarily removed. Smoke detectors and alarms that were removed shall be replaced upon conclusion of dust-producing work. Smoke detectors and smoke alarms that were ~~covered~~ protected shall be inspected and cleaned, as necessary, upon conclusion of dust-producing work.

3306.5 Automatic sprinkler system.
In buildings where an *automatic sprinkler system* is required by this code or the *International Building Code*, it shall be ~~unlawful~~ prohibited to occupy any portion of a building or structure until the *automatic sprinkler system* installation has been tested and *approved*, except as provided in Section 105.3.4.

3306.5.1 Operation of valves. Operation of sprinkler control valves shall be allowed only by properly authorized personnel and shall be accompanied by notification of duly designated parties. Where the sprinkler protection is being ~~regularly turned off and on~~ impaired to facilitate connection of newly completed segments, the sprinkler control valves shall be checked at the end of each work period to ascertain that protection is in service.

2024 International Building Code

SECTION 3312
AUTOMATIC SPRINKLER SYSTEM

Revise as follows:

[F] 3312.1 Completion before occupancy.
In *buildings* where an *automatic sprinkler system* is required by this code, it shall be ~~unlawful~~ prohibited to occupy any portion of a *building* or *structure* until the *automatic sprinkler system* installation has been tested and *approved*, except as provided in Section 111.3.

[F] 3312.2 Operation of valves.
Operation of sprinkler control valves shall be permitted only by properly authorized personnel and shall be accompanied by notification of duly designated parties. When the sprinkler protection is being ~~regularly turned off and on~~ impaired to facilitate connection of newly completed segments, the sprinkler control valves shall be checked at the end of each work period to ascertain that protection is in service.

2024 International Existing Building Code

SECTION 1510
AUTOMATIC SPRINKLER SYSTEM

Revise as follows:

[F] 1510.1 Completion before occupancy.
In buildings where an automatic sprinkler system is required by this code or the *International Building Code*, it shall be ~~unlawful~~ prohibited to occupy any portions of a building or structure until the automatic sprinkler system installation has been tested and *approved*, except as provided in Section 110.3.

[F] 1510.2 Operation of valves.
Operation of sprinkler control valves shall be permitted only by properly authorized personnel and shall be accompanied by notification of duly designated parties. When the sprinkler protection is being ~~regularly turned off and on~~ impaired to facilitate connection of newly completed segments, the sprinkler control valves shall be checked at the end of each work period to ascertain that protection is in service.

Reason: The intent of this code change is to clarify for the site safety director the applicable NFPA standards and other pertinent information that they should use for reference when maintaining, servicing and inspecting fire protection devices. For example, the codes require smoke alarms and smoke detectors to comply with both NFPA 72 and the manufacturer's installation, both of which outline how to protect the devices from airborne dust during construction. Likewise, the code currently references the use of NFPA 10 when selecting the location and size of portable fire extinguishers. The remaining proposed changes are editorial in nature and do not add any substantive change to the code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The changes being proposed are editorial in nature and will have no impact on the cost of construction. See reason statement.

F216-24

F217-24 Part I

PART I - IFC: 3307.1, 3307.1.3, 3307.5, 3307.5.1, 3307.5.2; IBC: SECTION 3310, [F] 3310.2, SECTION 3311, [F] 3311.1, [F] 3311.2, [F] 3311.3; IEBC: SECTION 1508, [F] 1508.2, SECTION 1509, [F] 1509.1, [F] 1509.2, [F] 1509.3

PART II - IFC: [BE] 3307.1.2; IBC: 3310.1; IEBC: [BE] 1508.1

Proponents: Steven Orlowski, Sundowne Building Code Consultants, LLC, Self (sorlowski@sbcc.codes)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE INTERNATIONAL FIRE CODE COMMITTEE AND PART II WILL BE HEARD BY THE INTERNATIONAL BUILDING CODE MEANS OF EGRESS COMMITTEE.

2024 International Fire Code

Revise as follows:

3307.1 Required access.
Approved vehicle access for firefighting shall be provided to all construction or demolition sites. Vehicle access shall be provided to within 100 feet (30 480 mm) of temporary or permanent fire department connections. Vehicle access shall be provided and maintained by either temporary or permanent roads, capable of supporting vehicle loading under all weather conditions. ~~Vehicle access shall be maintained until permanent fire apparatus access roads are available.~~

3307.1.3 Maintenance.
Required *means of egress* and required *accessible means of egress* shall be maintained during construction and demolition, ~~remodeling or~~ *alterations*, and additions to any building.

Exception: *Approved* temporary *means of egress* and *accessible means of egress systems* and facilities.

3307.5 Standpipes.
In buildings required to have standpipes by Section 905.3.1, not less than one functional standpipe for use by the fire service shall be provided for use during construction. ~~Such~~ Each functional *standpipe* ~~standpipes~~ shall be installed with the building as it progresses and prior to construction exceeding 40 feet (12 192 mm) in height above or below the lowest level of fire department vehicle access. Such standpipes shall be provided with fire department hose connections at approved locations in or adjacent to *stairways* complying with Section 3307.1.2. As construction continues to progress ~~progresses~~, ~~such~~ the standpipes shall be extended to within one floor of the highest point ~~of construction~~ having secured decking or flooring.

3307.5.1 Buildings being demolished. Where a building is being demolished and a standpipe is existing within such a building, such standpipe shall be maintained in an operable condition ~~so as~~ to be available for use by the fire department. Such standpipe shall be demolished with the building ~~but~~ and shall not be demolished more than one floor below the floor being demolished. Where more than one standpipe exists in the building, the contractor shall coordinate with the fire code official which standpipe shall remain functional.

Exception: Where the existing standpipe is found to be inoperable, damaged, or required to be removed as part of the site safety plan, a temporary standpipe shall be installed in accordance with Section 905.

Delete without substitution:

~~**3307.5.2 Detailed requirements.**~~
~~Standpipes shall be installed in accordance with the provisions of Section 905.~~

~~**Exception:** Standpipes shall be either temporary or permanent in nature, and with or without a water supply, provided that such standpipes comply with the requirements of Section 905 as to capacity, outlets and materials.~~

2024 International Building Code

SECTION 3310
MEANS OF EGRESS

Revise as follows:

[F] 3310.2 Maintenance of means of egress. *Means of egress* and required *accessible means of egress* shall be maintained at all times during construction, demolition, ~~remodeling or~~ *alterations* and *additions* to any *building*.

Exception: Existing *means of egress* need not be maintained where *approved* temporary *means of egress* systems and *facilities* are provided.

SECTION 3311
STANDPIPES

Revise as follows:

[F] 3311.1 Where required. In *buildings* required to have *standpipes* by Section 905.3.1, not fewer than one <u>functional</u> standpipe <u>for use by the fire service</u> shall be provided for use during construction. ~~Such~~ <u>Each functional *standpipe*</u> ~~*standpipes*~~ shall be installed <u>with the building as it progresses and</u> prior to construction exceeding 40 feet (12 192 mm) in height above <u>or below</u> the lowest level of fire department vehicle access. Such *standpipes* shall be provided with fire department hose connections at <u>approved</u> locations <u>in or</u> adjacent to *stairways* complying with Section 3310.1. As construction <u>continues to progress</u> ~~progresses~~, ~~such~~ <u>the</u> *standpipes* shall be extended to within one floor of the highest point ~~of construction~~ having secured decking or flooring.

[F] 3311.2 Buildings being demolished.
Where a *building* is being demolished and a standpipe exists within such a *building*, such standpipe shall be maintained in an operable condition ~~so as~~ to be available for use by the fire department. Such standpipe shall be demolished with the *building* ~~but~~ <u>and</u> shall not be demolished more than one floor below the floor being demolished. <u>Where more than one standpipe exists in the building, the contractor shall coordinate with the fire code official which standpipe shall remain functional.</u>

<u>**Exception:** Where the existing standpipe is found to be inoperable, damaged, or required to be removed as part of the site safety plan, a temporary standpipe shall be installed in accordance with Section 905.</u>

Delete without substitution:

~~**[F] 3311.3 Detailed requirements.**~~
~~*Standpipes* shall be installed in accordance with the provisions of Chapter 9.~~

~~**Exception:** *Standpipes* shall be either temporary or permanent in nature, and with or without a water supply, provided that such *standpipes* conform to the requirements of Section 905 as to capacity, outlets and materials.~~

2024 International Existing Building Code

SECTION 1508
MEANS OF EGRESS

Revise as follows:

[F] 1508.2 Maintenance of means of egress.
Means of egress and required accessible means of egress shall be maintained at all times during construction, demolition, ~~remodeling or~~ *alterations* and *additions* to any building.

Exception: Existing means of egress need not be maintained where *approved* temporary means of egress and accessible means of egress systems and facilities are provided.

SECTION 1509 STANDPIPES

Revise as follows:

[F] 1509.1 Where required.
In buildings required to have standpipes by Section 905.3.1 of the *International Building Code*, not less than one functional standpipe for use by the fire service shall be provided for use during construction. ~~Such~~ Each functional standpipe ~~standpipes~~ shall be installed with the building as it progresses and prior to construction exceeding 40 feet (12 192 mm) in height above or below the lowest level of fire department vehicle access. Such standpipes shall be provided with fire department hose connections at approved locations in or adjacent to *stairways*, complying with Section 1508.1. As construction ~~progresses~~ continues to progress, ~~such~~ the standpipes shall be extended to within one floor of the highest point ~~of construction~~ having secured decking or flooring.

[F] 1509.2 Buildings being demolished.
Where a building or portion of a building is being demolished and a standpipe is existing within such a building, such standpipe shall be maintained in an operable condition ~~so as~~ to be available for use by the fire department. Such standpipe shall be demolished with the building and ~~but~~ shall not be demolished more than one floor below the floor being demolished. Where more than one standpipe exists in the building, the contractor shall coordinate with the fire code official which standpipe shall remain functional.

Exception: Where the existing standpipe is found to be inoperable, damaged, or required to be removed as part of the site safety plan, a temporary standpipe shall be installed in accordance with Section 905 of the *International Building Code*.

Delete without substitution:

~~**[F] 1509.3 Detailed requirements.**~~
~~Standpipes shall be installed in accordance with the provisions of Chapter 9 of the International Building Code.~~

~~**Exception:** Standpipes shall be either temporary or permanent in nature, and with or without a water supply, provided that such standpipes conform to the requirements of Section 905 of the International Building Code as to capacity, outlets and materials.~~

F217-24 Part I

F217-24 Part II

PART II - IFC: [BE] 3307.1.2; IBC: 3310.1; IEBC: [BE] 1508.1

Proponents: Steven Orlowski, Sundowne Building Code Consultants, LLC, Self (sorlowski@sbcc.codes)

2024 International Fire Code

Revise as follows:

[BE] 3307.1.2 Stairways required. Where building construction exceeds 40 feet (12 192 mm) in height above or below the lowest level of fire department vehicle access, apermanent *stairway* or an approved temporary ~~or permanent~~ *stairway* shall be provided. As construction progresses, such *stairway* shall be extended to within one floor of the highest point of construction having secured decking or flooring.

2024 International Building Code

Revise as follows:

3310.1 Stairways required. Where *building* construction exceeds 40 feet (12 192 mm) in height above or below the lowest level of fire department vehicle access, a permanent *stairway* or an approved temporary ~~or permanent~~ *stairway* shall be provided. As construction progresses, such *stairway* shall be extended to within one floor of the highest point of construction having secured decking or flooring.

2024 International Existing Building Code

Revise as follows:

[BE] 1508.1 Stairways required.
Where building construction exceeds 40 feet (12 192 mm) in height above or below the lowest level of fire department vehicle access, a permanent stairwayor an *approved* temporary ~~or permanent~~ stairway shall be provided. As construction progresses, such stairway shall be extended to within one floor of the highest point of construction having secured decking or flooring.

Reason: Most of the changes in this proposal are editorial clean up, for example:

- Adding the word maintenance to vehicle access in the second sentence of section 3307.1 allows for the complete deletion of the last sentence.

- Both temporary and permanent stairways need to be approved, in section 3307.1.3.

- Section 3307.1.4 removing remodeling as it is a form of an alteration to a building.

- Section 3307.5 needed some additional clarification that as the building progresses in its vertical construction, that a minimum of one functioning standpipe needs to be available to the fire service, once the building reaches 40 feet in height above or below fire department vehicle access.

-Section 3307.5.1 added clarification that in buildings being demolished with mutliple standpipes, at least one standpipe must remain functional as demolition progresses and the contractor shall coordinate with the fire code official. The new exception was also added to this section to signify where the existing standpipe is found to be damaged , inoperable or needs to be removed, than a temporary standpipe shall be installed. Adding the exception allows for the deletion of section 3307.5.2 as it states the temporary or permanent standpipes must comply with section 905 which is in the new exception.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

As stated in the reason statement, the proposed changes to this section is purely editorial in nature and does not add any new requirements which would have an impact on the cost of construction.

F218-24

IFC: 3307.1.1 (New)

Proponents: James Carver, Self, Southern California Fire Prevention Officer's Association (james90245@pacbell.net)

2024 International Fire Code

Add new text as follows:

3307.1.1 Address Identification. Construction sites shall be provided with approved address identification. The address identification shall be legible and placed in a position that is visible from the street or road fronting the property. Address identification characters shall contrast with their background. The address identification and location shall be in a form approved by the Fire Chief. Where access is by means of a private road and the building cannot be viewed from the public way, a monument, pole or other sign or means shall be used to identify the structure. Address identification shall be maintained.

Reason: Chapter 33 does not have a prescriptive requirement for the address to be posted at the construction site. The requirement is identified only in the site safety plan. Although some construction sites are large and easily distinguishable, it is necessary for all construction sites to have the address posted for emergency responders.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The address posting requirement is not include in Chapter 33. This proposal brings the requirement to the Chapter, in the section reserved for fire department site access. There is no anticipated increase cost to construction, the posting would be included with the other site sign costs.

F218-24

F219-24

IFC: 3307.2; IBC: [F] 3313.1; IEBC: [F] 1512.1

Proponents: Steven Orlowski, Sundowne Building Code Consultants, LLC, Self (sorlowski@sbcc.codes)

2024 International Fire Code

Revise as follows:

3307.2 Water supply for fire protection.
An *approved* water supply for fire protection, either temporary or permanent, ~~shall be made available as soon as combustible building materials arrive on the site, on commencement of vertical combustible construction and on installation of a standpipe system in buildings under construction,~~meeting the fire flow requirements in this section shall be provided in accordance with Sections 3307.2.1through 3307.4, when any of the following occur:

1. Combustible building materials arrive on the site.
2. Commencement of vertical combustible construction.
3. Installation of standpipe systems in buildings under construction.

Exception: The *fire code official* is authorized to reduce the fire-flow requirements for isolated buildings or a group of buildings in rural areas or small communities where the development of full fire-flow requirements is impractical.

2024 International Building Code

Revise as follows:

[F] 3313.1 ~~Where~~ When required. An *approved* water supply for fire protection, either temporary or permanent, ~~shall be made available as soon as combustible *building* materials arrive on the site, on commencement of vertical combustible construction, and on installation of a *standpipe system* in *buildings* under construction,~~
meeting the fire flow requirements in this section shall be provided in accordance with Sections 3313.2 through 3313.5~~.~~ when any of the following occur:

1. Combustible building materials arrive on the site.
2. Commencement of vertical combustible construction.
3. Installation of standpipe systems in buildings under construction.

Exception: The *fire code official* is authorized to reduce the fire-flow requirements for isolated *buildings* or a group of *buildings* in rural areas or small communities where the development of full fire-flow requirements is impractical.

2024 International Existing Building Code

Revise as follows:

[F] 1512.1 When required.
An *approved* water supply for fire protection, either temporary or permanent, ~~shall be made available as soon as combustible building material arrives on the site, on commencement of vertical combustible construction, and on installation of a standpipe system in buildings under construction,~~ meeting the fire flow requirements in this section shall be provdied in accordance with Sections 1512.1 through 1512.5 when any of the following occur:~~.~~

1. Combustible building materials arrive on the site,
2. Commencement of vertical combustible construction.

3. Installation of standpipe systems in buildings under construction.

Exception: The fire code official is authorized to reduce the fire-flow requirements for isolated buildings or a group of buildings in rural areas or small communities where the development of full fire-flow requirements is impractical.

Reason: This editorial code change improves the readability of the section on water supply, by listing the three conditions when water supply on the job site is required individually. No new requirements have been added to the section.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

As stated in the reason statement, this code change is purely editorial and does not introduce any new requirements.

F219-24

F220-24

IFC: 3308.1

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Fire Code

Revise as follows:

3308.1 Conditions of use. Internal-combustion-powered construction equipment shall be used in accordance with all of the following conditions:

1. Equipment shall be located so that exhausts do not discharge against combustible material.
2. Exhausts <u>for stationary equipment</u> shall be piped to the outside of the building.
3. Equipment shall not be refueled while in operation.
4. Fuel for equipment shall be stored in an *approved* area <u>in accordance with Section 3309.2</u> ~~outside of the building~~.

Reason: This proposal intends to clean up the section on motorized construction equipment to clarify that stationary equipment should be exhausted outside of the building, where as mobile motorized equipment such as portable gas powered saws or compressors do not have the capability to connect to an exhaust piping system. The proposal also ties the use of fuel for equipment to be stored in a approved area in accordance with section 3309.2, which covers storage of flammable liquids.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

There are no anticipated additional cost associated with this change as it is editorial only. If there is any change in the cost of construction, it would most likely be a decrease as it would be expensive to try to exhaust portable/moveable equipment.

F220-24

F221-24

IFC: 3309.1.1, 3309.1.4, 3309.2

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Fire Code

Revise as follows:

3309.1.1 Class I and Class II liquids.
The storage, use and handling of *flammable* and *combustible liquids* ~~at construction sites~~ shall be in accordance with Section 5706.2. Ventilation shall be provided for operations involving the application of materials containing flammable solvents.

3309.1.4 Handling ~~at point of final use.~~ Class I and II liquids shall be kept in *approved* safety containers. Portable safety containers shall not be left unattended and shall be returned to their approved storage location after use.

3309.2 Storage, use and handling.
The storage, use and handling of flammable gases shall comply with Chapter 58.

Reason: Editorial clean up of the section on hazardous materials and provided clarification that handling of Class I and II liquids in their approved container shall be permitted during the use of the liquids, provided that they are not left unattended on the job site and a returned to the approved storage location after use.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

As stated in the reason statement, this is an editorial change that has no impact on the cost of construction.

F221-24

F222-24

IFC: 3310.1

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Fire Code

Revise as follows:

3310.1 Storage. Combustible materials associated with construction, demolition, ~~remodeling~~ or *alterations* to an occupied structure shall not be stored in *exits*, enclosures for *stairways* and *ramps*, or *exit access corridors* serving an *occupant load* of 30 or more.

Exceptions:

1. Where the only occupants are construction workers and an alternative egress is provided in accordance with Section 3307.1.3 .
2. Combustible materials that are temporarily accumulated to support work being performed when workers are present.

Reason: This proposed change address a concern that the code needs to be specific when it comes to providing construction workers with a safe egress path, even when the area of work may be along the means of egress path. Many times construction activities occur in the egress path and combustible materials may accumulate temporarily in stairwells, corridors and ramps during the scheduled activity. If the activity is coordinated properly with the site safety plan, the safety of the construction workers will be provided and all construction workers will know how to properly egress the construction site using the alternative egress path or paths.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

As stated in the reason statement, alternative egress is already a requirement according to Section 3307.1.4. The new language in the exception clarifies that the alternative egress for construction workers needs to be in accordance section 3307.1.4 as approved in the site safety plan.

F222-24

F223-24

IFC: 3311.1

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Fire Code

Revise as follows:

3311.1 Separations between construction areas.
~~Separations used in~~In buildings of Type I and Type II construction, materials used in assemblies to separate construction areas from occupied portions of the building shall ~~be constructed of materials that~~ comply with one of the following:

1. Noncombustible materials.
2. Materials that exhibit a flame spread index not exceeding 25 when tested in accordance with ASTM E84 or UL 723.
3. Materials exhibiting a peak heat release rate not exceeding 300 kW/m^2 when tested in accordance with ASTM E1354 at an incident heat flux of 50 kW/m^2 in the horizontal orientation on specimens at the thickness intended for use.

Reason: This is an editorial change to improve the readability of the charging section on separations between construction areas. No new requirements have been introduced in this code change.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

As stated in the reason statement, this is an editorial change to improve the readability of the section.

F223-24

F224-24

IFC: 3312.1

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Fire Code

Revise as follows:

3312.1 Fire safety requirements ~~for buildings of Types IV-A, IV-B and IV-C construction~~.
Buildings of type~~Types~~ IV-A, IV-B and IV-C construction designed to be greater than six stories above *grade plane* shall comply with the following requirements during construction unless otherwise *approved* by the *fire code official*:

1. Standpipes shall be provided in accordance with Section 3307.2.
2. An approved water supply for fire department operations~~, as *approved* by the *fire code official* and the *fire chief*~~.
3. ~~Where building construction exceeds six stories above *grade plane* and~~At least one layer of noncombustible protection as ~~is~~ required by Section 602.4 of the *International Building Code*, ~~at least one layer of noncombustible protection~~ shall be installed on all building elements on floor levels, including mezzanines, more than four levels below active mass timber construction before additional floor levels can be erected.

   Exceptions:
   1. Shafts and vertical exit enclosures shall not be considered part of the active mass timber construction.
   2. Noncombustible material on the top of mass timber floor assemblies shall not be required before erecting additional floor levels.

4. ~~Where building construction exceeds six stories above *grade plane*, required~~Required *exterior wall* coverings shall be installed on floor levels, including mezzanines, more than four levels below active mass timber construction before additional floor levels can be erected.

   Exception: Shafts and vertical exit enclosures shall not be considered part of the active mass timber construction.

Reason: This code change cleans up redundant language in the section to improve the readability of the section without changing the requirements of the existing language.
FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof.

In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

There are no anticipated additional costs associated with this change as it is editorial only and simplifies the wording to the section without changing the meaning. The qualifier as to when protection is required has not changed.

F224-24

F225-24

IFC: SECTION 3313 (New), 3313.1 (New)

Proponents: James Carver, Self, Southern California Fire Prevention Officer's Association (james90245@pacbell.net); Joseph Cervantes, Space Age Electronics, Space Age Electronics (joseph.cervantes@1sae.com)

2024 International Fire Code

Add new text as follows:

SECTION 3313 TEMPORARY DETECTION AND NOTIFICATION

3313.1 General. Buildings under construction greater than 3 stories in height, where the square footage of construction is greater than 100,000 square feet, shall be provided with an approved temporary notification and detection system during construction. The system shall report to a constantly attended location and be installed in accordance with the manufacturer's instructions.

Reason: The recent tragic incident in Charlotte, North Carolina, where two construction workers lost their lives in a significant fire, underscores the urgent need to revise the International Building Code to include mandatory advanced notification and detection systems on construction sites. This proposal is driven by several critical factors:

1. Immediate Notification for Enhanced Worker Safety: In environments like construction sites, where hazards are ever-present, the danger is magnified by the risk of fire. The Charlotte incident painfully illustrates this, as workers, hindered by mandatory hearing protection and ambient noise, were unable to hear verbal fire warnings. A formalized fire detection and notification system ensures that all workers are alerted promptly, significantly decreasing the likelihood of injury or loss of life.
2. Community Safety and Rapid Emergency Response: Fires on construction sites pose a significant threat not just to workers but also to nearby communities. An effective detection system allows for quicker mobilization of emergency services, thereby preventing the spread of fire and protecting local residents.
3. Minimizing Property Damage and Economic Loss: Early fire detection plays a crucial role in limiting property damage. By reducing the extent of the damage, these systems not only save costs but also prevent delays in construction projects.
4. Adherence to Evolving Safety Standards: The integration of fire detection and notification systems aligns construction practices with global safety trends, demonstrating a commitment to the highest safety standards for workers and the community.
5. Valuable Data for Ongoing Safety Enhancements: Such systems also serve as a vital source of data on fire incidents, contributing to the continuous improvement of fire safety standards and practices in the construction industry.

In conclusion, the implementation of temporary notification and detection systems on construction sites is a necessary measure. This proposal aims to provide early fire detection and efficient notification to construction workers, addressing a critical safety gap highlighted by recent catastrophic events. This change is not merely reactive but a proactive step toward enhancing overall safety and aligning with progressive construction management standards.

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Cost Impact: Increase

Estimated Immediate Cost Impact:

This cost impact statement is hypothetical and serves as a template. Actual figures should be derived using detailed cost analysis specific to the region, type of construction sites, and the specific technology used in the notification and detection systems.

Total Immediate Cost per construction site:

- Wireless notification and detection systems - $20,000 - $100,000
- Wired notification and detection systems - $35,000- $150,000

If through alternative means and methods, these systems are approved to replaces fire watch, the cost impact will be negative.

Estimated Immediate Cost Impact Justification (methodology and variables):

Equipment Costs: Includes the purchase of smoke sensors, heat sensors, and notification devices.

Installation Costs: Professional fees for installing and integrating the system into existing construction site infrastructure.

Training Costs: Expenses related to training site personnel in system operation and emergency response protocols.

Maintenance Costs: Initial maintenance and testing costs for the first year.

Administrative and Compliance Costs: Expenses associated with ensuring compliance with the new code, including any required certifications and inspections.

Variables include the size of the construction site, the complexity of the installation (which may vary based on site layout), and the level of technology chosen for the system.

Estimated Life Cycle Cost Impact:

Given the provided baseline cost ranges for wireless and wired notification and detection systems in the per project impact, this would be an estimated life cycle cost impact for each. Using a midpoint value within each range for the calculation to provide a balanced estimate.

Wireless Notification and Detection Systems

Initial Costs

Average Cost: $60,000 (midpoint of $20,000 - $100,000 range)

Installation Costs: Assumed at 10% of system cost = $6,000

Training Costs: $2,000

Total Initial Cost: $68,000

Operational Costs (Annually)

Maintenance: $1,500 (annual)

Energy Consumption: $300 (annual)
Total Annual Operational Cost: $1,800

Long-Term Costs (Over 10 Years)

System Upgrades (every 5 years): $10,000

Decommissioning Costs: $5,000

Total Long-Term Cost: $15,000

Indirect Costs and Savings

Insurance Premium Reductions: $1,000 (annual)

Reduced Accident Costs: $20,000 (over 10 years)

Total Indirect Savings (10 years): $30,000

Total Estimated Life Cycle Cost for Wireless System (10 years):

Initial Costs: $68,000

Operational Costs (10 years): $18,000

Long-Term Costs: $15,000

Indirect Savings: -$30,000

Net Cost: $71,000

Wired Notification and Detection Systems

Initial Costs

Average Cost: $92,500 (midpoint of $35,000 - $150,000 range)

Installation Costs: Assumed at 15% of system cost = $13,875

Training Costs: $2,000

Total Initial Cost: $108,375

Operational Costs (Annually)

Maintenance: $2,000 (annual)

Energy Consumption: $400 (annual)

Total Annual Operational Cost: $2,400

Long-Term Costs (Over 10 Years)

System Upgrades (every 5 years): $15,000

Decommissioning Costs: $7,000

Total Long-Term Cost: $22,000

Indirect Costs and Savings

Insurance Premium Reductions: $1,200 (annual)

Reduced Accident Costs: $25,000 (over 10 years)

Total Indirect Savings (10 years): $37,000

Total Estimated Life Cycle Cost for Wired System (10 years):

Initial Costs: $108,375

Operational Costs (10 years): $24,000

Long-Term Costs: $22,000

Indirect Savings: -$37,000

Net Cost: $117,375

These estimates are based on the provided cost ranges and average industry figures. Actual costs may vary based on specific site requirements, regional cost differences, and technology choices. Detailed, site-specific analysis is recommended for accurate budgeting.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

Long-term Maintenance and Servicing: Regular checks and repairs over the system's lifespan.

Technology Upgrades: Potential costs for upgrading the system to keep up with technological advancements.

Energy Usage: Operational costs including electricity usage of the system.

Potential Insurance Premium Reductions: Reduction in insurance premiums due to improved fire safety measures, contributing to cost savings over the life cycle.

Depreciation: The decrease in the value of the equipment over time.

Variables include the anticipated lifespan of the equipment, estimated frequency of maintenance and upgrades, and expected trends in energy costs and insurance premiums.

F225-24

F226-24

IFC: 3903.2

Proponents: Steve Thomas, Shums Coda Associates, Himself (sthomas@coloradocode.net)

2024 International Fire Code

Revise as follows:

3903.2 Prohibited occupancies. Extraction processes utilizing flammable gases or flammable *cryogenic fluids* shall not be located in any building containing a Group A, E, I ~~or~~ R occupancy, <u>or one- and two-family dwelling units and townhouses regulated under the *International Residential Code*.</u>

Reason: The current language does not prohibit extraction operations within a one- or two-family dwelling or townhouse. Those uses are not classified as Group R Occupancies. There is no occupancy classification language in the IRC. It is only located within the IBC and the two codes are stand-alone codes. You cannot apply provisions in the IBC to buildings regulated by the IRC. This language was previously submitted and the committee disapproved the item because they stated that the fire code does not apply to buildings regulated by the IRC. That is an incorrect statement. IFC Section 102.5 states the following:

> Where structures are designed and constructed in accordance with the International Residential Code, the provisions of this code shall apply as follows:
>
> 1. Construction and design provisions of this code pertaining to the exterior of the structure shall apply including, but not limited to, premises identification, fire apparatus access and water supplies. Where interior or exterior systems or devices are installed, construction permits required by Section 105.6 shall apply.
> 2. Administrative, <u>operational</u> and maintenance provisions of this code shall apply.

The extraction process is covered under operational permits in Section 105.5.42. Therefore, the process is covered by the fire code. This proposal will give the fire department the language to legally prohibit the extraction process within one- and two-family dwellings and townhouses. The current language will not hold up in court if the language of the codes is used.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposal clarifies the intent of the code language. See reason statement.

F226-24

F227-24

IFC: 4003.4

Proponents: Jonathan Roberts, UL Solutions, UL Solutions (jonathan.roberts@ul.com)

2024 International Fire Code

Revise as follows:

4003.4 Lightning.
Structures containing barrel storage shall ~~should~~ be protected from lightning. The lightning protection equipment shall be installed in accordance with NFPA 70 and NFPA 780.

Reason: This proposal changes should to shall and serves to remove non mandatory language.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This editorial change from should to shall to align with the necessary enforceable language found throughout the code.

F227-24

F228-24

IFC: 105.5.34, CHAPTER 41, SECTION 4106, 4106.1

Proponents: Scott Eckstein, Richardson Fire Department, Richardson Fire Department (scott.eckstein@cor.gov)

2024 International Fire Code

Revise as follows:

105.5.34 Mobile food preparation vehicles and trailers. An operational permit is required for mobile food preparation vehicles and trailers equipped with appliances that produce smoke or grease-laden vapors.

CHAPTER 41 TEMPORARY HEATING AND MOBILE COOKING OPERATIONS

SECTION 4106
MOBILE FOOD PREPARATION VEHICLES AND TRAILERS

4106.1 General. Mobile food preparation vehicles and occupiable trailers that are equipped with appliances that produce smoke or grease-laden vapors for the purpose of preparing, cooking or serving food shall comply with NFPA 96 and this section. Indoor use of mobile food preparation vehicles is prohibited unless *approved* by the *fire code official*.

Reason: Mobile cooking operations have frequently used mobile food trucks and occupied trailers. Trailers are not typically defined as vehicles. The context of the code should also include occupied trailers that are used as a mobile cooking apparatus. The permit required for mobile food preparation should also accurately include vehicles and trailers when they are occupied or meant to be used as an occupied mobile kitchen.

Bibliography: Proposal affects textual and conceptual changes. No other documentation submitted.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

There is no change in cost as many new trailers that have cooking appliances already have many features installed that are required by IFC and NFPA.

F228-24

F229-24

IFC: SECTION 202 (New), SECTION 202, SECTION 4106, 4106.1, 4106.2, 4106.3, 4106.4, 4106.4.1, 4106.4.2, 4106.4.3, 4106.4.3.1, 4106.4.3.2, 4106.4.3.3, 4106.4.3.4, 4106.5

Proponents: John Thomas, Fire Inspector Services LLC, Fire Inspector Services LLC (fireinspectorservices@outlook.com)

2024 International Fire Code

Add new definition as follows:

FOOD CART. A cart or other movable device used on the public sidewalks or in public places, in which ready to eat food is cooked, wrapped, packaged, processed or portioned for sale or distribution, and which is not licensed as a food truck or food trailer.

FOOD TRAILER. A nonmotorized vehicle designed to be towed by a motorized vehicle that is registered and is able to be operated on the public streets in which ready to eat food is cooked, wrapped, packaged, processed or portioned for sale or distribution.

FOOD TRUCK. A motorized vehicle that is registered and is able to be operated on the public streets, in which ready to eat food is cooked, wrapped, packaged, processed or portioned for sale or distribution.

FOOD VEHICLE. Vehicles including food trucks, food trailers and food carts.

Revise as follows:

MOBILE FOOD PREPARATION VEHICLES. Vehicles that contain cooking equipment that produce smoke or grease-laden vapors for the purpose of preparing and serving food to the public. This definition includes food vehicles. Vehicles intended for private recreation shall not be considered mobile food preparation vehicles.

SECTION 4106
MOBILE FOOD PREPARATION VEHICLES

Revise as follows:

4106.1 General. Mobile food preparation vehicles, that are equipped with appliances that produce smoke or grease-laden vapors for the purpose of preparing, cooking or serving food or contain LP-containers for heating food shall comply with NFPA 96 and this section. Indoor use of mobile food preparation vehicles, is prohibited unless *approved* by the *fire code official*.

4106.2 Permit required.
Permits shall be required as set forth in Section 105.5.

4106.3 Exhaust hood.
Cooking equipment that produces grease-laden vapors shall be provided with a kitchen exhaust hood constructed in accordance with Section 606.

4106.4 Maintenance.
Maintenance of systems on mobile food preparation vehicles shall be in accordance with Sections 4106.4.1 through 4106.4.3.

4106.4.1 Exhaust system.
The exhaust system, including hood, grease-removal devices, fans, ducts and other appurtenances, shall be inspected and cleaned in accordance with NFPA 96.

4106.4.2 Fire protection systems and devices.
Fire protection systems and devices shall be maintained in accordance with Section 901.6.

4106.4.3 Fuel gas systems.
Fuel gas systems shall be maintained in accordance with Sections 4106.4.3.1 through 4106.4.3.4.

4106.4.3.1 Lp-gas systems. LP-gas containers installed on the vehicle and fuel gas piping systems shall be inspected annually by an *approved* inspection agency, person or special expert who is qualified to ensure that system components are free from damage, suitable for the intended service and not subject to leaking.

4106.4.3.2 CNG systems.
CNG containers and fuel gas piping systems shall be inspected annually by an *approved* inspection agency, person or special expert who is qualified to ensure that system components are free from damage, suitable for the intended service and not subject to leaking.

4106.4.3.3 Annual leakage test.
All fuel gas piping systems and appliances shall be checked annually for leakage at the operating pressure of the system using a manometer or pressure gauge. Where leakage is indicated, the gas supply shall be turned off until repairs have been made and the system no longer leaks.

4106.4.3.4 Inspection tag.
Upon a satisfactory annual inspection, the *approved* inspection agency, person or special expert shall affix a tag on the fuel gas system or within the vehicle indicating the name of the inspection agency and the date of the satisfactory inspection.

4106.5 Manual system operation for the automatic fire extinguishing system(s).
A manual actuation device shall be provided for the *automatic fire extinguishing system(s)* provided for the cooking appliance(s). The manual actuation device shall be unobstructed and in view from the means of egress, located at or near a means of egress from the cooking area, and at a location acceptable to the *fire code official*. The manual actuation device shall be installed not more than 48 inches (1200 mm) nor less than 42 inches (1067 mm) above the walking surface of the means of egress and shall clearly identify the hazard protected. The manual actuation shall require a maximum force of 40 pounds (178 N) and a maximum movement of 14 inches (356 mm) to actuate the fire suppression system.

Reason: The primary reason that these definitions are needed is to acknowledge the different types of "Food Trucks" that are on the road. This will give the fire code official the ability to conduct inspections on all mobile food vendors. Some Mobile Food Vendors don't produce grease laden vapors but are using propane or large generators that can create different types of hazards.

To provide perspective my background with Mobile Food Vendors began before my retirement 2021 from the Fire Department. My last 9 years I was the Fire Marshal in charge of two townships. I had mobile food vendors parked by my high school every day plus mobile food vendors around my transit lots. We never conducted any inspections until we passed a local ordinance requiring them to have permits and to be inspected. I worked with NFPA on the Task Force in 2016 to develop some standards for NFPA 96. I have developed a safety and inspection training course that we have conducted all over NJ where we caused a code change that will be coming out in 2024 and in Virginia. When we started teaching the course in the State of NY we noticed the issues with the codes. I am a licensed Inspector/ Fire official here in NJ since 1987 and have written articles about Mobile Food vendors in Fire Engineering Magazine (Sept 20, 2019). Last, I have been working with the New Jersey Food Truck Association to keep the Mobile Food Vendors safe.

Bibliography:
This a link to the podcast we did on Mobile Food Vendors https://www.fireinspectorsservicesllc.com/blog/mobile-food-vendor-safety

Cost Impact: Increase

Estimated Immediate Cost Impact:

Approximately $1,000 -$2,000 to the Mobile Food vendor. These costs are not related to construction.

Estimated Immediate Cost Impact Justification (methodology and variables):

These costs relate to the potential need for type-1 hood suppression systems which will give the operator time to exit the vehicle in case of a fire.

The links should be changed twice a year instead of once a year because of the excessive wear due to the motion of the vehicle.

F230-24

IFC: CHAPTER 42 (New), SECTION 4201 (New), 4201.1 (New), 4201.1.1 (New), 4201.2 (New), 4201.3 (New), SECTION 4202 (New), 4202.1 (New), SECTION 320, 320.1, 320.2, 320.3, 320.4, 320.4.1, 320.4.2, 320.4.2.1, 320.4.2.2, 320.4.2.3, 320.4.2.4, 320.4.2.5, 320.4.2.6, 320.4.3, 320.4.3.1, 320.4.3.2, 320.4.3.3, SECTION 322, 322.1, 322.1.1, 322.2, 322.3, 322.4, 322.5

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Robert J Davidson, Davidson Code Concepts LLC, Self (rjd@davidsoncodeconcepts.com)

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Add new text as follows:

CHAPTER 42 BATTERIES

SECTION 4201 GENERAL

4201.1 Scope. The provisions of this chapter shall apply to research, testing, manufacturing, recycling, use or storage of the battery types defined in Chapter 2.

Exception: Installed energy storage systems regulated by Section 1207.

4201.1.1 Hazardous Materials Applicability.. Battery types other than those types defined in Chapter 2 shall also be in compliance with Chapters 50 through 67 as applicable.

4201.2 Electrical wiring and equipment.. Electrical wiring and equipment used in connection with batteries shall be installed and maintained in accordance with this chapter, Section 603 and NFPA 70, as applicable.

4201.3 Permits.. Permits shall be required, as applicable, in accordance with Section 105.5 and 105.6.

SECTION 4202 DEFINITIONS

4202.1 Definitions.. The following terms are defined in Chapter 2.
BATTERY

BATTERY TYPES.

Revise as follows:

SECTION ~~320~~ 4203
LITHIUM-ION AND LITHIUM METAL BATTERY STORAGE

~~**320.1**~~ **4203.1 General.** The storage of lithium-ion and lithium metal batteries shall comply with Section ~~320~~4203.

Exceptions:

1. New or refurbished batteries installed in the equipment, devices or vehicles they are designed to power.
2. New or refurbished batteries packed for use with the equipment, devices or vehicles they are designed to power.
3. Batteries in original retail packaging that are rated at not more than 300 watt-hours for lithium-ion batteries or contain not more than 25 grams of lithium metal for lithium metal batteries.
4. Temporary storage of batteries or battery components during the battery manufacturing process prior to completion of final quality control checks.

5. Temporary storage of batteries during the vehicle manufacturing or repair process.

~~320.2~~ 4203.2 Permits.
Permits shall be required for an accumulation of more than 15 cubic feet (0.42 m^3) of lithium-ion and lithium metal batteries, other than batteries listed in the exceptions to Section ~~321.1~~ 4203.1, as set forth in Section 105.5.29.

~~320.3~~ 4203.3 Fire safety plan.
A fire safety plan shall be provided in accordance with Section 404. In addition, the fire safety plan shall include emergency response actions to be taken upon detection of a fire or possible fire involving lithium-ion or lithium metal battery storage.

~~320.4~~ 4203.4 Storage requirements.
Lithium-ion and lithium metal batteries shall be stored in accordance with Section ~~320.4.1~~4203.4.1, ~~320.4.2~~4203.4.2 or ~~320.4.3~~4203.4.3, as applicable.

~~320.4.1~~ 4203.4.1 Limited indoor storage in containers. Not more than 15 cubic feet (0.42 m^3) of lithium-ion or lithium metal batteries shall be permitted to be stored in containers in accordance with all of the following:

1. Containers shall be open top and constructed of noncombustible materials or shall be *approved* for battery collection.
2. Individual containers and groups of containers shall not exceed a capacity of 7.5 cubic feet (0.21 m^3).
3. A second container or group of containers shall be separated by not less than 3 feet (914 mm) of open space or 10 feet (3048 mm) of space that contains combustible materials.
4. Containers shall be located not less than 5 feet (1524 mm) from *exits* or *exit access* doors.

~~320.4.2~~ 4203.4.2 Indoor storage areas.
Indoor storage areas for lithium-ion and lithium metal batteries, other than those complying with Section ~~320.4.1~~4203.4.1, shall comply with Sections ~~320.4.2.1~~4203.4.2.1 through ~~320.4.2.6~~4203.2.6.

~~320.4.2.1~~ 4203.4.2.1 Technical opinion and report. A technical opinion and report complying with Section 104.2.2 shall be prepared to evaluate the fire and explosion risks associated with the indoor storage area and to make recommendations for fire and explosion protection. The report shall be submitted to the *fire code official* and shall require the *fire code official 's* approval prior to issuance of a permit. In addition to the requirements of Section 104.2.2, the technical opinion and report shall specifically evaluate the following:

1. The potential for *deflagration* of flammable gases released during a thermal runaway event.
2. The basis of design for an *automatic sprinkler system* or other *approved* fire suppression system. Such design basis shall reference relevant full-scale fire testing or another *approved* method of demonstrating sufficiency of the recommended design.

~~320.4.2.2~~ 4203.4.2.2 Construction requirements. Where indoor storage areas for lithium-ion and lithium metal batteries are located in a building with other uses, battery storage areas shall be separated from the remainder of the building by 2-hour rated *fire barriers* or *horizontal assemblies*. *Fire barriers* shall be constructed in accordance with Section 707 of the *International Building Code*, and *horizontal assemblies* shall be constructed in accordance with Section 711 of the *International Building Code*.

Exceptions:

1. Where battery storage is contained in one or more *approved* prefabricated portable structures providing a complete 2-hour fire-resistance-rated enclosure, *fire barriers* and *horizontal assemblies* are not required.
2. Where battery storage is limited to new batteries in packaging that has been demonstrated to and *approved* by the *fire code official* as sufficient to isolate a fire in packaging to the package interior, *fire barriers* and *horizontal assemblies* are not required.

~~320.4.2.3~~ 4203.4.2.3 Fire protection systems.
Indoor storage areas for lithium-ion and lithium metal batteries shall be protected by an *automatic sprinkler system* complying with Section 903.3.1.1 or an *approved* alternative fire suppression system. The system design shall be based on recommendations in the

approved technical opinion and report required by Section ~~320.4.2.1~~4203.4.2.1.

~~320.4.2.4~~ 4203.4.2.4 Fire alarm systems.
Indoor storage areas for lithium-ion and lithium metal batteries shall be provided with an *approved* automatic fire detection and alarm system complying with Section 907. The fire detection system shall use air-aspirating smoke detection, radiant energy-sensing fire detection or both.

~~320.4.2.5~~ 4203.4.2.5 Explosion control.
Where the *approved* technical opinion and report required by Section ~~320.4.2.1~~4203.4.2.1 recommends explosion control, explosion control complying with Section 911 shall be provided.

~~320.4.2.6~~ 4203.4.2.6 Reduced requirements for storage of partially charged batteries.
Indoor storage areas for lithium-ion and lithium metal batteries with a demonstrated state of charge not exceeding 30 percent shall not be required to comply with Sections ~~320.4.2.1~~4203.4.2.1, ~~320.4.2.2~~4203.4.2.2 and ~~320.4.2.5~~4203.4.2.5, provided that procedures for limiting and verifying that the state of charge will not exceed 30 percent have been *approved*.

~~320.4.3~~ 4203.4.3 Outdoor storage.
Outdoor storage of lithium-ion or lithium metal batteries shall comply with Sections ~~320.4.3.1~~4203.4.3.1 through ~~320.4.3.3~~4203.4.3.3.

~~320.4.3.1~~4203.4.3.1 Distance from storage to exposures. Outdoor storage of lithium-ion or lithium metal batteries, including storage beneath weather protection in accordance with Section 414.6.1 of the *International Building Code*, shall comply with one of the following:

1. Battery storage shall be located not less than 20 feet (6096 mm) from any building, *lot line*, public street, public alley, public way or *means of egress*.
2. Battery storage shall be located not less than 3 feet (914 mm) from any building, *lot line*, public street, public alley, public way or *means of egress*, where the battery storage is separated by a 2-hour fire-resistance-rated assembly without openings or penetrations and extending 5 feet (1524 mm) above and to the sides of the battery storage area.
3. Battery storage shall be located not less than 3 feet (914 mm) from any building, *lot line*, public street, public alley, public way or *means of egress*, where batteries are contained in *approved,* prefabricated portable structures providing a complete 2-hour fire-resistance-rated enclosure.

~~320.4.3.2~~4203.4.3.2 Storage area size limits and separation.
Outdoor storage areas for lithium-ion or lithium metal batteries, including storage beneath weather protection in accordance with Section 414.6.1 of the *International Building Code*, shall not exceed 900 square feet (83.6 m^2). The height of battery storage in such areas shall not exceed 10 feet (3048 mm). Multiple battery storage areas shall be separated from each other by not less than 10 feet (3048 mm) of open space.

~~320.4.3.3~~4203.4.3.3 Fire detection.
Outdoor storage areas for lithium-ion or lithium metal batteries, regardless of whether such areas are open, under weather protection or in a prefabricated portable structure, shall be provided with an *approved* automatic fire detection and alarm system complying with Section 907. The fire detection system shall use radiant energy-sensing fire detection.

SECTION ~~322~~ 4204 POWERED MICROMOBILITY DEVICES

~~322.1~~4204.1 General.
Lithium-ion and lithium metal battery *powered micromobility devices* shall be operated and maintained in accordance with this section.

Exceptions:

1. Storage, repair and charging in residential occupancies of *powered mobility devices*, provided that such devices are for personal use by its owner.

2. Charging of a single *powered mobility device* in any occupancy by its owner.

~~322.1.1~~4204.1.1 Prohibited locations.
The use of a residential occupancy as a business for the charging of commercially owned *powered micromobility devices* as part of a rental or sales service shall not be permitted.

~~322.2~~4204.2 Battery chargers and equipment.
Powered micromobility devices shall be charged in accordance with their listing and the manufacturer's instructions using only the original equipment manufacturer-supplied charging equipment or charging equipment in accordance with the listing and manufacturer's instructions.

~~322.3~~4204.3 Listing.
Powered micromobility devices shall be *listed* and *labeled* in accordance with UL 2272 or UL 2849, as applicable.

~~322.4~~4204.4 Battery charging areas.
Where *approved*, *powered micromobility devices* shall permitted to be charged in a room or area that complies with all of the following:

1. Only *listed* devices utilizing *listed* charging equipment shall be permitted to be charged.
2. Is provided with sufficient electrical receptacles to allow the charging equipment for each device to be directly connected to a receptacle. Extension cords and relocatable power taps shall not be used.
3. Storage of combustible materials, combustible waste or hazardous materials shall not be permitted.
4. The charging operation shall not be conducted in or obstruct any required means of egress.
5. Removable storage batteries shall not be stacked or charged in an enclosed cabinet unless the cabinet is specially designed and *approved* for such purpose.
6. A minimum distance of 18 inches (457.2 mm) shall be maintained between each removable storage battery during charging operations unless each battery is isolated from neighboring batteries by an *approved* fire-resistant material.
7. A minimum of 18 inches (457.2 mm) shall be maintained between the location of the battery on each *powered micromobility device* during charging operations.
8. The indoor room or area shall be protected by a *fire alarm system* utilizing air-aspirating smoke detectors or radiant energy-sensing fire detection.

~~322.5~~4204.5 Fire safety plan.
A fire safety plan shall be provided in accordance with Section 403.10.6. In addition, the fire safety plan shall include emergency response actions to be taken upon detection of a fire or possible fire involving lithium-ion or lithium metal battery storage.

Reason: FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

With the growing number of sections and language addressing batteries from manufacture, R&D, storage and use in devices in the IFC it appears the time is appropriate to create a new chapter to gather the battery related language other than Section 1207 ESS. This proposal provides the initial structure of this chapter moving current Sections 320 and 322 to this chapter. The intent is that revisions made in Sections 320 and 322 would be made in this chapter as well. In addition there are other proposals adding to the requirements in the IFC on batteries. It is intended that all those new topics would be placed in this chapter as outlined below

- **Section 4201 General**
- **Section 4202 Definitions**
- **Section 4203 Lithium-Ion and Lithium Metal Research, Testing, Manufacturing and Recycling**
- **Section 4204 Lithium-Ion and Lithium Metal Battery Storage**

- **Section 4205 Battery-Powered Devices, Industrial Trucks, Equipment and Appliances (Note: Current Section 322 is proposal to expand scope to include the additional items)**
- **Section 4206 Other Battery Types**

Having a Chapter for batteries eases finding the technical language for designers, building owners/operators and code officials.

It is expected that some items from the other sections could be merged into a general requirement such as requirements for fire safety plans with the language specific to the subtopics remaining in the designated subsections.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is to establish a structure for moving other existing and proposed sections of the IFC related to batteries that are being heard separately into one chapter.

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IFC: CHAPTER 42 (New), SECTION 4201 (New), 4201.1 (New), 4201.2 (New), SECTION 4202 (New), 4202.1 (New), SECTION 202 (New), SECTION 4203 (New), 4203.1 (New), 4203.1.1 (New), 4203.1.2 (New), 4203.2 (New), 4203.3 (New), 4203.3.1 (New), 4203.3.2 (New), 4203.4 (New), 4203.5 (New), 4203.5.1 (New), 4203.5.2 (New), 4203.5.3 (New), SECTION 4204 (New), 4204.1 (New), 4204.2 (New), 4204.3 (New), 4204.4 (New), 903.2.2, 903.2.2.3 (New), 903.2.7, 903.2.7.4 (New), TABLE 906.1, 1103.7, 1103.7.1 (New), 1103.7.1, 1103.7.2, 1103.7.3, 1103.7.4, 1103.7.6 (New), 1103.9, 105.5.41 (New); IBC: [F] 903.2.2, 903.2.2.3 (New), [F] 903.2.7, 903.2.7.4 (New), [F] TABLE 906.1

Proponents: Jeffrey Shapiro, International Code Consultants, Lake Travis Fire Rescue (jshapiro@LTFR.org)

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Add new text as follows:

CHAPTER 42 PET BOARDING

SECTION 4201 GENERAL

4201.1 Scope. Occupancies containing *pet boarding* shall comply with this chapter.

4201.2 Permit. A permit shall be required for *pet boarding* as set forth in Section 105.5.

SECTION 4202 DEFINITIONS

4202.1 Definitions. The following terms are defined in Chapter 2:
PET BOARDING.

Add new definition as follows:

PET BOARDING.
Use of a Group B or Group M Occupancy to house a cumulative total of 10 or more dogs or cats for more than 12 hours per day that are available for sale or housed inside of a building as a service to the dog or cat owner.

Add new text as follows:

SECTION 4203 FIRE SAFETY PRECAUTIONS

4203.1 Fire safety plan. An *approved* fire safety and evacuation plan in accordance with Section 404 shall be prepared and maintained for *pet boarding*.

4203.1.1 Fire safety plan additions. In addition to the requirements of Section 404.2.2, fire safety plans for pet boarding shall include all of the following:

1. Sequence of procedures to be followed in the event of a fire.
2. Procedures for evacuating pets, including the location of any special keys or tools required to evacuate pets.
3. Items to be inspected when conducting daily safety inspections.

4. Procedures for training employees to know the locations of portable fire extinguishers and how to properly use them.
5. Procedures for maintaining proper clearances between combustibles and ignition sources in a *pet boarding* area in accordance with Section 305.
6. Procedures to ensure that there are no open flames in a *pet boarding* area.
7. Procedures to ensure that cooking and heating in a *pet boarding* area are conducted in accordance with Chapter 41.
8. Procedures to ensure that use of current taps, relocatable power taps and extension cords in a *pet boarding* area is done in a safe manner and complies with Sections 603.5 and 603.6.
9. Procedures for ensuring that trash and other combustible waste are removed from *pet boarding* areas not less than once per day.
10. Procedures for ensuring that clothes dryer vents are kept clear of lint accumulation in accordance with Section 610.1.2.
11. Procedures for maintaining a staffing plan that specifies hours of operation, minimum staffing, staff names, and staff contact information.

4203.1.2 Posting of fire safety plan. The sequence of procedures to be followed in the event of a fire shall be prominently posted next to each egress door or opening leading out of the *pet boarding* area.

4203.2 Removal of combustible waste. Trash and other combustible waste shall be removed from pet boarding areas not less than once per day.

4203.3 Staffing. Staffing for *pet boarding* shall comply with Sections 4203.3.1 and 4203.3.2.

4203.3.1 Staffing plan. A staffing plan shall be prepared and maintained that includes current hours of operation, minimum staffing, staff names, and staff contact information.

4203.3.2 Minimum staffing. At least one staff member shall be responsible for boarded pets, remaining in or immediately adjacent to pet boarding areas and awake at all times when a cumulative total of 10 or more dogs and cats are present, including overnight, for *pet boarding* in a *fire area* that is not equipped with an *automatic sprinkler system* in accordance with Section 4204.4

4203.4 Safety inspections. Safety inspections specified in the approved fire safety plan shall be conducted at least once per day. A record of such safety inspection shall be maintained on the premises to document the date and time of each inspection and shall include the name of the individual who conducted the inspection.

4203.5 Sources of ignition. Sources of ignition in *pet boarding* areas shall comply with Sections 4203.5.1 through 4203.5.3.

4203.5.1 Cooking and heating. Cooking and heating in *pet boarding* areas shall comply with Chapter 41. Heating pads used for warming animals shall be listed and labeled by a nationally recognized testing laboratory.

4203.5.2 Open flames. Open flames shall be prohibited in *pet boarding* areas.

4203.5.3 Smoking. Smoking shall be prohibited in occupancies containing a *pet boarding* area. "No Smoking" signs shall be provided in accordance with Section 310.

SECTION 4204
FIRE PROTECTION AND LIFE SAFETY SYSTEMS

4204.1 Portable fire extinguishers. Portable fire extinguishers rated 2-A:10-B:C and mounted in accordance with Section 906.9 shall be placed adjacent to each egress door or opening leading out of a *pet boarding* area, with additional extinguishers provided as necessary so that the travel distance to an extinguisher from anywhere in a *fire area* containing a *pet boarding* area does not exceed 50 feet (15240 mm).

4204.2 Smoke detection system. An automatic smoke detection system that activates occupant notification in accordance with Section 907.5 and is monitored in accordance with Section 907.6.6 shall be installed in new and existing *fire areas* containing *pet boarding*. In locations where ambient conditions are incompatible with *smoke detectors*, *heat detectors* with a response time index of 50 $(m \times s)^{1/2}$ shall be permitted.

> **Exception:** An automatic smoke detection system is not required in *fire areas* equipped with an *automatic sprinkler system* complying with Section 4204.4.

4204.3 Carbon monoxide detection. In addition to the requirements in Section 915, carbon monoxide detection shall be provided in new and existing *pet boarding* areas where a *carbon monoxide source* is present.

4204.4 Automatic sprinkler system. An *automatic sprinkler system* with quick-response sprinklers complying with Section 903.3.1 or a limited area *automatic sprinkler system* complying with Section 903.3.8 with quick-response sprinklers shall be installed in *fire areas* containing *pet boarding*.

Revise as follows:

903.2.2 Group B.
An *automatic sprinkler system* shall be provided for Group B occupancies as required in Sections 903.2.2.1 through 903.2.2.3 ~~and 903.2.2.2~~.

Add new text as follows:

903.2.2.3 Pet boarding. An *automatic sprinkler system* shall be installed in *fire areas* containing *pet boarding.*

Revise as follows:

903.2.7 Group M.
An *automatic sprinkler system* shall be provided throughout buildings containing a Group M occupancy where required by Sections 903.2.7.1 through 903.2.7.4 or where any~~one~~ of the following conditions exist~~s~~:

1. A Group M *fire area* exceeds 12,000 square feet (1115 m^2).
2. A Group M *fire area* is located more than three stories above *grade plane*.
3. The combined area of all Group M *fire areas* on all floors, including any mezzanines, exceeds 24,000 square feet (2230 m^2).

Add new text as follows:

903.2.7.4 Pet boarding. An *automatic sprinkler system* shall be installed in *fire areas* containing *pet boarding.*

Revise as follows:

TABLE 906.1 ADDITIONAL REQUIRED PORTABLE FIRE EXTINGUISHERS

Portions of table not shown remain unchanged.

SECTION	SUBJECT
4204.1	Pet boarding

1103.7 Fire alarm systems.
An *approved fire alarm system* shall be installed in existing buildings and structures in accordance with Sections 1103.7.1 through

1103.7.8~~1103.7.6~~ and provide occupant notification in accordance with Section 907.5 unless other requirements are provided by other sections of this code.

Exception: Occupancies with an existing, previously *approved fire alarm system*.

Add new text as follows:

1103.7.1 Group B pet boarding. An *automatic smoke detection system* shall be installed in *fire areas* containing *pet boarding* in accordance with Section 4204.2.

Revise as follows:

1103.7.2~~1103.7.1~~ Group E.

A *fire alarm system* shall be installed in existing Group E occupancies in accordance with Section 907.2.3.

Exceptions:

1. A manual *fire alarm system* is not required in a building with a maximum area of 1,000 square feet (93 m^2) that contains a single classroom and is located not closer than 50 feet (15 240 mm) from another building.
2. A manual *fire alarm system* is not required in Group E occupancies with an *occupant load* less than 50.

1103.7.3~~1103.7.2~~ Group I-1.

An automatic *fire alarm system* shall be installed in existing Group I-1 facilities in accordance with Section 907.2.6.1.

Exception: Where each sleeping room has a *means of egress* door opening directly to an exterior egress balcony that leads directly to the *exits* in accordance with Section 1021, and the building is not more than three stories in height.

1103.7.4~~1103.7.3~~ Group I-2.

In Group I-2, an automatic *fire alarm system* shall be installed in accordance with Section 1105.10.

1103.7.5~~1103.7.4~~ Group I-3.

An automatic and manual *fire alarm system* shall be installed in existing Group I-3 occupancies in accordance with Section 907.2.6.3.

Add new text as follows:

1103.7.6 Group M pet boarding.

An *automatic smoke detection system* shall be installed in *fire areas* containing *pet boarding* in accordance with Section 4204.2.

Revise as follows:

1103.9 Carbon monoxide detection.

Carbon monoxide detection shall be installed in existing buildings where any of the conditions identified in Section 915.1.1 exist and in *pet boarding* areas as specified in Section 4204.3. Carbon monoxide alarms shall be installed in the locations specified in Section 915.2 and the installation shall be in accordance with Section 915.4.

Exceptions:

1. Carbon monoxide alarms are permitted to be solely battery operated where the code that was in effect at the time of construction did not require carbon monoxide detectors to be provided.
2. Carbon monoxide alarms are permitted to be solely battery operated in *dwelling units* that are not served from a commercial power source.
3. A carbon monoxide detection system in accordance with Section 915.5 shall be an acceptable alternative to carbon monoxide alarms.

Add new text as follows:

105.5.41 Pet boarding. An operational permit is required to for *pet boarding*.

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[F] 903.2.2 Group B.
An *automatic sprinkler system* shall be provided for Group B occupancies as required in Sections 903.2.2.1 and 903.2.2.2.

Add new text as follows:

903.2.2.3 Pet boarding. An *automatic sprinkler system* shall be installed in *fire areas* containing *pet boarding.*

Revise as follows:

[F] 903.2.7 Group M.
An *automatic sprinkler system* shall be provided throughout buildings containing a Group M occupancy where required by Sections 903.2.7.1 through 903.2.7.4 or where any~~one~~ of the following conditions exist~~s~~:

1. A Group M *fire area* exceeds 12,000 square feet (1115 m^2).
2. A Group M *fire area* is located more than three stories above *grade plane*.
3. The combined area of all Group M *fire areas* on all floors, including any *mezzanines*, exceeds 24,000 square feet (2230 m^2).

Add new text as follows:

903.2.7.4 Pet boarding. An *automatic sprinkler system* shall be installed in *fire areas* containing *pet boarding.*

Revise as follows:

[F] TABLE 906.1 ADDITIONAL REQUIRED PORTABLE FIRE EXTINGUISHERS IN THE INTERNATIONAL FIRE CODE
Portions of table not shown remain unchanged.

IFC SECTION	SUBJECT
4204.1	Pet boarding

Reason: Unlike past proposals related to animal housing that broadly prescribed a minimum level of safety for all animal housing facilities based on NFPA 150 (Proposals G216-07/08, F277-18, and F69-21), this proposal takes a more targeted approach that focuses exclusively on pet safety in commercial occupancies where 10 or more dogs and cats are kept overnight. The focus on dogs and cats is not meant to diminish the value of other pets. Instead, it promotes incremental progress in the code to directly respond to numerous catastrophic fire losses in facilities that boarded dogs and cats. Most notable to me is the recent loss of 75 dogs in the Ponderosa Pet Resort fire in Georgetown, Texas on September 18, 2021. This incident led several jurisdictions in central Texas to enact ordinances that improve fire protection in new and existing pet boarding facilities. The love and care that dog and cat owners offer their pets is said by many to be on a par with children or family members. In fact, it's long been known that pet owners may delay evacuation or go back into a burning building after safely evacuating to rescue a pet. Likewise, there are recorded instances of employees of pet boarding facilities and firefighters entering burning buildings for the sole purpose of rescuing pets, putting their own lives at risk in the process. With proper safety plans and built-in protection features, these acts of desperation can be avoided.

A pet owner who entrusts a dog or cat to a business offering overnight care should have a reasonable expectation of safety for the pet based on due diligence of the business and building safety laws that govern the business. Likewise, dogs and cats in pet stores awaiting a forever home should be reasonably protected from the risk of dying unattended in an after-hours fire. Accordingly, this proposal adds new administrative requirements for a fire safety plan to be developed and maintained by dog and cat boarding occupancies, expanding the base requirements in Section 404 to address unique safety considerations related to pet boarding. The recommended safety plan additions and fire protection requirements were developed after consideration of relevant content in NFPA 150 (fire extinguisher provisions are correlated with those in NFPA 150), Illinois' 225 ILCS 605 Animal Welfare Act, California Health and Safety Code 122385, and several Texas jurisdiction ordinances.

The "10 or more" threshold is believed to be a reasonable basis for achieving consensus in the 2027 edition code development process. It seems fair that a facility with a smaller number of dogs and cats would occupy a small floor area in a personal environment with closer supervision. The larger number of 10 or more cumulative dogs and cats better reflects a commercial business that should be expected to comply with minimum safety considerations. I expect that there will be recommendations to expand the scope of this proposal, perhaps to include fire protection requirements for buildings where breeders keep dogs or cats or to include other types of animals or uses. Notably, in early January, a fire in a small breeder building killed 25 puppies in Milton, WI. Nevertheless, pet breeding facilities have not been included in this proposal, recognizing that dogs and cats in such facilities are owned by the breeder on private property, essentially no different than private party pet owners having multiple pets on their own property, who are likewise not included. I am sympathetic to additional discussion as part of the code development process, but my objective is to not let "the perfect become the enemy of the good." It is important that consensus be reached to approve some baseline for animal housing facilities as part of the 2027 code, and more controversial topics can be revisited in a later cycle if necessary to achieve that objective.

Although the value of fire sprinklers in pet boarding occupancies cannot be overstated (demonstrated as recently as December 2023, when a fire at Animal & Medical Hospital of Frisco, Texas was controlled by a single sprinkler, saving 20 pets and resulting in no human injuries), this proposal does not recommend retrofitting existing occupancies with sprinklers. A number of individuals testified in opposition to the code requiring a higher level of protection for animals than people in past code cycles, and in deference to that viewpoint, this proposal suggests a level of protection that parallels Group R-1. Although new Group R-1 Occupancies require sprinkler protection, existing Group R-1 Occupancies need only have fire alarm systems. Recognizing that boarded dogs and cats may be restrained or, even if unrestrained with a path of egress cannot be relied upon to have an evacuation response in the event of a fire, the baseline for existing occupancies should be early warning with onsite staff and rapid notification of emergency responders.

Although I serve as a consultant to the National Fire Sprinkler Association, this proposal has not been reviewed or endorsed by NFSA, and I am not representing NFSA on this issue.

Cost Impact: Increase

Estimated Immediate Cost Impact:

Administrative requirements, such as fire safety plans, are de minimis, and are mostly providing a means to ensure that existing code requirements are complied with. There will be a cost increase associated with adding a monitored smoke alarm system to existing occupancies, perhaps in the range of $1 to $5 per square foot, and sprinkler systems to new occupancies, perhaps in the range of $1 to $2 per square foot.

Estimated Immediate Cost Impact Justification (methodology and variables):

Various Web sites suggested the quoted price ranges, which will obviously vary greatly depending on conditions associated with any specific installation. ChatGPT generally agreed with these estimates, and given that it is entirely unreasonable to ask someone to better quantify the cost impact of a proposal of this breadth, that's as good a basis as any.

F231-24

F232-24

IFC: 105.5.18, 5001.1

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Jeff O'Neil, Chair, Committee on Healthcare (ahc@iccsafe.org)

2024 International Fire Code

Revise as follows:

105.5.18 Flammable and combustible liquids.
An operational permit is required:

1. To use or operate a pipeline for the transportation within facilities of *flammable* or *combustible liquids*. This requirement shall not apply to the off-site transportation in pipelines regulated by the Department of Transportation (DOTn) nor does it apply to piping systems.
2. To store, handle or use Class I liquids in excess of 5 gallons (19 L) in a building or in excess of 10 gallons (37.9 L) outside of a building, except that a permit is not required for the following:
   2.1. The storage or use of Class I liquids in the fuel tank of a motor vehicle, aircraft, motorboat, mobile power plant or mobile heating plant, unless such storage, in the opinion of the *fire code official*, would cause an unsafe condition.

   2.2. The storage or use of paints, oils, varnishes or similar flammable mixtures where such liquids are stored for maintenance, painting or similar purposes for a period of not more than 30 days.

   2.3. The storage, use or handling of alcohol-based handrub solutions in dispensers or containers where in compliance with Section 5705.5.
3. To store, handle or use Class II or Class IIIA liquids in excess of 25 gallons (95 L) in a building or in excess of 60 gallons (227 L) outside a building, except for the following:
   3.1 Fuel ~~fuel~~ oil used in connection with oil-burning equipment.

   3.2 The storage, use or handling of alcohol-based hand rub solution in dispensers or containers where in compliance with Section 5705.5.
4. To store, handle or use Class IIIB liquids in tanks or portable tanks for fueling motor vehicles at motor fuel-dispensing facilities or where connected to fuel-burning equipment.

   Exception: Fuel oil and used motor oil used for space heating or water heating.
5. To remove Class I or II liquids from an underground storage tank used for fueling motor vehicles by any means other than the *approved*, stationary on-site pumps normally used for dispensing purposes.
6. To operate tank vehicles, equipment, tanks, plants, terminals, wells, fuel-dispensing stations, refineries, distilleries and similar facilities where *flammable* and *combustible liquids* are produced, processed, transported, stored, dispensed or used.
7. To place temporarily out of service (for more than 90 days) an underground, protected above-ground or above-ground *flammable* or *combustible liquid* tank.
8. To change the type of contents stored in a *flammable* or *combustible liquid* tank to a material that poses a greater hazard than that for which the tank was designed and constructed.
9. To manufacture, process, blend or refine *flammable* or *combustible liquids*.
10. To engage in the dispensing of liquid fuels into the fuel tanks of motor vehicles at commercial, industrial, governmental or manufacturing establishments in accordance with Section 5706.5.4 or to engage in on-demand *mobile fueling* operations in accordance with Section 5707.

11. To utilize a site for the dispensing of liquid fuels from tank vehicles into the fuel tanks of motor vehicles, marine craft and other special equipment at commercial, industrial, governmental or manufacturing establishments in accordance with Section 5706.5.4 or, where required by the *fire code official*, to utilize a site for on-demand *mobile fueling* operations in accordance with Section 5707.

5001.1 Scope.
Prevention, control and mitigation of dangerous conditions related to storage, dispensing, use and handling of hazardous materials shall be in accordance with this chapter.
This chapter shall apply to all hazardous materials, including those materials regulated elsewhere in this code, except that where specific requirements are provided in other chapters, those specific requirements shall apply in accordance with the applicable chapter. Where a material has multiple hazards, all hazards shall be addressed.

Exceptions:

1. In retail or wholesale sales occupancies, medicines, foodstuff, cosmetics and commercial or institutional products containing not more than 50 percent by volume of water-miscible liquids and with the remainder of the solutions not being flammable, provided that such materials are packaged in individual containers not exceeding 1.3 gallons (5 L).
2. Alcoholic beverages in retail or wholesale sales occupancies, provided that the liquids are packaged in individual containers not exceeding 1.3 gallons (5 L).
3. Application and release of pesticide and agricultural products and materials intended for use in weed abatement, erosion control, soil amendment or similar applications where applied in accordance with the manufacturer's instructions and label directions.
4. The off-site transportation of hazardous materials where in accordance with Department of Transportation (DOTn) regulations.
5. Building materials not otherwise regulated by this code.
6. Refrigeration systems (see Section 608).
7. Stationary storage battery systems regulated by Section 1207.
8. The display, storage, sale or use of fireworks and *explosives* in accordance with Chapter 56.
9. *Corrosives* utilized in personal and household products in the manufacturer's original consumer packaging in Group M occupancies.
10. The storage of beer, distilled spirits and wines in barrels and casks.
11. The installation and use~~, storage or both~~ of dispensers containing alcohol-based hand rubs, replacement alcohol-based hand rub solution and dispensers in storage classified as Class I or II liquids where in accordance with Section 5705.5.
12. Specific provisions for flammable liquids in motor fuel-dispensing facilities, repair garages, airports and marinas in Chapter 23.
13. Storage and use of fuel oil in tanks and containers connected to oil-burning equipment. Such storage and use shall be in accordance with Section 605. For abandonment of fuel oil tanks, Chapter 57 applies.
14. Storage and display of aerosol products complying with Chapter 51.
15. Storage and use of *flammable* or *combustible liquids* that do not have a fire point when tested in accordance with ASTM D92, not otherwise regulated by this code.
16. *Flammable* or *combustible liquids* with a *flash point* greater than 95°F (35°C) in a water-miscible solution or dispersion with a water and inert (noncombustible) solids content of more than 80 percent by weight, which do not sustain combustion, not otherwise regulated by this code.
17. Commercial cooking oil storage tank systems located within a building and designed and installed in accordance with Section 607 and NFPA 30.

Reason: This proposal clarifies that an operational permit is not required when the use or storage of alcohol-based hand rub dispensers and replacement solution is in compliance with requirements specifies in Section 5705.5. The intent of creating the requirements and limitation in 5705.5 was never intended to also require an operational permit. The addition of "storage" in Exception 11 of Section 5001.1 (Scope) simply ensures that the intention of the exception is for both the alcohol-based hand rub dispensers and the storage of alcohol-based sanitizer solutions awaiting use.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC), ICC Committee for Healthcare (CHC) and the Pandemic Task Force Code Development Work Group (PTF CDWG)

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

The Committee on Healthcare (CHC) was established by the ICC Board of Directors in 2011 to pursue opportunities to study and develop effective and efficient provisions for Hospital, Nursing Homes, Assisted Living and Ambulatory Care Facilities. This committee was formed in cooperation with the American Society for Healthcare Engineering (ASHE). In July of 2017, the ICC Board made CHC a standing committee. In 2023 the CHC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the CHC website at CHC webpage.

The ICC/NEHA Pandemic Task Force (PTF) was organized and tasked with researching the effects of the COVID-19 pandemic on the built environment and developing a roadmap and proposing needed resources – including guidelines, recommended practices, publications and updates to the International Codes® (I-Codes®) – that are necessary to overcome the numerous challenges that may be faced during future pandemics and to construct and manage safe, sustainable and affordable occupancy of the built environment. The ICC Pandemic Task Force Code Development Work Group (PTF CDWG) has conducted a comprehensive review of current code requirements as they relate to the prevention of the transmission of diseases and other serious health concerns and suggested revisions to current code requirements based on this assessment.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal does not impose any requirements that would increase construction cost. It is a clarification of an administrative requirement related to an operational permit.

F232-24

F233-24

IFC: 5001.1, TABLE 5003.1.1(5); IBC: [F] 307.1.1, TABLE 307.1.1

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Robert J Davidson, Davidson Code Concepts LLC, Self (rjd@davidsoncodeconcepts.com)

2024 International Fire Code

Revise as follows:

5001.1 Scope.
Prevention, control and mitigation of dangerous conditions related to storage, dispensing, use and handling of hazardous materials shall be in accordance with this chapter.
This chapter shall apply to all hazardous materials, including those materials regulated elsewhere in this code, except that where specific requirements are provided in other chapters, those specific requirements shall apply in accordance with the applicable chapter. Where a material has multiple hazards, all hazards shall be addressed.

Exceptions:

1. In retail or wholesale sales occupancies, medicines, foodstuff, cosmetics and commercial or institutional products containing not more than 50 percent by volume of water-miscible liquids and with the remainder of the solutions not being flammable, provided that such materials are packaged in individual containers not exceeding 1.3 gallons (5 L).
2. Alcoholic beverages in retail or wholesale sales occupancies, provided that the liquids are packaged in individual containers not exceeding 1.3 gallons (5 L).
3. Application and release of pesticide and agricultural products and materials intended for use in weed abatement, erosion control, soil amendment or similar applications where applied in accordance with the manufacturer's instructions and label directions.
4. The off-site transportation of hazardous materials where in accordance with Department of Transportation (DOTn) regulations.
5. Building materials not otherwise regulated by this code.
6. Refrigeration systems (see Section 608).
7. Stationary storage battery systems regulated by Section 1207.
8. The display, storage, sale or use of fireworks and *explosives* in accordance with Chapter 56.
9. *Corrosives* utilized in personal and household products in the manufacturer's original consumer packaging in Group M occupancies.
10. The storage of beer, distilled spirits and wines in barrels and casks.
11. The use, storage or both of dispensers containing alcohol-based hand rubs classified as Class I or II liquids where in accordance with Section 5705.5.
12. Specific provisions for flammable liquids in motor fuel-dispensing facilities, repair garages, airports and marinas in Chapter 23.
13. Storage and use of fuel oil in tanks and containers connected to oil-burning equipment. Such storage and use shall be in accordance with Section 605. For abandonment of fuel oil tanks, Chapter 57 applies.
14. Storage and display of aerosol products complying with Chapter 51.
15. Storage and use of *flammable* or *combustible liquids* that do not have a fire point when tested in accordance with ASTM D92, not otherwise regulated by this code.

16. *Flammable* or *combustible liquids* with a *flash point* greater than 95°F (35°C) in a water-miscible solution or dispersion with a water and inert (noncombustible) solids content of more than 80 percent by weight, which do not sustain combustion, not otherwise regulated by this code.

17. Commercial cooking oil storage tank systems located within a building and designed and installed in accordance with Section 607 and NFPA 30.

18. Storage of *battery types* defined in Section 202.

TABLE 5003.1.1(5) HAZARDOUS MATERIALS EXEMPTIONS[a]

MATERIAL CLASSIFICATION	OCCUPANCY OR APPLICATION	EXEMPTION
Combustible fiber	Baled cotton	Densely packed baled cotton shall not be classified as combustible fiber, provided that the bales comply with the packing requirements of ISO 8115.
Corrosive	Building materials	The quantity of commonly used building materials that are classified as corrosive materials is not limited.
	Personal and household products	The quantity of personal and household products that are classified as corrosive materials is not limited in retail displays, provided that the products are in original packaging.
	Retail and wholesale sales occupancies	The quantity of medicines, foodstuffs or consumer products, and cosmetics containing not more than 50 percent by volume of water-miscible liquids, with the remainder of the solutions not being flammable, is not limited. To qualify for this allowance, such materials shall be packaged in individual containers not exceeding 1.3 gallons.
Explosives	Groups B, F, M and S	Storage of special industrial explosive devices is not limited.
	Groups M and R-3	Storage of black powder, smokeless propellant, and small arms primers is not limited.
Flammable and combustible liquids and gases	Aerosols	Buildings and structures occupied for the storage of aerosol products, aerosol cooking spray products, or plastic aerosol 3 products shall be classified as Group S-1.
	Alcoholic beverages	The quantity of alcoholic beverages in liquor stores and distributors without bulk storage is not limited.
		The quantity of alcoholic beverages in distilling or brewing of beverages is not limited.
		The storage quantity of beer, distilled spirits and wines in barrels and casks is not limited.
		The quantity of alcoholic beverages in retail and wholesale sales occupancies is not limited. To qualify for this allowance, beverages shall be packaged in individual containers not exceeding 1.3 gallons.
	Cleaning establishments with combustible liquid solvents	The quantity of combustible liquid solvents used in closed systems and having a flash point at or above 140°F is not limited. To qualify for this allowance, equipment shall be listed by an approved testing agency and the occupancy shall be separated from all other areas of the building by 1-hour fire barriers or 1-hour horizontal assemblies, or both, constructed in accordance with the *International Building Code* .
		The quantity of combustible liquid solvents having a flash point at or above 200°F is not limited.
	Closed piping systems	The quantity of flammable and combustible liquids and gases utilized for the operation of machinery or equipment is not limited.
	Flammable finishing operations using flammable and combustible liquids	Buildings and structures occupied for the application of flammable finishes shall comply with Section 416.
	Fuel	The quantity of liquid or gaseous fuel in fuel tanks on vehicles or motorized equipment is not limited.
		The quantity of gaseous fuels in piping systems and fixed appliances regulated by the *International Fuel Gas Code* is not limited.
		The quantity of liquid fuels in piping systems and fixed appliances regulated by the *International Mechanical Code* is not limited.
	Fuel oil	The quantity of fuel oil storage complying with Section 605.4.2 is not limited.
	Hand sanitizer	The quantity of alcohol-based hand rubs (ABHR) classified as Class I or II liquids in dispensers installed in accordance with Sections 5705.5 and 5705.5.1 is not limited. The location of the ABHR shall be provided in the construction documents.
	Retail and wholesale sales occupancies with flammable and combustible liquids	The quantity of medicines, foodstuffs or consumer products, and cosmetics containing not more than 50 percent by volume of water-miscible liquids, with the remainder of the solutions not being flammable, is not limited. To qualify for this allowance, such materials shall be packaged in individual containers not exceeding 1.3 gallons.

Highly toxic and toxic materials	Retail and wholesale sales occupancies	The quantity of medicines, foodstuffs or consumer products, and cosmetics containing not more than 50 percent by volume of water-miscible liquids, with the remainder of the solutions not being flammable, is not limited. To qualify for this allowance, such materials shall be packaged in individual containers not exceeding 1.3 gallons.
Any	Agricultural materials	The quantity of agricultural materials stored or utilized for agricultural purposes on the premises is not limited.
	Batteries	The storage of battery types defined in Section 202 is not limited.
	Energy storage	The quantity of hazardous materials in stationary storage battery systems is not limited.
		The quantity of hazardous materials in stationary fuel cell power systems is not limited.
		The quantity of hazardous materials in capacitor energy storage systems is not limited.
	Refrigeration systems	The quantity of refrigerants in refrigeration systems is not limited.

For SI: 1 gallon = 3.785 L, °C = (°F – 32)/1.8.

a. Exempted materials and conditions listed in this table are required to comply with provisions of this code that are not based on exceeding maximum allowable quantities in Section 5003.

2024 International Building Code

[F] 307.1.1 Occupancy Exemptions.
Storage, use and *handling* of *hazardous materials* in accordance with Table 307.1.1 shall not be counted as contributing to Maximum Allowable Quantities and shall not cause classification of an occupancy to be Group H. Such storage, use and *handling* shall comply with applicable provisions of the *International Fire Code* .

Revise as follows:

TABLE 307.1.1 HAZARDOUS MATERIALS EXEMPTIONS[a]

MATERIAL CLASSIFICATION	OCCUPANCY OR APPLICATION	EXEMPTION	
Combustible fiber	Baled cotton	Densely packed baled cotton shall not be classified as combustible fiber, provided that the bales comply with the packing requirements of ISO 8115.	
Corrosive	Building materials	The quantity of commonly used building materials that are classified as corrosive materials is not limited.	
	Personal and household products	The quantity of personal and household products that are classified as corrosive materials is not limited in retail displays, provided that the products are in original packaging.	
	Retail and wholesale sales occupancies	The quantity of medicines, foodstuffs or consumer products, and cosmetics containing not more than 50 percent by volume of water-miscible liquids, with the remainder of the solutions not being flammable, is not limited. To qualify for this allowance, such materials shall be packaged in individual containers not exceeding 1.3 gallons.	
Explosives	Groups B, F, M and S	Storage of special industrial explosive devices is not limited.	
	Groups M and R-3	Storage of black powder, smokeless propellant and small arms primers is not limited.	
Flammable and combustible liquids and gases	Aerosols	Buildings and structures occupied for the storage of aerosol products, aerosol cooking spray products, or plastic aerosol 3 products shall be classified as Group S-1.	
	Alcoholic beverages	The quantity of alcoholic beverages in liquor stores and distributors without bulk storage is not limited.	
		The quantity of alcoholic beverages in distilling or brewing of beverages is not limited.	
		The storage quantity of beer, distilled spirits and wines in barrels and casks is not limited.	
		The quantity of alcoholic beverages in retail and wholesale sales occupancies is not limited. To qualify for this allowance, beverages shall be packaged in individual containers not exceeding 1.3 gallons.	
	Cleaning establishments with combustible liquid solvents	The quantity of combustible liquid solvents used in closed systems and having a flash point at or above 140ºF is not limited. To qualify for this allowance, equipment shall be listed by an approved testing agency and the occupancy shall be separated from all other areas of the building by 1-hour fire barriers constructed in accordance with Section 707 or 1-hour horizontal assemblies constructed in accordance with Section 711, or both	

		The quantity of combustible liquid solvents having a flash point at or above 200ºF is not limited.	
	Closed piping systems	The quantity of flammable and combustible liquids and gases utilized for the operation of machinery or equipment is not limited.	
	Fuel	The quantity of liquid or gaseous fuel in fuel tanks on vehicles or motorized equipment is not limited.	
		The quantity of gaseous fuels in piping systems and fixed appliances regulated by the International Fuel Gas Code is not limited.	
		The quantity of liquid fuels in piping systems and fixed appliances regulated by the International Mechanical Code is not limited.	
	Flammable finishing operations using flammable and combustible liquids	Buildings and structures occupied for the application of flammable finishes shall comply with Section 416.	
	Fuel oil	The quantity of fuel oil storage complying with Section 605.4.2 of the *International Fire Code* is not limited. .	
	Hand sanitizer	The quantity of alcohol-based hand rubs (ABHR) classified as Class I or II liquids in dispensers installed in accordance with Sections 5705.5 and 5705.5.1 of the *International Fire Code* is not limited. The location of the ABHR dispensers shall be provided in the construction documents.	
	Retail and wholesale sales occupancies with flammable and combustible liquids	The quantity of medicines, foodstuffs or consumer products, and cosmetics containing not more than 50 percent by volume of water-miscible liquids, with the remainder of the solutions not being flammable, is not limited. To qualify for this allowance, such materials shall be packaged in individual containers not exceeding 1.3 gallons.	
Highly toxic and toxic materials	Retail and wholesale sales occupancies	The quantity of medicines, foodstuffs or consumer products, and cosmetics containing not more than 50 percent by volume of water-miscible liquids, with the remainder of the solutions not being flammable, is not limited. To qualify for this allowance, such materials shall be packaged in individual containers not exceeding 1.3 gallons.	
Any	Agricultural materials	The quantity of agricultural materials stored or utilized for agricultural purposes on the premises is not limited.	
	Batteries	The storage of battery types defined in Section 202 of the *International Fire Code* is not limited.	
	Energy storage	The quantity of hazardous materials in stationary storage battery systems is not limited.	
		The quantity of hazardous materials in stationary fuel cell power systems is not limited.	
		The quantity of hazardous materials in capacitor energy storage systems is not limited.	
	Refrigeration Systems	The quantity of refrigerants in refrigeration systems is not limited.	

For SI: 1 gallon = 3.785L, °C = (°F - 32)/1.8.

a. Exempted materials and conditions listed in this table are required to comply with applicable provisions of the International Fire Code.

Reason: FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

There is confusion as to whether electrolyte, cathodes, anodes, lead or other materials inside of batteries are supposed to be identified, classified, quantified, and reported as hazardous materials, as well as be subject to IFC Chapter 50 – 67 and IBC Group H Occupancy requirements. The concept of regulating MAQs addresses what an emergency responder may be faced with when responding to an event, i.e., an amount of hazardous material physically present upon arrival. The hazard in an amount exceeding the MAQ does not present itself when the material is confined in manufactured articles and devices containing amounts less than the MAQ.

An example of the problem is if I have an entire existing floor of a building occupied by a lead-acid battery energy storage system the electrolyte in the batteries is not added up for MAQs because there is an existing carve out for ESS. But if I have the same amount of floor area and number of lead-acid batteries in storage in a warehouse, something presenting a lower event hazard than those in use, some jurisdictions require the electrolyte from the individual batteries to be added up and if the aggregate is over the MAQ they force an H-4 Group classification on the facility. The same activity has occurred with Lithium-ion cells and batteries where the amount of electrolyte per cell is minimal, in some cases you need a centrifuge to get it out.

This exception clarifies that storage of those *battery types* defined in Chapter 2, which have been vetted through the IFC or NFPA 855 process as to hazards presented are not subject to IFC Chapter 50-67 regulations or IBC 307.1 Group H-Occupancy requirements but may be regulated elsewhere in the code.

If the separate proposal for a new Chapter 42 Battery in the IFC is approved by the committee, it is our intent to modify the exception language to include reference to that new chapter where code application guidance will exist.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0.00

Estimated Immediate Cost Impact Justification (methodology and variables):

This proposal will eliminate inappropriate application of IFC requirements and high-hazard group designations for the storage of batteries. This will reduce the cost of construction and overall compliance.

Reducing code requirements reduces cost.

F233-24

F234-24

IFC: 5003.1.1, 5003.1.1.1 (New); IBC: [F] 307.1, 307.1.1 (New)

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Fire Code

5003.1.1 Maximum allowable quantity per control area.
The *maximum allowable quantity per control area* shall be as specified in Tables 5003.1.1(1) through 5003.1.1(4). For retail and wholesale storage and display in Group M occupancies and Group S storage, see Section 5003.11.

Add new text as follows:

5003.1.1.1 Physical states. Where a hazard class includes solids, liquids, gases (gaseous) and gases (liquefied), the maximum allowable quantity for each shall be permitted.

2024 International Building Code

[F] 307.1 High-hazard Group H.
High-hazard Group H occupancy includes, among others, the use of a *building* or *structure*, or a portion thereof, that involves the manufacturing, processing, generation or storage of materials that constitute a physical or *health hazard* in quantities in excess of those allowed in *control areas* complying with Section 414, based on the maximum allowable quantity limits for *control areas* set forth in Tables 307.1(1) and 307.1(2). Hazardous occupancies are classified in Groups H-1, H-2, H-3, H-4 and H-5 and shall be in accordance with this section, the requirements of Section 415 and the *International Fire Code* . *Hazardous materials* stored or used on top of roofs or *canopies* shall be classified as rooftop storage or use and shall comply with the *International Fire Code* .

Add new text as follows:

307.1.1 Physical states. Where a hazard class includes solids, liquids, gases (gaseous) and gases (liquefied), the maximum allowable quantity for each shall be permitted.

Reason: The purpose of this code change is to clarify the intent of the IFC and IBC to allow up to the MAQ for each physical state as listed in the MAQ tables.

For example, the Table 5003.1.1(1) would allow up to 5 pounds of solid **and** 5 pounds (~1/2 gallon) of a liquid Class 1 Organic Peroxide.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

There is no impact to construction cost as this proposal simply clarifies the intent as to how the table is to be applied. It has always been the intent that each material state be counted separately.

F234-24

F235-24

IFC: TABLE 5003.1.1(1), TABLE 5003.1.1(2), TABLE 5003.1.1(3), TABLE 5003.1.1(4); IBC: [F] TABLE 307.1(1), [F] TABLE 307.1(2)

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Fire Code

Revise as follows:

TABLE 5003.1.1(1) MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD[a, c, i, l, m, o]

MATERIAL	CLASS	GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED	STORAGE[b]				USE-CLOSED SYSTEMS[b]				USE-OPEN SYSTEMS[b]	
					Gas				Gas			
			Solid pounds (cubic feet)	Liquid gallons (pounds)	Gaseous ~~(~~cubic feet at NTP~~)~~	Liquefied pounds	Solid pounds (cubic feet)	Liquid gallons (pounds)	Gaseous ~~(~~cubic feet at NTP~~)~~	Liquefied pounds	Solid pounds (cubic feet)	Liquid gallons (pounds)
Combustible dust	NA	H-2	See Note p	NA	NA	NA	See Note p	NA	NA	NA	See Note p	NA
Combustible fibers[p]	Loose	H-3	(100)	NA	NA	NA	(100)	NA	NA	NA	(20)	NA
	Baled		(1,000)				(1,000)				(200)	
Combustible liquid	II	H-2 or H-3	NA	120[d, e]	NA	NA	NA	120[d]	NA	NA	NA	30[d]
	IIIA	H-2 or H-3		330[d, e]				330[d]				80[d]
	IIIB	NA		13,200[e, f]				13,200[f]				3,300[f]
CryogenicFlammable	NA	H-2	NA	45[d]	NA	NA	NA	45[d]	NA	NA	NA	10[d]
CryogenicInert	NA	NA	NA	~~NA~~ NL	~~NL~~ NA	NA	NA	~~NA~~ NL	~~NL~~ NA	NA	NA	NA
CryogenicOxidizing	NA	H-3	NA	45[d]	NA	NA	NA	45[d]	NA	NA	NA	10[d]
Explosives	Division 1.1	H-1	1[e, g]	(1)[e, g]	NA	NA	0.25[g]	(0.25)[g]	NA	NA	0.25[g]	(0.25)[g]
	Division 1.2	H-1	1[e, g]	(1)[e, g]			0.25[g]	(0.25)[g]			0.25[g]	(0.25)[g]
	Division 1.3	H-1 or H-2	5[e, g]	(5)[e, g]			1[g]	(1)[g]			1[g]	(1)[g]
	Division 1.4	H-3	50[e, g]	(50)[e, g]			50[g]	(50)[g]			NA	NA
	Division 1.4G	H-3	125[e, k]	NA			NA	NA			NA	NA
	Division 1.5	H-1	1[e, g]	(1)[e, g]			0.25[g]	(0.25)[g]			0.25[g]	(0.25)[g]
	Division 1.6	H-1	1[e, g]	NA			NA	NA			NA	NA
Flammable gas	~~Gaseous~~											
	1A and 1B (High BV)[q]	H-2	NA	NA	1,000[d, e]	150[d, e]	NA	NA	1,000[d, e]	150[d, e]	NA	NA
	1B (Low BV)[q]				162,500[d, e]	10,000[d, e]			162,500[d, e]	10,000[d, e]		
	~~Liquefied~~		~~NA~~		~~NA~~		~~NA~~		~~NA~~		~~NA~~	~~NA~~
	~~1A and 1B (High BV)[q]~~			~~(150)[d, e]~~				~~(150)[d, e]~~				
	~~1B (Low BV)[q]~~			~~(10,000)[d, e]~~				~~(10,000)[d, e]~~				
Flammable liquid[n]	IA	H-2 or H-3	NA	30[d, e]	NA	NA	NA	30[d]	NA	NA	NA	10d
	IB and IC			120[d, e]				120[d]				30d
Flammable liquid, combination ~~(IA, IB, IC)~~ [n]	~~NA~~ IA, IB, IC	H-2 or H-3	NA	120[d, e, h]	NA	NA	NA	120[d, h]	NA	NA	NA	30[d, h]
Flammable solid	NA	H-3	125[d, e]	NA	NA	NA	125[d]	NA	NA	NA	25[d]	NA
Inert gas	~~Gaseous~~ NA	NA	NA	NA	NL	NL	NA	NA	NL	NL	NA	NA
	~~Liquefied~~	~~NA~~	~~NA~~	~~NA~~	~~NL~~		~~NA~~	~~NA~~	~~NL~~		~~NA~~	~~NA~~
Organic peroxide	UD	H-1	1[e, g]	(1)[e, g]	NA	NA	0.25[g]	(0.25)[g]	NA	NA	0.25[g]	(0.25)[g]
	I	H-2	5[d, e]	(5)[d, e]			1[d]	(1)[d]			1[d]	(1)[d]
	II	H-3	50[d, e]	(50)[d, e]			50[d]	(50)[d]			10[d]	(10)[d]
	III	H-3	125[d, e]	(125)[d, e]			125[d]	(125)[d]			25[d]	(25)[d]
	IV	NA	NL	NL			NL	NL			NL	NL
	V	NA	NL	NL			NL	NL			NL	NL
Oxidizer	4	H-1	1[g]	(1)[e, g]	NA	NA	0.25[g]	(0.25)[g]	NA	NA	0.25[g]	(0.25)[g]
	3[j]	H-2 or H-3	10[d, e]	(10)[d, e]			2[d]	(2)[d]			2[d]	(2)[d]
	2	H-3	250[d, e]	(250)[d, e]			250[d]	(250)[d]			50[d]	(50)[d]
	1	NA	4,000[e, f]	(4,000)[e, f]			4,000[f]	(4,000)[f]			1,000[f]	(1,000)[f]
Oxidizing gas	~~Gaseous~~ NA	H-3	NA	NA	1,500[d,e]	150[d,e]	NA	NA	1,500[d, e]	150[d,e]	NA	NA
	~~Liquefied~~			~~(150)[d, e]~~	~~NA~~			~~(150)[d, e]~~	~~NA~~			
Pyrophoric	NA	H-2	4[e, g]	(4)[e, g]	50[e, g]	4[e, g]	1[g]	(1)[g]	10[e, g]	1[e, g]	0	0
Unstable (reactive)	4	H-1	1[e, g]	(1)[e, g]	10[e, g]	1[e, g]	0.25[g]	(0.25)[g]	2[e, g]	1[e, g]	0.25[g]	(0.25)[g]

MATERIAL	CLASS	GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED	STORAGE				USE-CLOSED SYSTEMS				USE-OPEN SYSTEMS	
			Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas: Gaseous ~~(~~cubic feet at NTP~~)~~	Gas: Liquefied pounds	Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas: Gaseous ~~(~~cubic feet at NTP~~)~~	Gas: Liquefied pounds	Solid pounds (cubic feet)	Liquid gallons (pounds)
	3 Detonable	H-1	1[d, e]	(1)[d, e]	10[d, e]	1[d, e]	0.25[d]	(0.25)[d]	2[d, e]	1[d, e]	0.25[d]	(0.25)[d]
	3 Nondetonable	~~H-1 or~~ H-2	5[d, e]	(5)[d, e]	50[d, e]	1[d, e]	1[d]	(1)[d]	10[d, e]	2[d, e]	1[d]	(1)[d]
	2	H-3	50[d, e]	(50)[d, e]	750[d, e]	150[d, e]	50[d]	(50)[d]	750[d, e]	150[d, e]	10[d]	(10)[d]
	1	NA	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL
Water reactive	3	H-2	5[d, e]	(5)[d, e]	NA	NA	5[d]	(5)[d]	NA	NA	1[d]	(1)[d]
	2	H-3	50[d, e]	(50)[d, e]			50[d]	(50)[d]			10[d]	(10)[d]
	1	NA	NL	NL			NL	NL			NL	NL

For SI: 1 cubic foot = 0.02832 m^3, 1 pound = 0.454 kg, 1 gallon = 3.785 L.

NA = Not Applicable, NL = Not Limited, UD = Unclassified Detonable.

a. For use of control areas, see Section 5003.8.3.

b. The aggregate quantity in use and storage shall not exceed the maximum allowance quantity for storage, including applicable increases.

c. For hazardous materials in Group B higher education laboratory occupancies, see Section 428 of the *International Building Code* and Chapter 38.

d. Maximum allowable quantities shall be increased 100 percent in buildings equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1. Where Note e applies, the increase for both notes shall be applied accumulatively.

e. Maximum allowable quantities shall be increased 100 percent where stored in approved storage cabinets, day boxes, gas cabinets, gas rooms, exhausted enclosures or in listed safety cans in accordance with Section 5003.9.10. Where Note d applies, the increase for both notes shall be applied accumulatively.

f. Quantities shall not be limited in a building equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1.

g. Allowed only in buildings equipped throughout with an approved automatic sprinkler system.

h. Containing not more than the maximum allowable quantity per control area of Class IA, Class IB or Class IC flammable liquids.

i. Quantities in parentheses indicate quantity units in parentheses at the head of each column.

j. A maximum quantity of 220 pounds of solid or 22 gallons of liquid Class 3 oxidizers is allowed where such materials are necessary for maintenance purposes, operation or sanitation of equipment where the storage containers and the manner of storage are approved.

k. Net weight of pyrotechnic composition of the fireworks. Where the net weight of the pyrotechnic composition of the fireworks is not known, 25 percent of the gross weight of the fireworks including packaging shall be used.

l. For gallons of liquids, divide the amount in pounds by 10 in accordance with Section 5003.1.2.

m. For oxidizers, unstable (reactive) materials and water-reactive materials stored or displayed in Group M occupancies or storedin Group S occupancies, see Section 5003.11..

n. For flammable and combustible liquid storage in Group M occupancy wholesale and retail sales uses, see Section 5704.3.6.

o. Quantities in this table shall be modified in accordance with Table 5003.1.1(5).

p. Where manufactured, generated or used in such a manner that the concentration and conditions create a fire or explosion hazard based on information prepared in accordance with Section 104.2.2.

q. "High BV" Category 1B flammable gas has a burning velocity greater than 3.9 in/s (10 cm/s). "Low BV" Category 1B flammable gas has a burning velocity of 3.9 in/s (10 cm/s) or less. Where the fundamental burning velocity for a gas is not known, the gas will be treated as Category 1A flammable gas.

TABLE 5003.1.1(2) MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A HEALTH HAZARD[a, c, h, i, j]

MATERIAL	STORAGE[b]				USE-CLOSED SYSTEMS[b]				USE-OPEN SYSTEMS[b]	
			Gas				Gas			
	Solid pounds[d, e, f]	Liquid gallons (pounds)[d, e, f]	Gaseous cubic feet at NTP ~~(pounds)~~[d]	Liquefied pounds[d]	Solid pounds[d]	Liquid gallons (pounds)[d]	Gaseous cubic feet at NTP ~~(pounds)~~[d]	Liquefied pounds[d]	Solid pounds[d]	Liquid gallons (pounds)[d]
Corrosives	5,000	500	~~Gaseous~~ 810[e] ~~Liquefied (150)~~	150[e]	5,000	500	~~Gaseous~~ 810[e] ~~Liquefied (150)~~	150[e]	1,000	100
Highly toxics	10	(10)	~~Gaseous~~ 20[g] ~~Liquefied (4)~~[g]	4[g]	10	(10)	~~Gaseous~~ 20[g] ~~Liquefied (4)~~[g]	4[g]	3	(3)
Toxics	500	(500)	~~Gaseous~~ 810[e] ~~Liquefied (150)~~[e]	150[e]	500	(500)	~~Gaseous~~ 810[e] ~~Liquefied (150)~~[e]	150[e]	125	(125)

For SI: 1 cubic foot = 0.02832 m^3, 1 pound = 0.454 kg, 1 gallon = 3.785 L.

a. For use of control areas, see Section 5003.8.3.

b. The aggregate quantity in use and storage shall not exceed the quantity listed for storage.

c. In retail and wholesale sales occupancies, the quantities of medicines, foodstuff or consumer products and cosmetics, containing not more than 50 percent by volume of water-miscible liquids and with the remainder of the solutions not being flammable, shall not be limited, provided that such materials are packaged in individual containers not exceeding 1.3 gallons.

d. Maximum allowable quantities shall be increased 100 percent in buildings equipped throughout with an *approved* automatic sprinkler system in accordance with Section 903.3.1.1. Where Note e also applies, the increase for both notes shall be applied accumulatively.

e. Maximum allowable quantities shall be increased 100 percent where stored in *approved* storage cabinets, gas cabinets or exhausted enclosures. Where Note d applies, the increase for both notes shall be applied accumulatively.

f. For storage and display quantities in Group M and storage quantities in Group S occupancies complying with Section 5003.11, see Table 5003.11.1.

g. Allowed only where stored in *approved* exhausted gas cabinets or exhausted enclosures.

h. Quantities in parentheses indicate quantity units in parentheses at the head of each column.

i. For gallons of liquids, divide the amount in pounds by 10 in accordance with Section 5003.1.2.

j. Quantities in this table shall be modified in accordance with Table 5003.1.1(5).

TABLE 5003.1.1(3) MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD IN AN OUTDOOR CONTROL AREA[a, b, c, d]

MATERIAL	CLASS	STORAGE[b]				USE-CLOSED SYSTEMS[b]				USE-OPEN SYSTEMS[b]	
				Gas				Gas			
		Solid pounds (cubic feet)	Liquid gallons (pounds)[d]	Gaseous cubic feet at NTP	Liquefied pounds	Solid pounds (cubic feet)	Liquid gallons (pounds)[d]	Gaseous cubic feet at NTP	Liquefied pounds	Solid pounds (cubic feet)	Liquid gallons (pounds)[d]
Flammable gas	~~Gaseous~~										

MATERIAL	CLASS	STORAGE				USE-CLOSED SYSTEMS				USE-OPEN SYSTEMS	
				Gas				Gas			
		Solid pounds (cubic feet)	Liquid gallons (pounds)	Gaseous cubic feet at NTP	Liquefied pounds	Solid pounds (cubic feet)	Liquid gallons (pounds)	Gaseous cubic feet at NTP	Liquefied pounds	Solid pounds (cubic feet)	Liquid gallons (pounds)
	1A and 1B (High BV)[e]	NA	NA	3,000	300	NA	NA	1,500	150	NA	NA
	1B (Low BV)[e]			195,000	20,000			97,500	10,000		
	~~Liquefied~~										
	~~1A and 1B (High BV)[e]~~	~~NA~~	~~(300)~~	~~NA~~		~~NA~~	~~(150)~~	~~NA~~		~~NA~~	~~NA~~
	~~1B (Low BV)[e]~~		~~(20,000)~~				~~(10,000)~~				
Flammable solid	NA	500	NA	NA	NA	250	NA	NA		50	NA
Inert Gas	~~Gaseous~~NA	NA	NA	NL	NL	NA	NA	NL	NL	NA	NA
	~~Liquefied~~	~~NA~~	~~NA~~	~~NL~~		~~NA~~	~~NA~~	~~NL~~		~~NA~~	~~NA~~
Cryogenic inert	NA	NA	~~NA~~NL	~~NL~~NA	NA	NA	~~NA~~NL	~~NL~~NA	NA	NA	NA
Organic peroxide	Unclassified Detonable	1	(1)	NA	NA	0.25	(0.25)	NA	NA	0.25	(0.25)
Organic peroxide	I	20	(20)	NA	NA	10	(10)	NA	NA	2	(2)
	II	200	(200)	NA	NA	100	(100)	NA	NA	20	(20)
	III	500	(500)	NA	NA	250	(250)	NA	NA	50	(50)
	IV	NL	NL	NA	NA	NL	NL	NA	NA	NL	NL
	V	NL	NL	NA	NA	NL	NL	NA	NA	NL	NL
Oxidizer	4	2	(2)	NA	NA	1	(1)	NA	NA	0.25	(0.25)
	3	40	(40)	NA	NA	20	(20)	NA	NA	4	(4)
	2	1,000	(1,000)	NA	NA	500	(500)	NA	NA	100	(100)
	1	NL	NL	NA	NA	NL	NL	NA	NA	NL	NL
Oxidizing gas	~~Gaseous~~ NA	NA	NA	6,000	600	NA	NA	1,500	300	NA	NA
	~~Liquefied~~	~~NA~~	~~(600)~~	~~NA~~		~~NA~~	~~(300)~~	~~NA~~		~~NA~~	~~NA~~
Pyrophoric ~~materials~~	NA	8	(8)	100	8	4	(4)	10	4	0	0
Unstable (reactive)	4	2	(2)	20	2	1	(1)	2	0.2	0.25	(0.25)
	3 Detonable	2	(2)	20	2	1	(1)	2	0.2	0.25	(0.25)
	3 Nondetonable	20	(20)	200	20	10	(10)	10	1	1	(1)
	2	200	(200)	1,000	100	100	(100)	250	25	10	(10)
	1	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL
Water reactive	3	20	(20)	NA	NA	10	(10)	NA	NA	1	(1)
	2	200	(200)	NA	NA	100	(100)	NA	NA	10	(10)
	1	NL	NL	NA	NA	NL	NL	NA	NA	NL	NL

For SI: 1 pound = 0.454 kg, 1 gallon = 3.785 L, 1 cubic foot = 0.02832 m^3.

Na = Not Applicable, NL = Not Limited.

a. For gallons of liquids, divide the amount in pounds by 10 in accordance with Section 5003.1.2.

b. The aggregate quantities in storage and use shall not exceed the maximum allowable quantity for storage, including applicable increases.

c. The aggregate quantity of nonflammable solid and nonflammable or noncombustible liquid hazardous materials allowed in outdoor storage per single property under the same ownership or control used for retail or wholesale sales is allowed to exceed the maximum allowable quantity per control area where such storage is in accordance with Section 5003.11.

d. Quantities in parentheses indicate quantity units in parentheses at the head of each column.

e. “High BV” Category 1B flammable gas has a burning velocity greater than 3.9 in/s (10 cm/s). “Low BV” Category 1B flammable gas has a burning velocity of 3.9 in/s (10 cm/s) or less. Where the fundamental burning velocity for a gas is not known, the gas will be treated as Category 1A flammable gas.

TABLE 5003.1.1(4) MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A HEALTH HAZARD IN AN OUTDOOR CONTROL AREA[a, b, c, f]

MATERIAL	STORAGE				USE-CLOSED SYSTEMS				USE-OPEN SYSTEMS	
			Gas				Gas			
	Solid pounds	Liquid gallons (pounds)	Gaseous cubic feet at NTP ~~(pounds)~~	Liquefied pounds	Solid pounds	Liquid gallons (pounds)	Gaseous cubic feet at NTP ~~(pounds)~~	Liquefied pounds	Solid pounds	Liquid gallons (pounds)
Corrosives	20,000	2,000	~~Gaseous~~ 1,620 ~~Liquefied (300)~~	300	10,000	1,000	~~Gaseous~~ 810 ~~Liquefied (150)~~	150	1,000	100
Highly toxics	20	(20)	~~Gaseous~~ 40[d] ~~Liquefied (8)[d]~~	8[d]	10	(10)	~~Gaseous~~ 20[d] ~~Liquefied (4)[d]~~	4[d]	3	(3)
Toxics	1,000	(I,000)[e]	~~Gaseous~~ 1,620 ~~Liquefied (300)~~	300	500	50[e]	~~Gaseous~~ 810 ~~Liquefied (150)~~	150	125	(125)[e]

For SI: 1 cubic foot = 0.02832 m^3, 1 pound = 0.454 kg, 1 gallon = 3.785 L, 1 pound per square inch absolute = 6.895 kPa, °C = (°F – 32)/1.8.

a. For gallons of liquids, divide the amount in pounds by 10 in accordance with Section 5003.1.2.

b. The aggregate quantities in storage and use shall not exceed the maximum allowable quantity for storage, including applicable increases.

c. The aggregate quantity of nonflammable solid and nonflammable or noncombustible liquid hazardous materials allowed in outdoor storage per single property under the same ownership or control used for retail or wholesale sales is allowed to exceed the maximum allowable quantity per control area where such storage is in accordance with Section 5003.11.

d. Allowed only where used in *approved* exhausted gas cabinets, exhausted enclosures or under fume hoods.

e. The maximum allowable quantity per control area for toxic liquids with vapor pressures in excess of 1 psia at 77°F shall be the maximum allowable quantity per control area listed for highly toxic liquids.

f. Quantities in parentheses indicate quantity units in parentheses at the head of each column.

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Revise as follows:

[F] TABLE 307.1(1) MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD[a, c, i, l, m]

MATERIAL	CLASS	GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED	STORAGE[b]				USE-CLOSED SYSTEMS[b]				USE-OPEN SYSTEMS[b]	
					Gas				Gas			
			Solid pounds (cubic feet)	Liquid gallons (pounds)	Gaseous ~~(~~ cubic feet at NTP~~)~~	Liquefied pounds	Solid pounds (cubic feet)	Liquid gallons (pounds)	Gaseous ~~(~~ cubic feet at NTP~~)~~	Liquefied pounds	Solid pounds (cubic feet)	Liquid gallons (pounds)
Combustible dust	NA	H-2	See Note o	NA	NA	NA	See Note o	NA	NA	NA	See Note o	NA
Combustible fiber [o]	Loose	H-3	(100)	NA	NA	NA	(100)	NA	NA	NA	(20)	NA
	Baled		(1,000)				(1,000)				(200)	
Combustible liquid[n]	II	H-2 or H-3	NA	120[d, e]	NA	NA	NA	120[d]	NA	NA	NA	30[d]
	IIIA	H-2 or H-3		330[d, e]				330[d]				80[d]
	IIIB	NA		13,200[e, f]				13,200[f]				3,300[f]
Cryogenic flammable	NA	H-2	NA	45[d]	NA	NA	NA	45[d]	NA	NA	NA	10[d]
Cryogenic inert	NA	NA	NA	~~NA~~ NL	~~NL~~ NA	NA	NA	~~NA~~ NL	~~NL~~ NA	NA	NA	NA
Cryogenic oxidizing	NA	H-3	NA	45[d]	NA	NA	NA	45[d]	NA	NA	NA	10[d]
Explosives	Division 1.1	H-1	1[e, g]	(1)[e, g]	NA	NA	0.25[g]	(0.25)[g]	NA	NA	0.25[g]	(0.25)[g]
	Division 1.2	H-1	1[e, g]	(1)[e, g]			0.25[g]	(0.25)[g]			0.25[g]	(0.25)[g]
	Division 1.3	H-1 or H-2	5[e, g]	(5)[e, g]			1[g]	(1)[g]			1[g]	(1)[g]
	Division 1.4	H-3	50[e, g]	(50)[e, g]			50[g]	(50)[g]			NA	NA
	Division 1.4G	H-3	125[e, k]	NA			NA	NA			NA	NA
	Division 1.5	H-1	1[e, g]	(1)[e, g]			0.25[g]	(0.25)[g]			0.25[g]	(0.25)[g]
	Division 1.6	H-1	1[e, g]	NA			NA	NA			NA	NA
Flammable gas	~~Gaseous~~											
	1A and 1B (High BV)[p]	H-2	NA	NA	1,000[d, e]	150[d, e]	NA	NA	1,000[d, e]	150[d, e]	NA	NA
	1B (Low BV)[p]				162,500[d, e]	10,000[d, e]			162,500[d, e]	10,000[d, e]		
	~~Liquefied~~						~~NA~~					

MATERIAL	CLASS	GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED	STORAGE				USE-CLOSED SYSTEMS				USE-OPEN SYSTEMS	
					Gas				Gas			
			Solid pounds (cubic feet)	Liquid gallons (pounds)	Gaseous ~~(~~ cubic feet at NTP~~)~~	Liquefied pounds	Solid pounds (cubic feet)	Liquid gallons (pounds)	Gaseous ~~(~~ cubic feet at NTP~~)~~	Liquefied pounds	Solid pounds (cubic feet)	Liquid gallons (pounds)
	~~1A and 1B (High BV)[p]~~			~~(150)[d, e]~~	~~NA~~			~~(150)[d, e]~~	~~NA~~		~~NA~~	~~NA~~
	~~1B (Low BV)[p]~~			~~(10,000)[d, e]~~				~~(10,000)[d, e]~~				
Flammable liquid[n]	IA	H-2 or H-3	NA	30[d, e]	NA	NA	NA	30[d]	NA	NA	NA	10[d]
	IB and IC			120[d, e]				120[d]				30[d]
Flammable liquid, combination ~~(IA, IB, IC)~~[n]	~~NA~~ IA, IB, IC	H-2 or H-3	NA	120[d, e, h]	NA	NA	NA	120[d, h]	NA	NA	NA	30[d, h]
Flammable solid	NA	H-3	125[d, e]	NA	NA	NA	125[d]	NA	NA	NA	25[d]	NA
Inert gas	~~Gaseous~~ NA	NA	NA	NA	NL	NL	NA	NA	NL	NL	NA	NA
	~~Liquefied~~	~~NA~~	~~NA~~	~~NA~~	~~NL~~		~~NA~~	~~NA~~	~~NL~~		~~NA~~	~~NA~~
Organic peroxide	UD	H-1	1[e, g]	(1)[e, g]	NA	NA	0.25[g]	(0.25)[g]	NA	NA	0.25[g]	(0.25)[g]
	I	H-2	5[d, e]	(5)[d, e]			1[d]	(1)[d]			1[d]	(1)[d]
	II	H-3	50[d, e]	(50)[d, e]			50[d]	(50)[d]			10[d]	(10)[d]
	III	H-3	125[d, e]	(125)[d, e]			125[d]	(125)[d]			25[d]	(25)[d]
	IV	NA	NL	NL			NL	NL			NL	NL
	V	NA	NL	NL			NL	NL			NL	NL
Oxidizer	4	H-1	1[g]	(1)[e, g]	NA	NA	0.25[g]	(0.25)[g]	NA	NA	0.25[g]	(0.25)[g]
	3~~[j]~~	H-2 or H-3	10[d, e]	(10)[d, e]			2[d]	(2)[d]			2[d]	(2)[d]
	2	H-3	250[d, e]	(250)[d, e]			250[d]	(250)[d]			50[d]	(50)[d]
	1	NA	4,000[e, f]	(4,000)[e, f]			4,000[f]	(4,000)[f]			1,000[f]	(1,000)[f]
Oxidizing gas	~~Gaseous~~ NA	H-3	NA	NA	1,500[d, e]	150[d, e]	NA	NA	1,500[d,e]	150[d, e]	NA	NA
	~~Liquefied~~			~~(150)[d, e]~~	~~NA~~			~~(150)[d,e]~~	~~NA~~			
Pyrophoric	NA	H-2	4[e, g]	(4)[e, g]	50[e, g]	4[e, g]	1[g]	(1)[g]	10[e, g]	1[e, g]	0	0
Unstable (reactive)	4	H-1	1[e, g]	(1)[e, g]	10[e, g]	1[e, g]	0.25[g]	(0.25)[g]	2[e, g]	1[e, g]	0.25[g]	(0.25)[g]
	3 Detonable	H-1	1[d, e]	(1)[d, e]	10[d, e]	1[d, e]	0.25[d]	(0.25)[d]	2[d, e]	1[d, e]	0.25[d]	(0.25)[d]
	3 Nondetonable	~~H-1 or~~ H-2	5[d, e]	(5)[d, e]	50[d, e]	2[d, e]	1[d]	(1)[d]	10[d, e]	2[d, e]	1[d]	(1)[d]
	2	H-3	50[d, e]	(50)[d, e]	750[d, e]	150[d, e]	50[d]	(50)[d]	750[d, e]	150[d, e]	10[d]	(10)[d]
	1	NA	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL
Water reactive	3	H-2	5[d, e]	(5)[d, e]	NA	NA	5[d]	(5)[d]	NA	NA	1[d]	(1)[d]
	2	H-3	50[d, e]	(50)[d, e]			50[d]	(50)[d]			10[d]	(10)[d]
	1	NA	NL	NL			NL	NL			NL	NL

For SI: 1 cubic foot = 0.028 m^3, 1 pound = 0.454 kg, 1 gallon = 3.785 L.

NL = Not Limited; NA = Not Applicable; UD = Unclassified Detonable.

a. For use of control areas, see Section 414.2.

b. The aggregate quantity in use and storage shall not exceed the maximum allowable quantity for storage, including applicable increases.

c. For hazardous materials in Group B higher education laboratory occupancies, see Section 428 of this code and Chapter 38 of the *International Fire Code*.

d. Maximum allowable quantities shall be increased 100 percent in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1. Where Note e also applies, the increase for both notes shall be applied accumulatively.

e. Maximum allowable quantities shall be increased 100 percent when stored in approved storage cabinets, day boxes, gas cabinets, gas rooms or exhausted enclosures or in listed safety cans in accordance with Section 5003.9.10 of the International Fire Code. Where Note d also applies, the increase for both notes shall be applied accumulatively.

f. Quantities shall not be limited in a building equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

g. Allowed only in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

h. Containing not more than the maximum allowable quantity per control area of Class IA, IB or IC flammable liquids.

i . Quantities in parentheses indicate quantity units in parentheses at the head of each column.

j . A maximum quantity of 220 pounds of solid or 22 gallons of liquid Class 3 oxidizers is allowed when such materials are necessary for maintenance purposes, operation or sanitation of equipment when the storage containers and the manner of storage are approved.

k . Net weight of the pyrotechnic composition of the fireworks. Where the net weight of the pyrotechnic composition of the fireworks is not known, 25 percent of the gross weight of the fireworks, including packaging, shall be used.

l . For gallons of liquids, divide the amount in pounds by 10 in accordance with Section 5003.1.2 of the International Fire Code.

m . For oxidizers, unstable (reactive) materials, and water-reactive materials stored or displayed in Group M occupancies or stored in Group S occupancies, see Section 414.2.5.1.

n . For flammable and combustible liquid storage in Group M occupancy wholesale and retail sales uses, see Section 414.2.5.2.

o . Where manufactured, generated or used in such a manner that the concentration and conditions create a fire or explosion hazard based on information prepared in accordance with Section 414.1.3.

p. "High BV" Category 1B flammable gas has a burning velocity greater than 3.9 inches per second (10 cm/s). "Low BV" Category 1B flammable gas has a burning velocity of 3.9 inches per second (10 cm/s) or less. Where the fundamental burning velocity for a gas is not known, the gas will be treated as Category 1A flammable gas.

[F] TABLE 307.1(2) MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A HEALTH HAZARD[a, c, h, i]

MATERIAL	STORAGE[b]				USE-CLOSED SYSTEMS[b]				USE-OPEN SYSTEMS[b]	
			Gas				Gas			
	Solid pounds[d, e, f]	Liquid gallons (pounds)[d, e, f]	Gaseous cubic feet at NTP ~~(pounds)~~[d]	Liquefied pounds[d]	Solid pounds[d]	Liquid gallons (pounds)[d]	Gaseous cubic feet at NTP ~~(pounds)~~[d]	Liquefied pounds[d]	Solid pounds[d]	Liquid gallons (pounds)[d]
Corrosives	5,000	500	~~Gaseous~~ 810[e]	150[e]	5,000	500	~~Gaseous~~ 810[e]	150[e]	1,000	100
			~~Liquefied (150)~~				~~Liquefied (150)~~			
Highly Toxic	10	(10)	~~Gaseous~~ 20[g]	4[g]	10	(10)	~~Gaseous~~ 20[g]	4[g]	3	(3)
			~~Liquefied (4)~~[g]				~~Liquefied (4)~~[g]			
Toxic	500	(500)	~~Gaseous~~ 810[e]	150[e]	500	(500)	~~Gaseous~~ 810[e]	150[e]	125	(125)
			~~Liquefied (150)~~[e]				~~Liquefied (150)~~[e]			

For SI: 1 cubic foot = 0.028 m^3, 1 pound = 0.454 kg, 1 gallon = 3.785 L.

a. For use of control areas, see Section 414.2.

b. The aggregate quantity in use and storage shall not exceed the maximum allowable quantity for storage, including applicable increases.

c. For hazardous materials in Group B higher education laboratory occupancies, see Section 428 of this code and Chapter 38 of the *International Fire Code*.

d. Maximum allowable quantities shall be increased 100 percent in buildings equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1. Where Note e also applies, the increase for both notes shall be applied accumulatively.

e. Maximum allowable quantities shall be increased 100 percent where stored in approved storage cabinets, gas cabinets or exhausted enclosures as specified in the *International Fire Code*. Where Note d also applies, the increase for both notes shall be applied accumulatively.

f. For corrosive, highly toxic and toxic materials stored or displayed in Group M occupancies or stored in Group S occupancies, see Section 414.2.5.1.

g. Allowed only where stored in approved exhausted gas cabinets or exhausted enclosures as specified in the *International Fire Code*.

h. Quantities in parentheses indicate quantity units in parentheses at the head of each column.

i. For gallons of liquids, divide the amount in pounds by 10 in accordance with Section 5003.1.2 of the International Fire Code.

Reason: The intent of this proposal is to clarify the MAQ tables and to insert new columns for "liquefied gases" under Storage and Use-Closed Systems. Several line entries for gases in the tables specify an MAQ for compressed gases in a gaseous state and in a liquefied state. See Table 503.1.1.1(1) for Flammable Gas, Inert Gas, and Oxidizing Gas. However, not all materials are listed in this fashion. For those other materials, the applicant must attempt to determine an equivalency for liquefied gases as compared to compressed gases. The inclusion of these new columns in the table resolves this issue and provides the appropriate MAQ.

The MAQ for each class of material is already allowed to include both compressed gases and liquefied gases. This is demonstrated in the reason statement for F169-06/07 which initially added liquefied gas MAQs into the tables where previously the tables only listed gaseous MAQs. The following is a portion of the reason statement indicating that the intent was to allow an MAQ for compressed gases in a gaseous state and in a liquefied state, and that both were allowed. “It may be argued that by recognizing the common forms of gases, e.g., liquefied and nonliquefied allows a defacto increase in the threshold levels applied. It is possible that one could have a toxic gas that is liquefied and also one that is nonliquefied in the same area therefore doubling the aggregate quantity of gas if all was considered. While this is theoretically possible, it is not considered to be the norm. In addition, there is precedent in using the approach as established in Table 2703.1.1(1) *[Table 5003.1.1(1) in the 2024 IFC]* for flammable and oxidizing gases.”

This proposal is simply separating out the gaseous MAQ from the liquefied MAQ to provide clarity to the table and to reinforce the fact that a control area is allowed to contain both gaseous and liquefied gases provided the individual MAQs are not exceeded.

General comments that apply to all of the tables:

- In the header, the column "Gas" is split into gaseous and liquefied. The units for Gaseous are cubic feet at NTP; the units for liquefied is pounds.
- Cryogenic Flammable: the MAQ of 45 gallons is *NOT* relocated under liquefied gas. The definition of compressed gases, gaseous does not include Cryogenic fluids. This reinforces the fact that cryogenic fluids are not included with liquefied gases.
- Cryogenic Inert: the MAQ of not limited is relocated to the column for liquids. This is consistent with all the other cryogenic fluid entries.
- Cryogenic Oxidizing: treated the same as cryogenic flammable noted above.
- Oxidizing Gas: the MAQ for liquefied is relocated under liquefied gas.

Specific comments for each table are below.

IFC Table 5003.1.1(1) and IBC Table 307.1(1)

- Parenthesis around “cubic feet at NTP” are removed from the heading for Gas in storage and Use-Closed Systems. Footnote i states that where values in the cells are in parentheses, then the units in parentheses in the header will apply. For liquids, the table has values with or without parentheses. However, the values for gases are all without parentheses even though the unit of cubic feet is parenthetical. The table currently has a discrepancy and this revision will clarify the use of cubic feet.
- Pyrophoric: MAQs for liquefied gas storage are from NFPA 55 Table 6.3.1.1, NFPA 1 Table 61.4.2.1.1.3 and NFPA 400 Table 5.2.1.1.3.
- Pyrophoric: Table 6.3.1.1 in NFPA 55 shows 4 lbs for use-closed for liquefied pyrophoric gas. However, the IFC reduces the use-closed for gaseous pyrophoric gas from 50 to 10, so the liquefied MAQ is reduced to 1 gallon. 1 gallon is also the MAQ for use-closed liquid pyrophorics.
- Unstable (reactive): this category includes Class 1 through 4, but Class 3 indicates that the occupancy might be Group H-1 or H-2. The problem is that no guidance is provided to determine if Group H-1 is appropriate or if H-2 is correct. This proposal separates out Class 3 Detonable and places it in Group H-1; while Class 3 Nondetonable will result in Group H-2 classification. This is clarification as to how to apply the proper occupancy classification when the MAQ is exceeded. MAQs assigned to Class 3 detonable are the same as Class 4, which is also detonable; however, the Footnote d (increase for sprinklers) that previously

applied to all Class 3 materials is applied to Class 3 detonable, and Footnote g which requires a sprinklered building for Class 4 does not apply to Class 3 detonable. This provides a separation between the requirements for Class 4 and Class 3 detonable.

- Unstable (reactive) gas: MAQs for liquefied gas come from NFPA 55 Table 6.3.1.1, NFPA 1 Table 61.4.2.1.1.3 and NFPA 400 Table 5.2.1.1.3.
- Footnote q is revised to clarify that flammable gases that do not have supporting data to justify reducing the classification to Category 1B shall be classified as Category 1A. This is consistent with GHS 7 guidance and provides clarity that the default is Category 1A.

IFC Table 5003.1.1(2) and IBC Table 307.1(2)

- Under storage and use-closed systems for gaseous in the header, the unit of measure "(pounds)" is relocated to liquefied.

Table 5003.1.1(3)

- Pyrophoric: the category of “pyrophoric materials” is simply listed as “pyrophoric”. This is consistent with terminology in Table 5003.1.1(1).
- Pyrophoric: MAQs for liquefied gas are the same as the MAQ for liquid in pounds.
- Unstable (reactive): this category includes Class 1 through 4, but Class 3 indicates that the occupancy might be Group H-1 or H-2. The problem is that no guidance is provided to determine if Group H-1 is appropriate or if H-2 is correct. This proposal separates out Class 3 Detonable and places it in Group H-1; while Class 3 Nondetonable will result in Group H-2 classification. This is clarification as to how to apply the proper occupancy classification when the MAQ is exceeded.
- Unstable (reactive) gas: MAQs for liquefied gas are based on 10% of the MAQ for Unstable (reactive) compressed gas.

IFC Table 5003.1.1(4)

- Under storage and use-closed systems for gaseous in the header, the unit of measure "(pounds)" is relocated to liquefied.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This code change reformats the MAQ tables and includes provisions found elsewhere in the code or referenced standards.

F235-24

F236-24

IFC: TABLE 5003.1.1(1); IBC: [F] TABLE 307.1(1)

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2024 International Fire Code

Revise as follows:

TABLE 5003.1.1(1) MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD[a, c, i, l, m, o]

MATERIAL	CLASS	GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED	STORAGE[b]			USE-CLOSED SYSTEMS[b]			USE-OPEN SYSTEMS[b]	
			Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds (cubic feet)	Liquid gallons (pounds)
Combustible dust	NA	H-2	See Note p	NA	NA	See Note p	NA	NA	See Note p	NA
Combustible fibers [p]	Loose	H-3	(100)	NA	NA	(100)	NA	NA	(20)	NA
	Baled		(1,000)			(1,000)			(200)	
Combustible liquid	II	H-2 or H-3	NA	120[d, e]	NA	NA	120[d]	NA	NA	30[d]
	IIIA	H-2 or H-3		330[d, e]			330[d]			80[d]
	IIIB	NA		13,200[e, f]			13,200[f]			3,300[f]
CryogenicFlammable	NA	H-2	NA	45[d]	NA	NA	45[d]	NA	NA	10[d]
CryogenicInert	NA	NA	NA	NA	NL	NA	NA	NL	NA	NA
CryogenicOxidizing	NA	H-3	NA	45[d]	NA	NA	45[d]	NA	NA	10[d]
Explosives	Division 1.1	H-1	1[e, g]	(1)[e, g]	NA	0.25[g]	(0.25)[g]	NA	0.25[g]	(0.25)[g]
	Division 1.2	H-1	1[e, g]	(1)[e, g]		0.25[g]	(0.25)[g]		0.25[g]	(0.25)[g]
	Division 1.3	H-1 or H-2	5[e, g]	(5)[e, g]		1[g]	(1)[g]		1[g]	(1)[g]
	Division 1.4	H-3	50[e, g]	(50)[e, g]		50[g]	(50)[g]		NA	NA
	Division 1.4G	H-3	125[e, k]	NA		NA	NA		NA	NA
	Division 1.5	H-1	1[e, g]	(1)[e, g]		0.25[g]	(0.25)[g]		0.25[g]	(0.25)[g]
	Division 1.6	H-1	1[e, g]	NA		NA	NA		NA	NA
Flammable gas	Gaseous	H-2 or H-3	NA	NA		NA	NA		NA	NA
	1A and 1B (High BV)[q]				1,000[d, e]			1,000[d, e]		
	1B (Low BV)[q]				162,500[d, e]			162,500[d, e]		
	Liquefied				NA			NA		
	1A and 1B (High BV)[q]			(150)[d, e]			(150)[d, e]			
	1B (Low BV)[q]			(10,000)[d, e]			(10,000)[d, e]			
Flammable liquid[n]	IA IB and IC	H-2 or H-3	NA	30[d, e]	NA	NA	30[d]	NA	NA	10d
				120[d, e]			120[d]			30d
Flammable liquid, combination (IA, IB, IC) [n]	NA	H-2 or H-3	NA	120[d, e, h]	NA	NA	120[d, h]	NA	NA	30[d, h]
Flammable solid	NA	H-3	125[d, e]	NA	NA	125[d]	NA	NA	25[d]	NA
Inert gas	Gaseous	NA	NA	NA	NL	NA	NA	NL	NA	NA
	Liquefied	NA	NA	NA	NL	NA	NA	NL	NA	NA
Organic peroxide	UD	H-1	1[e, g]	(1)[e, g]	NA	0.25[g]	(0.25)[g]	NA	0.25[g]	(0.25)[g]
	I	H-2	5[d, e]	(5)[d, e]		1[d]	(1)[d]		1[d]	(1)[d]
	II	H-3	50[d, e]	(50)[d, e]		50[d]	(50)[d]		10[d]	(10)[d]
	III	H-3	125[d, e]	(125)[d, e]		125[d]	(125)[d]		25[d]	(25)[d]
	IV	NA	NL	NL		NL	NL		NL	NL
	V	NA	NL	NL		NL	NL		NL	NL
Oxidizer	4	H-1	1[g]	(1)[e, g]	NA	0.25[g]	(0.25)[g]	NA	0.25[g]	(0.25)[g]
	3[j]	H-2 or H-3	10[d, e]	(10)[d, e]		2[d]	(2)[d]		2[d]	(2)[d]
	2	H-3	250[d, e]	(250)[d, e]		250[d]	(250)[d]		50[d]	(50)[d]
	1	NA	4,000[e, f]	(4,000)[e, f]		4,000[f]	(4,000)[f]		1,000[f]	(1,000)[f]
Oxidizing gas	Gaseous	H-3	NA	NA	1,500[d,e]	NA	NA	1,500[d, e]	NA	NA
	Liquefied			(150)[d, e]	NA		(150)[d, e]	NA		
Pyrophoric	NA	H-2	4[e, g]	(4)[e, g]	50[e, g]	1[g]	(1)[g]	10[e, g]	0	0
Unstable (reactive)	4	H-1	1[e, g]	(1)[e, g]	10[e, g]	0.25[g]	(0.25)[g]	2[e, g]	0.25[g]	(0.25)[g]
	3	H-1 or H-2	5[d, e]	(5)[d, e]	50[d, e]	1[d]	(1)[d]	10[d, e]	1[d]	(1)[d]
	2	H-3	50[d, e]	(50)[d, e]	750[d, e]	50[d]	(50)[d]	750[d, e]	10[d]	(10)[d]
	1	NA	NL	NL	NL	NL	NL	NL	NL	NL

MATERIAL	CLASS	GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED	STORAGE			USE-CLOSED SYSTEMS			USE-OPEN SYSTEMS	
			Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds (cubic feet)	Liquid gallons (pounds)
Water reactive	3	H-2	5[d, e]	(5)[d, e]	NA	5[d]	(5)[d]	NA	1[d]	(1)[d]
	2	H-3	50[d, e]	(50)[d, e]		50[d]	(50)[d]		10[d]	(10)[d]
	1	NA	NL	NL		NL	NL		NL	NL

For SI: 1 cubic foot = 0.02832 m^3, 1 pound = 0.454 kg, 1 gallon = 3.785 L.

NA = Not Applicable, NL = Not Limited, UD = Unclassified Detonable.

a. For use of control areas, see Section 5003.8.3.

b. The aggregate quantity in use and storage shall not exceed the maximum allowance quantity for storage, including applicable increases.

c. For hazardous materials in Group B higher education laboratory occupancies, see Section 428 of the *International Building Code* and Chapter 38.

d. Maximum allowable quantities shall be increased 100 percent in buildings equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1. Where Note e applies, the increase for both notes shall be applied accumulatively.

e. Maximum allowable quantities shall be increased 100 percent where stored in approved storage cabinets, day boxes, gas cabinets, gas rooms, exhausted enclosures or in listed safety cans in accordance with Section 5003.9.10. Where Note d applies, the increase for both notes shall be applied accumulatively.

f. Quantities shall not be limited in a building equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1.

g. Allowed only in buildings equipped throughout with an approved automatic sprinkler system.

h. Containing not more than the maximum allowable quantity per control area of Class IA, Class IB or Class IC flammable liquids.

i. Quantities in parentheses indicate quantity units in parentheses at the head of each column.

j. A maximum quantity of 220 pounds of solid or 22 gallons of liquid Class 3 oxidizers is allowed where such materials are necessary for maintenance purposes, operation or sanitation of equipment where the storage containers and the manner of storage are approved.

k. Net weight of pyrotechnic composition of the fireworks. Where the net weight of the pyrotechnic composition of the fireworks is not known, 25 percent of the gross weight of the fireworks including packaging shall be used.

l. For gallons of liquids, divide the amount in pounds by 10 in accordance with Section 5003.1.2.

m. For oxidizers, unstable (reactive) materials and water-reactive materials stored or displayed in Group M occupancies or storedin Group S occupancies, see Section 5003.11..

n. For flammable and combustible liquid storage in Group M occupancy wholesale and retail sales uses, see Section 5704.3.6.

o. Quantities in this table shall be modified in accordance with Table 5003.1.1(5).

p. Where manufactured, generated or used in such a manner that the concentration and conditions create a fire or explosion hazard based on information prepared in accordance with Section 104.2.2.

q. "High BV" Category 1B flammable gas has a burning velocity greater than 3.9 in/s (10 cm/s). "Low BV" Category 1B flammable gas has a burning velocity of 3.9 in/s (10 cm/s) or less.

2024 International Building Code

Revise as follows:

[F] TABLE 307.1(1) MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD[a, c, i, l, m]

MATERIAL	CLASS	GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED	STORAGE[b]			USE-CLOSED SYSTEMS[b]			USE-OPEN SYSTEMS[b]	
			Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds (cubic feet)	Liquid gallons (pounds)
Combustible dust	NA	H-2	See Note o	NA	NA	See Note o	NA	NA	See Note o	NA
Combustible fiber[o]	Loose	H-3	(100)	NA	NA	(100)	NA	NA	(20)	NA
	Baled		(1,000)			(1,000)			(200)	
Combustible liquid[n]	II	H-2 or H-3	NA	120[d, e]	NA	NA	120[d]	NA	NA	30[d]
	IIIA	H-2 or H-3		330[d, e]			330[d]			80[d]
	IIIB	NA		13,200[e, f]			13,200[f]			3,300[f]
Cryogenic flammable	NA	H-2	NA	45[d]	NA	NA	45[d]	NA	NA	10[d]
Cryogenic inert	NA	NA	NA	NA	NL	NA	NA	NL	NA	NA
Cryogenic oxidizing	NA	H-3	NA	45[d]	NA	NA	45[d]	NA	NA	10[d]
Explosives	Division 1.1	H-1	1[e, g]	(1)[e, g]	NA	0.25[g]	(0.25)[g]	NA	0.25[g]	(0.25)[g]
	Division 1.2	H-1	1[e, g]	(1)[e, g]		0.25[g]	(0.25)[g]		0.25[g]	(0.25)[g]
	Division 1.3	H-1 or H-2	5[e, g]	(5)[e, g]		1[g]	(1)[g]		1[g]	(1)[g]
	Division 1.4	H-3	50[e, g]	(50)[e, g]		50[g]	(50)[g]		NA	NA
	Division 1.4G	H-3	125[e, k]	NA		NA	NA		NA	NA
	Division 1.5	H-1	1[e, g]	(1)[e, g]		0.25[g]	(0.25)[g]		0.25[g]	(0.25)[g]
	Division 1.6	H-1	1[e, g]	NA		NA	NA		NA	NA
Flammable gas	Gaseous	H-2 or H-3	NA	NA		NA	NA		NA	NA
	1A and 1B (High BV)[p]				1,000[d, e]			1,000[d, e]		
	1B (Low BV)[p]				162,500[d, e]			162,500[d, e]		
	Liquefied				NA			NA		
	1A and 1B (High BV)[p]			(150)[d, e]			(150)[d, e]			
	1B (Low BV)[p]			(10,000)[d, e]			(10,000)[d, e]			
Flammable liquid[n]	IA	H-2 or H-3	NA	30[d, e]	NA	NA	30[d]	NA	NA	10[d]
	IB and IC			120[d, e]			120[d]			30[d]
Flammable liquid, combination (IA, IB, IC)[n]	NA	H-2 or H-3	NA	120[d, e, h]	NA	NA	120[d, h]	NA	NA	30[d, h]
Flammable solid	NA	H-3	125[d, e]	NA	NA	125[d]	NA	NA	25[d]	NA
Inert gas	Gaseous	NA	NA	NA	NL	NA	NA	NL	NA	NA
	Liquefied	NA	NA	NA	NL	NA	NA	NL	NA	NA
Organic peroxide	UD	H-1	1[e, g]	(1)[e, g]	NA	0.25[g]	(0.25)[g]	NA	0.25[g]	(0.25)[g]
	I	H-2	5[d, e]	(5)[d, e]		1[d]	(1)[d]		1[d]	(1)[d]
	II	H-3	50[d, e]	(50)[d, e]		50[d]	(50)[d]		10[d]	(10)[d]
	III	H-3	125[d, e]	(125)[d, e]		125[d]	(125)[d]		25[d]	(25)[d]
	IV	NA	NL	NL		NL	NL		NL	NL
	V	NA	NL	NL		NL	NL		NL	NL
Oxidizer	4	H-1	1[g]	(1)[e, g]	NA	0.25[g]	(0.25)[g]	NA	0.25[g]	(0.25)[g]
	3[j]	H-2 or H-3	10[d, e]	(10)[d, e]		2[d]	(2)[d]		2[d]	(2)[d]
	2	H-3	250[d, e]	(250)[d, e]		250[d]	(250)[d]		50[d]	(50)[d]
	1	NA	4,000[e, f]	(4,000)[e, f]		4,000[f]	(4,000)[f]		1,000[f]	(1,000)[f]
Oxidizing gas	Gaseous	H-3	NA	NA	1,500[d, e]	NA	NA	1,500[d,e]	NA	NA
	Liquefied			(150)[d, e]	NA		(150)[d,e]	NA		
Pyrophoric	NA	H-2	4[e, g]	(4)[e, g]	50[e, g]	1[g]	(1)[g]	10[e, g]	0	0
Unstable (reactive)	4	H-1	1[e, g]	(1)[e, g]	10[e, g]	0.25[g]	(0.25)[g]	2[e, g]	0.25[g]	(0.25)[g]
	3	H-1 or H-2	5[d, e]	(5)[d, e]	50[d, e]	1[d]	(1)[d]	10[d, e]	1[d]	(1)[d]
	2	H-3	50[d, e]	(50)[d, e]	750[d, e]	50[d]	(50)[d]	750[d, e]	10[d]	(10)[d]
	1	NA	NL	NL	NL	NL	NL	NL	NL	NL
Water reactive	3	H-2	5[d, e]	(5)[d, e]	NA	5[d]	(5)[d]	NA	1[d]	(1)[d]
	2	H-3	50[d, e]	(50)[d, e]		50[d]	(50)[d]		10[d]	(10)[d]
	1	NA	NL	NL		NL	NL		NL	NL

For SI: 1 cubic foot = 0.028 m^3, 1 pound = 0.454 kg, 1 gallon = 3.785 L.

NL = Not Limited; NA = Not Applicable; UD = Unclassified Detonable.

a. For use of control areas, see Section 414.2.

b. The aggregate quantity in use and storage shall not exceed the maximum allowable quantity for storage, including applicable increases.

c. For hazardous materials in Group B higher education laboratory occupancies, see Section 428 of this code and Chapter 38 of the *International Fire Code*.

d. Maximum allowable quantities shall be increased 100 percent in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1. Where Note e also applies, the increase for both notes shall be applied accumulatively.

e. Maximum allowable quantities shall be increased 100 percent when stored in approved storage cabinets, day boxes, gas cabinets, gas rooms or exhausted enclosures or in listed safety cans in accordance with Section 5003.9.10 of the International Fire Code. Where Note d also applies, the increase for both notes shall be applied accumulatively.

f. Quantities shall not be limited in a building equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

g. Allowed only in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

h. Containing not more than the maximum allowable quantity per control area of Class IA, IB or IC flammable liquids.

i . Quantities in parentheses indicate quantity units in parentheses at the head of each column.

j . A maximum quantity of 220 pounds of solid or 22 gallons of liquid Class 3 oxidizers is allowed when such materials are necessary for maintenance purposes, operation or sanitation of equipment when the storage containers and the manner of storage are approved.

k . Net weight of the pyrotechnic composition of the fireworks. Where the net weight of the pyrotechnic composition of the fireworks is not known, 25 percent of the gross weight of the fireworks, including packaging, shall be used.

l . For gallons of liquids, divide the amount in pounds by 10 in accordance with Section 5003.1.2 of the International Fire Code.

m . For oxidizers, unstable (reactive) materials, and water-reactive materials stored or displayed in Group M occupancies or stored in Group S occupancies, see Section 414.2.5.1.

n . For flammable and combustible liquid storage in Group M occupancy wholesale and retail sales uses, see Section 414.2.5.2.

o . Where manufactured, generated or used in such a manner that the concentration and conditions create a fire or explosion hazard based on information prepared in accordance with Section 414.1.3.

p. “High BV” Category 1B flammable gas has a burning velocity greater than 3.9 inches per second (10 cm/s). "Low BV" Category 1B flammable gas has a burning velocity of 3.9 inches per second (10 cm/s) or less.

Reason: This is an editorial correlation. Adding “or H-3” to the MAQ Tables for flammable gas correlates with what has already been changed in 307.4 and 307.5.

[F] 307.4 High-hazard Group H-2.

Buildings and structures containing materials that pose a deflagration hazard or a hazard from accelerated burning shall be classified as Group H-2. Such materials shall include, but not be limited to, the following:

Category 1B flammable gases having a burning velocity greater than 3.9 inches per second (10 cm/s) *...*

[F] 307.5 High-hazard Group H-3.

Buildings and structures containing materials that readily support combustion or that pose a physical hazard shall be classified as Group H-3. Such materials shall include, but not be limited to, the following:

Category 1B flammable gases having a burning velocity of 3.9 inches per second (10 cm/s) or less *...*

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Simply correlates the tables with change already made to the IBC.

F236-24

F237-24

IFC: TABLE 5003.1.1(1), TABLE 5003.1.1(3); IBC: [F] TABLE 307.1(1)

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Kris Jaggari, Nouryon/OPPSD Representative (kris.jaggari@nouryon.com)

2024 International Fire Code

Revise as follows:

TABLE 5003.1.1(1) MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD[a, c, i, l, m, o]

MATERIAL	CLASS	GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED	STORAGE[b]			USE-CLOSED SYSTEMS[b]			USE-OPEN SYSTEMS[b]	
			Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds (cubic feet)	Liquid gallons (pounds)
Combustible dust	NA	H-2	See Note p	NA	NA	See Note p	NA	NA	See Note p	NA
Combustible fibers[p]	Loose	H-3	(100)	NA	NA	(100)	NA	NA	(20)	NA
	Baled		(1,000)			(1,000)			(200)	
Combustible liquid	II	H-2 or H-3	NA	120[d, e]	NA	NA	120[d]	NA	NA	30[d]
	IIIA	H-2 or H-3		330[d, e]			330[d]			80[d]
	IIIB	NA		13,200[e, f]			13,200[f]			3,300[f]
CryogenicFlammable	NA	H-2	NA	45[d]	NA	NA	45[d]	NA	NA	10[d]
CryogenicInert	NA	NA	NA	NA	NL	NA	NA	NL	NA	NA
CryogenicOxidizing	NA	H-3	NA	45[d]	NA	NA	45[d]	NA	NA	10[d]
Explosives	Division 1.1	H-1	1[e, g]	(1)[e, g]	NA	0.25[g]	(0.25)[g]	NA	0.25[g]	(0.25)[g]
	Division 1.2	H-1	1[e, g]	(1)[e, g]		0.25[g]	(0.25)[g]		0.25[g]	(0.25)[g]
	Division 1.3	H-1 or H-2	5[e, g]	(5)[e, g]		1[g]	(1)[g]		1[g]	(1)[g]
	Division 1.4	H-3	50[e, g]	(50)[e, g]		50[g]	(50)[g]		NA	NA
	Division 1.4G	H-3	125[e, k]	NA		NA	NA		NA	NA
	Division 1.5	H-1	1[e, g]	(1)[e, g]		0.25[g]	(0.25)[g]		0.25[g]	(0.25)[g]
	Division 1.6	H-1	1[e, g]	NA		NA	NA		NA	NA
Flammable gas	Gaseous	H-2	NA	NA		NA	NA		NA	NA
	1A and 1B (High BV)[q]				1,000[d, e]			1,000[d, e]		
	1B (Low BV)[q]				162,500[d, e]			162,500[d, e]		
	Liquefied				NA			NA		
	1A and 1B (High BV)[q]			(150)[d, e]			(150)[d, e]			
	1B (Low BV)[q]			(10,000)[d, e]			(10,000)[d, e]			
Flammable liquid[n]	IA	H-2 or H-3	NA	30[d, e]	NA	NA	30[d]	NA	NA	10d
	IB and IC			120[d, e]			120[d]			30d
Flammable liquid, De combination (IA, IB, IC) [n]	NA	H-2 or H-3	NA	120[d, e, h]	NA	NA	120[d, h]	NA	NA	30[d, h]
Flammable solid	NA	H-3	125[d, e]	NA	NA	125[d]	NA	NA	25[d]	NA
Inert gas	Gaseous	NA	NA	NA	NL	NA	NA	NL	NA	NA
	Liquefied	NA	NA	NA	NL	NA	NA	NL	NA	NA
Organic peroxide	UD	H-1	1[e, g]	(1)[e, g]	NA	0.25[g]	(0.25)[g]	NA	0.25[g]	(0.25)[g]
	I	H-2	16~~5~~[d, e]	(16~~5~~)[d, e]		16~~1~~[d]	(16~~1~~)[d]		8~~1~~[d]	(8~~1~~)[d]
	II	H-3	100~~50~~[d, e]	(100~~50~~)[d, e]		100~~50~~[d]	(100~~50~~)[d]		20~~10~~[d]	(20~~10~~)[d]
	III	H-3	400~~125~~[d, e]	(400~~125~~)[d, e]		400~~125~~[d]	(400~~125~~)[d]		100~~25~~[d]	(100~~25~~)[d]
	IV	NA	NL	NL		NL	NL		NL	NL
	V	NA	NL	NL		NL	NL		NL	NL
Oxidizer	4	H-1	1[g]	(1)[e, g]	NA	0.25[g]	(0.25)[g]	NA	0.25[g]	(0.25)[g]
	3[j]	H-2 or H-3	10[d, e]	(10)[d, e]		2[d]	(2)[d]		2[d]	(2)[d]
	2	H-3	250[d, e]	(250)[d, e]		250[d]	(250)[d]		50[d]	(50)[d]
	1	NA	4,000[e, f]	(4,000)[e, f]		4,000[f]	(4,000)[f]		1,000[f]	(1,000)[f]
Oxidizing gas	Gaseous	H-3	NA	NA	1,500[d,e]	NA	NA	1,500[d, e]	NA	NA
	Liquefied			(150)[d, e]	NA		(150)[d, e]	NA		
Pyrophoric	NA	H-2	4[e, g]	(4)[e, g]	50[e, g]	1[g]	(1)[g]	10[e, g]	0	0
Unstable (reactive)	4	H-1	1[e, g]	(1)[e, g]	10[e, g]	0.25[g]	(0.25)[g]	2[e, g]	0.25[g]	(0.25)[g]
	3	H-1 or H-2	5[d, e]	(5)[d, e]	50[d, e]	1[d]	(1)[d]	10[d, e]	1[d]	(1)[d]

MATERIAL	CLASS	GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED	STORAGE			USE-CLOSED SYSTEMS			USE-OPEN SYSTEMS	
			Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds (cubic feet)	Liquid gallons (pounds)
	2	H-3	50[d, e]	(50)[d, e]	750[d, e]	50[d]	(50)[d]	750[d, e]	10[d]	(10)[d]
	1	NA	NL	NL	NL	NL	NL	NL	NL	NL
Water reactive	3	H-2	5[d, e]	(5)[d, e]	NA	5[d]	(5)[d]	NA	1[d]	(1)[d]
	2	H-3	50[d, e]	(50)[d, e]		50[d]	(50)[d]		10[d]	(10)[d]
	1	NA	NL	NL		NL	NL		NL	NL

For SI: 1 cubic foot = 0.02832 m^3, 1 pound = 0.454 kg, 1 gallon = 3.785 L.NA = Not Applicable, NL = Not Limited, UD = Unclassified Detonable.

a. For use of control areas, see Section 5003.8.3.

b. The aggregate quantity in use and storage shall not exceed the maximum allowance quantity for storage, including applicable increases.

c. For hazardous materials in Group B higher education laboratory occupancies, see Section 428 of the *International Building Code* and Chapter 38.

d. Maximum allowable quantities shall be increased 100 percent in buildings equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1. Where Note e applies, the increase for both notes shall be applied accumulatively.

e. Maximum allowable quantities shall be increased 100 percent where stored in approved storage cabinets, day boxes, gas cabinets, gas rooms, exhausted enclosures or in listed safety cans in accordance with Section 5003.9.10. Where Note d applies, the increase for both notes shall be applied accumulatively.

f. Quantities shall not be limited in a building equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1.

g. Allowed only in buildings equipped throughout with an approved automatic sprinkler system.

h. Containing not more than the maximum allowable quantity per control area of Class IA, Class IB or Class IC flammable liquids.

i. Quantities in parentheses indicate quantity units in parentheses at the head of each column.

j. A maximum quantity of 220 pounds of solid or 22 gallons of liquid Class 3 oxidizers is allowed where such materials are necessary for maintenance purposes, operation or sanitation of equipment where the storage containers and the manner of storage are approved.

k. Net weight of pyrotechnic composition of the fireworks. Where the net weight of the pyrotechnic composition of the fireworks is not known, 25 percent of the gross weight of the fireworks including packaging shall be used.

l. For gallons of liquids, divide the amount in pounds by 10 in accordance with Section 5003.1.2.

m. For oxidizers, unstable (reactive) materials and water-reactive materials stored or displayed in Group M occupancies or storedin Group S occupancies, see Section 5003.11..

n. For flammable and combustible liquid storage in Group M occupancy wholesale and retail sales uses, see Section 5704.3.6.

o. Quantities in this table shall be modified in accordance with Table 5003.1.1(5).

p. Where manufactured, generated or used in such a manner that the concentration and conditions create a fire or explosion hazard based on information prepared in accordance with Section 104.2.2.

q. "High BV" Category 1B flammable gas has a burning velocity greater than 3.9 in/s (10 cm/s). "Low BV" Category 1B flammable gas has a burning velocity of 3.9 in/s (10 cm/s) or less.

TABLE 5003.1.1(3) MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD IN AN OUTDOOR CONTROL AREA[a, b, c, d]

		STORAGE[b]			USE-CLOSED SYSTEMS[b]			USE-OPEN SYSTEMS[b]	
MATERIAL	CLASS	Solid pounds (cubic feet)	Liquid gallons (pounds)[d]	Gas cubic feet at NTP	Solid pounds (cubic feet)	Liquid gallons (pounds)[d]	Gas cubic feet at NTP	Solid pounds (cubic feet)	Liquid gallons (pounds)[d]
Flammable gas	Gaseous	Not Applicable	Not Applicable		Not Applicable	Not Applicable		Not Applicable	Not Applicable
	1A and 1B (High BV)[e]			3,000			1,500		
	1B (Low BV)[e]			195,000			97,500		
	Liquefied			Not Applicable			Not Applicable		
	1A and 1B (High BV)[e]		(300)			(150)			
	1B (Low BV)[e]		(20,000)			(10,000)			
Flammable solid	Not Applicable	500	Not Applicable	Not Applicable	250	Not Applicable	Not Applicable	50	Not Applicable
Inert Gas	Gaseous	Not Applicable	Not Applicable	Not Limited	Not Applicable	Not Applicable	Not Limited	Not Applicable	Not Applicable
	Liquefied	Not Applicable	Not Applicable	Not Limited	Not Applicable	Not Applicable	Not Limited	Not Applicable	Not Applicable
Cryogenic inert	Not Applicable	Not Applicable	Not Applicable	Not Limited	Not Applicable	Not Applicable	Not Limited	Not Applicable	Not Applicable
Organic peroxide	Unclassified Detonable	1	(1)	Not Applicable	0.25	(0.25)	Not Applicable	0.25	(0.25)
Organic peroxide	I	20	(20)	Not Applicable	10	(10)	Not Applicable	8~~2~~	(8~~2~~)
	II	200	(200)		100	(100)		50~~20~~	(50~~20~~)
	III	840~~500~~	(840~~500~~)		400~~250~~	(400~~250~~)		200~~50~~	(200~~50~~)
	IV	Not Limited	Not Limited		Not Limited	Not Limited		Not Limited	Not Limited
	V	Not Limited	Not Limited		Not Limited	Not Limited		Not Limited	Not Limited
Oxidizer	4	2	(2)	Not Applicable	1	(1)	Not Applicable	0.25	(0.25)
	3	40	(40)		20	(20)		4	(4)
	2	1,000	(1,000)		500	(500)		100	(100)
	1	Not Limited	Not Limited		Not Limited	Not Limited		Not Limited	Not Limited
Oxidizing gas	Gaseous	Not Applicable	Not Applicable	6,000	Not Applicable	Not Applicable	1,500	Not Applicable	Not Applicable
	Liquefied		(600)	Not Applicable		(300)	Not Applicable		
Pyrophoric materials	Not Applicable	8	(8)	100	4	(4)	10	0	0
Unstable (reactive)	4	2	(2)	20	1	(1)	2	0.25	(0.25)
	3	20	(20)	200	10	(10)	10	1	(1)
	2	200	(200)	1,000	100	(100)	250	10	(10)
	1	Not Limited	Not Limited	Not Limited	Not Limited	Not Limited	Not Limited	Not Limited	Not Limited
Water reactive	3	20	(20)	Not Applicable	10	(10)	Not Applicable	1	(1)
	2	200	(200)		100	(100)		10	(10)
	1	Not Limited	Not Limited		Not Limited	Not Limited		Not Limited	Not Limited

For SI: 1 pound = 0.454 kg, 1 gallon = 3.785 L, 1 cubic foot = 0.02832 m^3.

a. For gallons of liquids, divide the amount in pounds by 10 in accordance with Section 5003.1.2.

b. The aggregate quantities in storage and use shall not exceed the maximum allowable quantity for storage, including applicable increases.

c. The aggregate quantity of nonflammable solid and nonflammable or noncombustible liquid hazardous materials allowed in outdoor storage per single property under the same ownership or control used for retail or wholesale sales is allowed to exceed the maximum allowable quantity per control area where such storage is in accordance with Section 5003.11.

d. Quantities in parentheses indicate quantity units in parentheses at the head of each column.

e. “High BV” Category 1B flammable gas has a burning velocity greater than 3.9 in/s (10 cm/s). “Low BV” Category 1B flammable gas has a burning velocity of 3.9 in/s (10 cm/s) or less.

2024 International Building Code

Revise as follows:

[F] TABLE 307.1(1) MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD[a, c, i, l, m]

MATERIAL	CLASS	GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED	STORAGE[b]			USE-CLOSED SYSTEMS[b]			USE-OPEN SYSTEMS[b]	
			Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds (cubic feet)	Liquid gallons (pounds)
Combustible dust	NA	H-2	See Note o	NA	NA	See Note o	NA	NA	See Note o	NA
Combustible fiber [o]	Loose	H-3	(100)	NA	NA	(100)	NA	NA	(20)	NA
	Baled		(1,000)			(1,000)			(200)	
Combustible liquid[n]	II	H-2 or H-3	NA	120[d, e]	NA	NA	120[d]	NA	NA	30[d]
	IIIA	H-2 or H-3		330[d, e]			330[d]			80[d]
	IIIB	NA		13,200[e, f]			13,200[f]			3,300[f]
Cryogenic flammable	NA	H-2	NA	45[d]	NA	NA	45[d]	NA	NA	10[d]
Cryogenic inert	NA	NA	NA	NA	NL	NA	NA	NL	NA	NA
Cryogenic oxidizing	NA	H-3	NA	45[d]	NA	NA	45[d]	NA	NA	10[d]
Explosives	Division 1.1	H-1	1[e, g]	(1)[e, g]	NA	0.25[g]	(0.25)[g]	NA	0.25[g]	(0.25)[g]
	Division 1.2	H-1	1[e, g]	(1)[e, g]		0.25[g]	(0.25)[g]		0.25[g]	(0.25)[g]
	Division 1.3	H-1 or H-2	5[e, g]	(5)[e, g]		1[g]	(1)[g]		1[g]	(1)[g]
	Division 1.4	H-3	50[e, g]	(50)[e, g]		50[g]	(50)[g]		NA	NA
	Division 1.4G	H-3	125[e, k]	NA		NA	NA		NA	NA
	Division 1.5	H-1	1[e, g]	(1)[e, g]		0.25[g]	(0.25)[g]		0.25[g]	(0.25)[g]
	Division 1.6	H-1	1[e, g]	NA		NA	NA		NA	NA
Flammable gas	Gaseous	H-2	NA	NA		NA	NA		NA	NA
	1A and 1B (High BV)[p]				1,000[d, e]			1,000[d, e]		
	1B (Low BV)[p]				162,500[d, e]			162,500[d, e]		
	Liquefied				NA			NA		
	1A and 1B (High BV)[p]			(150)[d, e]			(150)[d, e]			
	1B (Low BV)[p]			(10,000)[d, e]			(10,000)[d, e]			
Flammable liquid [n]	IA	H-2 or H-3	NA	30[d, e]	NA	NA	30[d]	NA	NA	10[d]
	IB and IC			120[d, e]			120[d]			30[d]
Flammable liquid, combination (IA, IB, IC) [n]	NA	H-2 or H-3	NA	120[d, e, h]	NA	NA	120[d, h]	NA	NA	30[d, h]
Flammable solid	NA	H-3	125[d, e]	NA	NA	125[d]	NA	NA	25[d]	NA
Inert gas	Gaseous	NA	NA	NA	NL	NA	NA	NL	NA	NA
	Liquefied	NA	NA	NA	NL	NA	NA	NL	NA	NA
Organic peroxide	UD	H-1	1[e, g]	(1)[e, g]	NA	0.25[g]	(0.25)[g]	NA	0.25[g]	(0.25)[g]
	I	H-2	16 ~~5~~[d, e]	(16 ~~5~~)[d, e]		16 ~~1~~[d]	(16 ~~1~~)[d]		8 ~~1~~[d]	(8 ~~1~~)[d]
	II	H-3	100 ~~50~~[d, e]	(100 ~~50~~)[d, e]		100 ~~50~~[d]	(100 ~~50~~)[d]		20 ~~10~~[d]	(20 ~~10~~)[d]
	III	H-3	400 ~~125~~[d, e]	(400 ~~125~~)[d, e]		400 ~~125~~[d]	(400 ~~125~~)[d]		100 ~~25~~[d]	(100 ~~25~~)[d]
	IV	NA	NL	NL		NL	NL		NL	NL
	V	NA	NL	NL		NL	NL		NL	NL
Oxidizer	4	H-1	1[g]	(1)[e, g]	NA	0.25[g]	(0.25)[g]	NA	0.25[g]	(0.25)[g]
	3[j]	H-2 or H-3	10[d, e]	(10)[d, e]		2[d]	(2)[d]		2[d]	(2)[d]
	2	H-3	250[d, e]	(250)[d, e]		250[d]	(250)[d]		50[d]	(50)[d]
	1	NA	4,000[e, f]	(4,000)[e, f]		4,000[f]	(4,000)[f]		1,000[f]	(1,000)[f]
Oxidizing gas	Gaseous	H-3	NA	NA	1,500[d, e]	NA	NA	1,500[d,e]	NA	NA
	Liquefied			(150)[d, e]	NA		(150)[d,e]	NA		
Pyrophoric	NA	H-2	4[e, g]	(4)[e, g]	50[e, g]	1[g]	(1)[g]	10[e, g]	0	0
Unstable (reactive)	4	H-1	1[e, g]	(1)[e, g]	10[e, g]	0.25[g]	(0.25)[g]	2[e, g]	0.25[g]	(0.25)[g]
	3	H-1 or H-2	5[d, e]	(5)[d, e]	50[d, e]	1[d]	(1)[d]	10[d, e]	1[d]	(1)[d]
	2	H-3	50[d, e]	(50)[d, e]	750[d, e]	50[d]	(50)[d]	750[d, e]	10[d]	(10)[d]
	1	NA	NL	NL	NL	NL	NL	NL	NL	NL
Water reactive	3	H-2	5[d, e]	(5)[d, e]	NA	5[d]	(5)[d]	NA	1[d]	(1)[d]
	2	H-3	50[d, e]	(50)[d, e]		50[d]	(50)[d]		10[d]	(10)[d]
	1	NA	NL	NL		NL	NL		NL	NL

For SI: 1 cubic foot = 0.028 m^3, 1 pound = 0.454 kg, 1 gallon = 3.785 L.

NL = Not Limited; NA = Not Applicable; UD = Unclassified Detonable.

a. For use of control areas, see Section 414.2.

b. The aggregate quantity in use and storage shall not exceed the maximum allowable quantity for storage, including applicable increases.

c. For hazardous materials in Group B higher education laboratory occupancies, see Section 428 of this code and Chapter 38 of the *International Fire Code*.

d. Maximum allowable quantities shall be increased 100 percent in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1. Where Note e also applies, the increase for both notes shall be applied accumulatively.

e. Maximum allowable quantities shall be increased 100 percent when stored in approved storage cabinets, day boxes, gas cabinets, gas rooms or exhausted enclosures or in listed safety cans in accordance with Section 5003.9.10 of the International Fire Code. Where Note d also applies, the increase for both notes shall be applied accumulatively.

f. Quantities shall not be limited in a building equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

g. Allowed only in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

h. Containing not more than the maximum allowable quantity per control area of Class IA, IB or IC flammable liquids.

i . Quantities in parentheses indicate quantity units in parentheses at the head of each column.

j . A maximum quantity of 220 pounds of solid or 22 gallons of liquid Class 3 oxidizers is allowed when such materials are necessary for maintenance purposes, operation or sanitation of equipment when the storage containers and the manner of storage are approved.

k . Net weight of the pyrotechnic composition of the fireworks. Where the net weight of the pyrotechnic composition of the fireworks is not known, 25 percent of the gross weight of the fireworks, including packaging, shall be used.

l . For gallons of liquids, divide the amount in pounds by 10 in accordance with Section 5003.1.2 of the International Fire Code.

m . For oxidizers, unstable (reactive) materials, and water-reactive materials stored or displayed in Group M occupancies or stored in Group S occupancies, see Section 414.2.5.1.

n . For flammable and combustible liquid storage in Group M occupancy wholesale and retail sales uses, see Section 414.2.5.2.

o . Where manufactured, generated or used in such a manner that the concentration and conditions create a fire or explosion hazard based on information prepared in accordance with Section 414.1.3.

p. “High BV” Category 1B flammable gas has a burning velocity greater than 3.9 inches per second (10 cm/s). "Low BV" Category 1B flammable gas has a burning velocity of 3.9 inches per second (10 cm/s) or less.

Reason: This code change proposal is to increase the MAQs for organic peroxides. The current MAQs in the control area are very low and have not been reviewed or changed for a very long time. There are many small users in the organic peroxide industry who use small quantities but are over the current MAQs. Small quantities would typically constitute a couple of gallons or a few 5-gallon containers depending on the storage classification of the organic peroxide. A 1-gallon container is an example of a smaller commercial package which typically can contain about 8 lbs of a Class I organic peroxide. An example of a common container for packaging a Class II, III or IV organic peroxide is a 5-gallon container which would contain about 35 lbs of an organic peroxide. Proposed increase in MAQs would allow a control area user to store a couple of 1-gallon containers of Class I organic peroxides or a few 5-gallon containers of other Class organic peroxides. Most importantly, with the proposed code changes in Chapter 62 as part of code change proposal # 9867, control area users shall now comply with applicable requirements of Chapter 62 in addition to Chapter 50 and other requirements. An organic peroxide safety incident can occur even when storing very small quantities. In addition, there are many organic peroxides that are temperature controlled and failure of refrigeration equipment or using improper equipment even when storing small quantities can result in fire and explosion. With the proposed code changes in Chapter 62, control area users would now require following some specific storage requirements outlined in Chapter 62 but not extensive construction requirements that would be required in Group H occupancy. Critical requirements like proper storage equipment, design to vent an overpressure event, separation distance from storage, meeting electrical classification, preventing contamination, using designed containers and quantities, meeting temperature control, monitoring and signs requirements, avoiding open flames, meeting hotwork, heating and cooling requirements, meeting storage tanks and dosing vessels requirements, segregating incompatible, flammable and combustible materials, meeting general requirements for the safe handling and use of organic peroxides and requirements for the safe transfer of organic peroxides including those with low flash points are now required to be followed by the control area users. These storage requirements would be adequate to safely store the proposed MAQs of organic peroxides, without putting undue burden on the small users to meet the other Group H occupancy requirements. Proposed MAQs are now closer to but still lower than quantities in corresponding table in NFPA 400 Chapter 5.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

The cost of construction is expected to decrease with this code change proposal. With the increase in MAQs, the code users can store slight increased quantities in a control area. This would mean the slight increase in MAQs would allow the code user to store these quantities without having to spend on a fire wall barrier and horizontal assemblies with fire-resistance rating in a mixed occupancy storage or having to locate the storage at a separation distance of at least 50 ft which may not be practical for most users who have space/land availability constraints. The exact decrease in cost is dependent on the storage quantity and the cost of fire barriers that the user would otherwise have to spend or the land area cost which varies by region, to accommodate the storage at a separation distance of at least 50 ft.

An example cost of decrease for a fire barrier used in a mixed occupancy building for an organic peroxide storage room size of 10 ft x 10 ft x 10 ft is $6000 for a 1-hour rated fire barrier wall/horizontal assembly construction and $7500 for a 2-hour rated fire barrier wall/horizontal assembly construction.

Cost of construction will not change for the code users that intend to store the current MAQs.

Estimated Immediate Cost Impact Justification (methodology and variables):

The exact immediate cost impact is difficult to arrive at and is dependent on the cost of fire barriers that the user would otherwise have to spend or the land area cost which varies by region, to accommodate the storage at a separation distance of at least 50 ft.

The above cost decrease example is based on the cost of construction of $12/sq ft for 1-hour rated fire barrier wall/horizontal assembly construction and $15/sq ft for a 2-hour rated fire barrier wall/horizontal assembly construction. This information was based on an estimate from a private contractor in the Milwaukee, WI area.

F237-24

F238-24

IFC: 5003.8.2; IBC: [F] 415.6.5

Proponents: William Koffel, Koffel Associates, Inc., Semiconductor Industry Association (wkoffel@koffel.com)

2024 International Fire Code

Revise as follows:

5003.8.2 Required detached buildings.
Group H<u>-1, H-2, and H-3</u> occupancies containing quantities of hazardous materials in excess of those set forth in Table 5003.8.2 shall be in detached buildings <u>in accordance with the applicable provisions of Sections 415.7 and 415.8 of the *International Building Code*.</u>.

<u>**Exceptions:**</u>

1. <u>Where a minimum of 80 feet separates each H-2 and H-3 occupancy in a Group H-5 mixed-occupancy building each H-2 and H-3 occupancy is allowed to contain quantities of hazardous materials up to, but not exceeding the quantities in Table 5003.8.2.</u>
2. <u>When approved by the fire code official and the quantities comply with Chapter 10 of NFPA 400, compliance with Table 5003.8.2 shall not be required.</u>

2024 International Building Code

Revise as follows:

[F] 415.6.5 <u>Required</u> ~~Detached~~ <u>detached</u> buildings ~~for Group H-1, H-2 or H-3 occupancy~~.
<u>Group H-1, H-2, and H-3 occupancies</u> ~~The storage or use of~~ <u>containing quantities of</u> *hazardous materials* in excess of ~~those~~ amounts specified in Table 415.6.5 shall be in <u>detached buildings in</u> accordance with the applicable provisions of Sections 415.7 and 415.8.

<u>**Exceptions:**</u>

1. <u>Where a minimum of 80 feet separates each H-2 and H-3 occupancy in a Group H-5 mixed-occupancy building each H-2 and H-3 occupancy is allowed to contain quantities of hazardous materials up to, but not exceeding, the quantities in Table 415.6.5.</u>
2. <u>Where approved by the fire code official and the quantities comply with Chapter 10 of NFPA 400, compliance with Table 415.6.5 shall not be required.</u>

Reason: The two sections in the IBC and IFC should read the same. As they currently exist, the application of the provisions are different.

The quantity limits in the tables are based on smaller factories, typically between 30,000 and 45,000 square feet. Today, HPM manufacturing facilities are much larger (200,000 sq. ft. and larger) with separate HPM rooms to accommodate the tools. Whereas the limits can be interpreted to be a building quantity limit, the proposal adds clarity to other methods of providing the same allocation of the quantity limits by using physical separation or engineering methods. In larger facilities, sufficient distance between groups of hazards within the same building to mitigation reactions between the groups can be considered equivalent to the detached building separation requirements of 50 feet plus 30 feet (80 ft.).

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0.00. The specific reduction in cost will be project specific.

Estimated Immediate Cost Impact Justification (methodology and variables):

The reduced cost is associated with providing an alternative to detached buildings and providing consistency between the IBC and IFC and providing or a consistent interpretation of the requirements.

F239-24

IFC: 5003.9.10, SECTION 202

Proponents: Kevin Scott, KH Scott & Associates LLC, self (khscottassoc@gmail.com)

2024 International Fire Code

Revise as follows:

5003.9.10 Safety cans.
Safety cans ~~shall be *listed* in accordance with UL 30 where~~ used to increase the *maximum allowable quantities per control area* of *flammable* or *combustible liquids* in accordance with Table 5003.1.1(1) shall be metal and *listed* in accordance with UL 30. ~~*Safety*~~Nonmetalic *safety cans* listed in accordance with UL 30 and *safety* *cans listed* in accordance with UL 1313 are allowed for *flammable* and *combustible liquids* where not used to increase the *maximum allowable quantities per control area* and for other hazardous material liquids in accordance with the listing.

SAFETY CAN. An *approved* container of not more than ~~5-gallon (19 L)~~5.3-gallon (20 L) capacity having a spring-closing lid and spout cover so designed that it will relieve internal pressure when subjected to fire exposure.

Reason: For several editions, the IFC has allowed an increase in the maximum allowable quantity of flammable or combustible liquids when stored in safety cans, provided the safety cans were listed to UL 30. When this provision was added to the code, UL 30 only addressed metal safety cans, as evidenced by the reference to UL 30 in Chapter 80 of the 2021 IFC below:

Chapter 80
UL 30—1995: Metal Safety Cans—with revisions through June 2014
5003.9.10, 5005.1.10, 5705.2.4, 5707.2

The UL standard has been revised and now titled UL 30 Metallic and Nonmetallic Safety Cans for Flammable and Combustible Liquids. It is now possible to obtain a nonmetallic safety can that is listed to UL 30.

The nonmetallic safety can was not intended to be allowed as a method of increasing the MAQ, and that is why the code specified safety cans listed to UL 30. Since the standard has changed, it is appropriate to revise the allowance for increasing the MAQ to specify a metallic safety can listed to UL 30. The nonmetallic safety can is allowed for storage and dispensing and can be listed to either UL 30 or UL 1313.

Cost Impact: Increase

Estimated Immediate Cost Impact:

The initial cost to purchase a safety can will result in about a 50% increase in cost. The annual maintenance cost should not increase. When replacements safety cans are needed, the prices will be similar to the purchase prices.

Estimated Immediate Cost Impact Justification (methodology and variables):

A search of the internet on November 20, 2023 shows a Type I metal safety can with an average cost of $60. A plastic safety can has an average cost of $40.

F239-24

F240-24

IFC: TABLE 5003.11.2; IBC: [F]TABLE 414.2.5.4

Proponents: Kevin Scott, KH Scott & Associates LLC, self (khscottassoc@gmail.com)

2024 International Fire Code

Revise as follows:

TABLE 5003.11.2 MAXIMUM ALLOWABLE QUANTITY OF LOW BURNING VELOCITY CATEGORY 1B FLAMMABLE GAS IN GROUP M AND S OCCUPANCIES PER CONTROL AREA[a]

CATEGORY 1B (Low BV)[d]	SPRINKLERED IN ACCORDANCE WITH NOTE B	NONSPRINKLERED
Gaseous	39,000 ft^3	195,000 ft^3
Liquified	40,000 lb[c]	20,000 lb

For SI: 1 pound = 0.454 kg, 1 cubic foot = 0.028 m^3.

BV = Fundamental Burning Velocity

a. Control areas shall be separated from each other by not less than a 1-hour fire barrier.

b. The building shall be equipped throughout with an approved automatic sprinkler system with a minimum sprinkler design density of Ordinary Hazard Group 2 in the area where flammable gases are stored or displayed.

c. Where storage areas exceed 50,000 square feet in area, the maximum allowable quantities area is allowed to be increased by 2 percent for each 1,000 square feet of area in excess of 50,000 square feet, up to not more than 100 percent of the table amounts. Separation of control areas is not required. The aggregate amount shall not exceed 80,000 pounds.

d. "Low BV" Category 1B flammable gas has a fundamental burning velocity of 3.9 in/s (10 cm/s) or less.

2024 International Building Code

Revise as follows:

[F]TABLE 414.2.5.4 MAXIMUM ALLOWABLE QUANTITY OF LOW BURNING VELOCITY CATEGORY 1B FLAMMABLE GAS IN GROUP M AND S OCCUPANCIES PER CONTROL AREA[a]

CATEGORY 1B (Low BV)[d]	MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA	
	Sprinklered[b]	Nonsprinklered
Gaseous	390,000 cu ft	195,000 cu ft
Liquefied	40,000 lb[c]	20,000 lb

For SI: 1 pound = 0.454 kg, 1 square foot = 0.0929 m^2, 1 cubic foot = 0.028 m^3, 1 inch per second = 2.54 cm/s.

BV = Fundamental Burning Velocity

a. Control areas shall be separated from each other by not less than a 1-hour fire barrier.

b. The building shall be equipped throughout with an approved automatic sprinkler system with a minimum sprinkler design density of Ordinary Hazard Group 2 in the area where flammable gases are stored or displayed.

c. Where storage areas exceed 50,000 square feet in area, the maximum allowable quantities area is allowed to be increased by 2 percent for each 1,000 square feet of area in excess of 50,000 square feet, up to not more than 100 percent of the table amounts. Separation of control areas is not required. The aggregate amount shall not exceed 80,000 pounds.

d. "Low BV" Category 1B flammable gas has a fundamental burning velocity of 3.9 in/s or less.

Reason: This proposal is an editorial revision to include information on the acronym “BV”. The acronym BV is used in the IFC table and the IBC table, however, there is no indication what BV represents.

BV is the fundamental burning velocity as specified in the definition of flammable gas in Section 202.

This is consistent with the format in other tables where an acronym is utilized in the table.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is simply an editorial clarification of the term BV.

F240-24

F241-24

IFC: TABLE 5003.11.2, TABLE 5704.3.4.1; IBC: [F]TABLE 414.2.5.2, [F]TABLE 414.2.5.4

Proponents: Kevin Scott, KH Scott & Associates LLC, self (khscottassoc@gmail.com)

2024 International Fire Code

Revise as follows:

TABLE 5003.11.2 MAXIMUM ALLOWABLE QUANTITY OF LOW BURNING VELOCITY CATEGORY 1B FLAMMABLE GAS IN GROUP M AND S OCCUPANCIES PER CONTROL AREA[a]

CATEGORY 1B (Low BV)[d]	SPRINKLERED IN ACCORDANCE WITH NOTE B	NONSPRINKLERED
Gaseous	39,000 ft^3	195,000 ft^3
Liquified	40,000 lb[c]	20,000 lb

For SI: 1 pound = 0.454 kg, 1 cubic foot = 0.028 m^3.

a. Control areas shall be separated from each other by not less than a 1-hour fire barrier.

b. The building shall be equipped throughout with an approved automatic sprinkler system with a minimum sprinkler design density of Ordinary Hazard Group 2 in the area where flammable gases are stored or displayed.

c. Where storage areas exceed 50,000 square feet in area, the maximum allowable quantities area is allowed to be increased by 2 percent for each 1,000 square feet of area in excess of 50,000 square feet, up to not more than 100 percent of the table amounts. ~~Separation of control areas is not required.~~ The aggregate amount shall not exceed 80,000 pounds.

d. "Low BV" Category 1B flammable gas has a burning velocity of 3.9 in/s (10 cm/s) or less.

TABLE 5704.3.4.1 MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF FLAMMABLE AND COMBUSTIBLE LIQUIDS IN WHOLESALE AND RETAIL SALES OCCUPANCIES[a]

TYPE OF LIQUID	MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA (gallons)		
	Sprinklered[b] in accordance with footnote densities and arrangements	Sprinklered in accordance with Tables 5704.3.6.3(4) through 5704.3.6.3(8) and Table 5704.3.7.5.1	Nonsprinklered
Class IA	60	60	30
Class IB, IC, II and IIIA	7,500[c]	15,000[c]	1,600
Class IIIB	Unlimited	Unlimited	13,200

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m^2, 1 gallon = 3.785 L, 1 gallon per minute per square foot = 40.75 L/min/m^2.

a. Control areas shall be separated from each other by not less than a 1-hour fire barrier.

b. To be considered as sprinklered, a building shall be equipped throughout with an *approved* automatic sprinkler system with a design providing minimum densities as follows:

1. For uncartoned commodities on shelves 6 feet or less in height where the ceiling height does not exceed 18 feet, quantities are those allowed with a minimum sprinkler design density of Ordinary Hazard Group 2.

2. For cartoned, palletized or racked commodities where storage is 4 feet 6 inches or less in height and where the ceiling height does not exceed 18 feet, quantities are those allowed with a minimum sprinkler design density of 0.21 gallon per minute per square foot over the most remote 1,500-square-foot area.

c. Where wholesale and retail sales or storage areas exceed 50,000 square feet in area, the maximum allowable quantities are allowed to be increased by 2 percent for each 1,000 square feet of area in excess of 50,000 square feet, up to not more than 100 percent of the table amounts. ~~A control area separation is not required.~~ The cumulative amounts, including amounts attained by having an additional control area, shall not exceed 30,000 gallons.

2024 International Building Code

Revise as follows:

[F]TABLE 414.2.5.2 MAXIMUM ALLOWABLE QUANTITY OF FLAMMABLE AND COMBUSTIBLE LIQUIDS IN WHOLESALE AND RETAIL SALES OCCUPANCIES PER CONTROL AREA[a]

TYPE OF LIQUID	MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA (gallons)		
	Sprinklered in accordance with Note b densities and arrangements	Sprinklered in accordance with Tables 5704.3.6.3(4) through 5704.3.6.3(8) and 5704.3.7.5.1 of the International Fire Code	Nonsprinklered
Class IA	60	60	30
Class IB, IC, II and IIIA	7,500[c]	15,000[c]	1,600
Class IIIB	Unlimited	Unlimited	13,200

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m^2, 1 gallon = 3.785 L, 1 gallon per minute per square foot = 40.75 L/min/m^2.

a. *Control areas* shall be separated from each other by not less than a 1-hour *fire barrier* wall.

b. To be considered as sprinklered, a *building* shall be equipped throughout with an *approved automatic sprinkler system* with a design providing minimum densities as follows:

   1. For uncartoned commodities on shelves 6 feet or less in height where the ceiling height does not exceed 18 feet, quantities are those permitted with a minimum sprinkler design density of Ordinary Hazard Group 2.

   2. For cartoned, palletized or racked commodities where storage is 4 feet 6 inches or less in height and where the ceiling height does not exceed 18 feet, quantities are those permitted with a minimum sprinkler design density of 0.21 gallon per minute per square foot over the most remote 1,500-square-foot area.

c. Where wholesale and retail sales or storage areas exceed 50,000 square feet in area, the maximum allowable quantities are allowed to be increased by 2 percent for each 1,000 square feet of area in excess of 50,000 square feet, up to not more than 100 percent of the table amounts. ~~A control area separation is not required.~~ The cumulative amounts, including amounts attained by having an additional control area, shall not exceed 30,000 gallons.

[F]TABLE 414.2.5.4 MAXIMUM ALLOWABLE QUANTITY OF LOW BURNING VELOCITY CATEGORY 1B FLAMMABLE GAS IN GROUP M AND S OCCUPANCIES PER CONTROL AREA[a]

CATEGORY 1B (Low BV)[d]	MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA	
	Sprinklered[b]	Nonsprinklered
Gaseous	390,000 cu ft	195,000 cu ft
Liquefied	40,000 lb[c]	20,000 lb

For SI: 1 pound = 0.454 kg, 1 square foot = 0.0929 m^2, 1 cubic foot = 0.028 m^3, 1 inch per second = 2.54 cm/s.

a. Control areas shall be separated from each other by not less than a 1-hour fire barrier.

b. The building shall be equipped throughout with an approved automatic sprinkler system with a minimum sprinkler design density of Ordinary Hazard Group 2 in the area where flammable gases are stored or displayed.

c. Where storage areas exceed 50,000 square feet in area, the maximum allowable quantities area is allowed to be increased by 2 percent for each 1,000 square feet of area in excess of 50,000 square feet, up to not more than 100 percent of the table amounts. ~~Separation of control areas is not required.~~ The aggregate amount shall not exceed 80,000 pounds.

d. "Low BV" Category 1B flammable gas has a burning velocity of 3.9 in/s or less.

Reason: Footnote c is revised by deleting only one sentence from the Footnote because this sentence creates confusion.

All of these tables, whether in the IFC or IBC, provide the maximum allowable quantity per control area. In other words, the quantities derived from this table represent the maximum in a single control area. This table does not address separation of multiple control areas.

Looking at Table 5704.3.4.1, Footnote c appears in the row addressing Classes IB, IC, II and IIIA liquids. The table provides the maximum quantity in a control area. When Footnote c is utilized, the quantity shown in the table for a single control area can be doubled, provided adequate floor area is available. Keep in mind that the increased quantity becomes the maximum allowed in a single control area—the increased quantity is not in a separate control area. The footnote modifies the maximum allowed quantity for a single control area. If a second control area was constructed and properly separated as required in Table 5003.8.3.2. In that situation with 2 control areas, the allowed quantity from Table 5704.3.4.1 would be allowed in each control area.

The fact that the sentence states “separation is not required” has resulted in the misinterpretation that 2 control areas exist, but they are not separated by 1-hour construction. Since it implies there are 2 control areas, applicants have attempted to double quantities of other hazardous materials by using the MAQ for each control area. While this is allowed for flammable and combustible liquids, there are specific limitations and criteria for the storage and display of those materials. Those provisions would not apply to all classes of hazardous materials.

This same concept is repeated in IFC Table 5003.11.2 and the companion tables in the IBC. Eliminating this sentence in these locations will remove the potential misapplication of code requirements.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The reason statement explains how this proposal is simply clarifying the intended application of the code with regard to control areas.

F241-24

F242-24

IFC: 5005.4.2

Proponents: Kevin Scott, KH Scott & Associates LLC, self (khscottassoc@gmail.com)

2024 International Fire Code

Revise as follows:

5005.4.2 Quantities not exceeding the maximum allowable quantity per control area.
Handling of hazardous materials in indoor locations in amounts not exceeding the *maximum allowable quantity per control area* indicated in Tables 5003.1.1(1) and 5003.1.1(2) shall be in accordance with Sections 5001~~,~~ and 5003~~ and 5005.1~~. Handling of hazardous materials in outdoor locations in amounts not exceeding the *maximum allowable quantity per control area* indicated in Tables 5003.1.1(3) and 5003.1.1(4) shall be in accordance with Sections 5001 and 5003.

Reason: This proposal removes an inappropriate reference in Section 5005.4.2 to correlate with Section 5005.1.

Section 5005.1 reads: "Use, dispensing and handling of hazardous materials in amounts exceeding the maximum allowable quantity per control area set forth in Section 5003.1 shall be in accordance with Sections 5001, 5003 and 5005. Use, dispensing and handling of hazardous materials in amounts not exceeding the maximum allowable quantity per control area set forth in Section 5003.1 shall be in accordance with Sections 5001 and 5003."

The second sentence of Section 5005.1 states that for quantities **not** exceeding the MAQ, use Sections 5001 and 5003 for handling provisions.

The first sentence of Section 5005.4.2 states that for quantities **not** exceeding the MAQ, use Sections 5001, 5003 and 5005.1. When you go back to 5005.1 it tells you that you never should have been in Section 5005.4.2. This is an incorrect reference to Section 5005.1 and should be deleted.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal simply correlates Section 5005.1 and Section 5005.4.2 and eliminates an unneeded reference.

F242-24

F243-24

IFC CHAPTER 51

Proponents: William Koffel, Koffel Associates, Inc., Household & Consumer Products Association (HCPA) (wkoffel@koffel.com)

2024 International Fire Code

CHAPTER 51 AEROSOLS

SECTION 5101 GENERAL

5101.1 Scope.
The provisions of this chapter, the *International Building Code* and NFPA 30B shall apply to the manufacturing, storage and display of aerosol products, aerosol cooking spray products and plastic aerosol 3 products. Manufacturing of aerosol products, aerosol cooking spray products and plastic aerosol 3 products using hazardous materials shall also comply with Chapter 50.

5101.2 Permit required.
Permits shall be required as set forth in Section 105.5.

5101.3 Safety Data Sheets. Safety Data Sheet (SDS) information for aerosol products displayed shall be kept on the premises at an *approved* location.

Delete without substitution:

~~**5101.4 Containers.**~~
~~Metal aerosol containers shall be limited to a maximum size of 33.8 fluid ounces (1000 ml). Plastic aerosol containers shall be limited to a maximum of 4 fluid ounces (118 ml) except as provided in Sections 5104.1.1 and 5104.1.2. Glass aerosol containers shall be limited to a maximum of 4 fluid ounces (118 ml).~~

SECTION 5102 DEFINITIONS

5102.1 Definitions.
The following terms are defined in Chapter 2:
AEROSOL CONTAINER.

AEROSOL PRODUCT.

Level 1 aerosol products.
Level 2 aerosol products.
Level 3 aerosol products.

AEROSOL PRODUCT WAREHOUSE.
PROPELLANT.

RETAIL DISPLAY AREA.

SECTION 5103 CLASSIFICATION OF AEROSOL PRODUCTS

Revise as follows:

5103.1 Classification levels.
Aerosol products shall be classified as Level 1, 2 or 3 in accordance with ~~Table 5103.1 and~~ NFPA 30B. Aerosol products in cartons that are not identified in accordance with this section shall be classified as Level 3.

Delete without substitution:

~~TABLE 5103.1 CLASSIFICATION OF AEROSOL PRODUCTS~~

CHEMICAL HEAT OF COMBUSTION		AEROSOL CLASSIFICATION
Greater than (Btu/lb)	Less than or equal to (Btu/lb)	
0	8,600	1
8,600	13,000	2
13,000	—	3

~~For SI: 1 British thermal unit per pound = 0.002326 kJ/g.~~

5103.2 Identification. Cartons or outer packaging shall be identified on not fewer than one exterior side with the classification level of the aerosol products contained within the carton.

5103.2.1 Aerosol products. Cartons or outer packaging containing aerosol products in metal containers or glass and plastic containers 4 fluid ounces. (118 ml) or less shall be clearly marked as follows:

LEVEL _________ AEROSOLS

5103.2.2 Aerosol cooking spray products. Cartons or outer packaging containing aerosol cooking spray products in metal containers shall be clearly marked as follows:

AEROSOL COOKING SPRAY

Revise as follows:

5103.2.3 Plastic aerosol products. Cartons or outer packaging containing aerosol products in plastic containers greater than 4 fluid ounces (118 ml) shall be clearly marked as follows:

PLASTIC AEROSOL 1, 2, 3 or X

SECTION 5104
INSIDE STORAGE OF AEROSOL PRODUCTS

Revise as follows:

5104.1 General.
The inside storage of Level 2 and 3 aerosol products , aerosol cooking sprays, plastic aerosol 2 products, and plastic aerosol 3 products shall comply with Section~~s~~ 5104.2~~ through 5104.8 and~~ NFPA 30B. Level 1 aerosol products and those aerosol products covered by Section 5104.1.1 shall be considered to be equivalent to a Class III commodity and shall comply with the requirements for palletized or rack storage in NFPA 13.

Delete without substitution:

~~5104.1.1 Plastic aerosol 1 products.~~
~~Aerosol products in plastic containers larger than 4 fluid ounces (118 ml), but not to exceed 33.8 fluid ounces (1000 ml), shall be allowed~~

~~only where in accordance with this section. The commodity classification shall be Class III commodities, as defined in NFPA 13 where any of the following conditions are met:~~

1. ~~Base product does not have a fire point where tested in accordance with ASTM D92, and nonflammable propellant.~~
2. ~~Base product does not sustain combustion as tested in accordance with DOTn 49 CFR Part 173, Appendix H, and nonflammable propellant.~~
3. ~~Base product contains up to 20 percent by volume (15.8 percent by weight) of ethanol, isopropyl alcohol or a combination thereof in an aqueous mix, and nonflammable propellant.~~
4. ~~Base product contains 4 percent by weight or less of an emulsified flammable liquefied gas propellant within an aqueous base. The propellant shall remain emulsified for the life of the product. Where such propellant is not permanently emulsified, the propellant shall be nonflammable.~~

~~5104.1.2 Plastic aerosol 3 products.~~
~~Plastic aerosol 3 products shall be defined as those that meet one of the following criteria:~~

1. ~~Base product does not have a fire point where tested in accordance with ASTM D92, and there is not more than 10 percent by weight flammable propellant.~~
2. ~~Base product does not sustain combustion as tested in accordance with DOTn 49 CFR 173, Appendix H, and there is not more than 10 percent by weight flammable propellant.~~
3. ~~Base product contains 50 percent by volume or less of flammable or combustible water-miscible alcohols in an aqueous mix, and there is not more than 10 percent by weight of flammable propellant.~~

~~5104.1.3 Plastic aerosol X products.~~
~~Plastic aerosol X products are those products, in containers larger than 4 fluid ounces (118 ml), that do not meet the criteria provided in Section 5104.1.1 or 5104.1.2.~~

Revise as follows:

5104.2 **~~5104.1.3.1~~ Storage, use or handling.** The storage, use or handling of plastic aerosol X products shall be prohibited.

Delete without substitution:

~~5104.2 Storage in Groups A, B, E, F, I and R.~~
~~Storage of Level 2 and 3 aerosol and plastic aerosol 3 products in occupancies in Groups A, B, E, F, I and R shall be limited to the following maximum quantities:~~

1. ~~A net weight of 1,000 pounds (454 kg) of Level 2 aerosol products.~~
2. ~~A net weight of 500 pounds (227 kg) of Level 3 aerosol and plastic aerosol 3 products.~~
3. ~~A combined net weight of 1,000 pounds (454 kg) of Level 2 and 3 aerosol and plastic aerosol 3 products.~~

~~The maximum quantity shall be increased 100 percent where the excess quantity is stored in storage cabinets in accordance with Section 5704.3.2.~~

~~5104.2.1 Excess storage.~~
~~Storage of quantities exceeding the maximum quantities indicated in Section 5104.2 shall be stored in separate inside *flammable liquid* storage rooms in accordance with Section 5104.5.~~

~~**5104.2.2 Aerosol cooking spray products.** Storage of aerosol cooking spray products in Group A, B, E, F, I and R occupancies shall not be more than 1,000 pounds (454 kg) net weight.~~

~~**5104.3 Storage in general purpose warehouses.**~~
~~Aerosol product storage in general purpose warehouses utilized only for warehousing-type operations involving mixed commodities shall comply with Section 5104.3.1, 5104.3.2. or 5104.3.3.~~

~~**5104.3.1 Nonsegregated storage**~~**.**
~~Storage consisting of solid pile, palletized or rack storage of Level 2 and 3 aerosol and plastic aerosol 3 products not segregated into areas utilized exclusively for the storage of aerosol products shall comply with Table 5104.3.1.~~

~~TABLE 5104.3.1 NONSEGREGATED STORAGE OF LEVEL 2 AND 3 AEROSOL AND PLASTIC AEROSOL 3 PRODUCTS IN GENERAL PURPOSE WAREHOUSES~~~~[b]~~

AEROSOL LEVEL	MAXIMUM NET WEIGHT PER FLOOR (pounds)[b]			
	Palletized or solid-pile storage		Rack storage	
	Unprotected	Protected[a]	Unprotected	Protected[a]
2	2,500	12,000	2,500	24,000
3	1,000	12,000	1,000	24,000
Combination 2 and 3	2,500	12,000	2,500	24,000

~~For SI: 1 foot = 304.8 mm, 1 pound = 0.454 kg, 1 square foot = 0.0929 m~~^{2}~~.~~

~~a. *Approved* automatic sprinkler system protection and storage arrangements shall comply with NFPA 30B. Sprinkler system protection shall extend 20 feet beyond the storage area containing the aerosol products.~~

~~b. Storage quantities indicated are the maximum permitted in any 50,000-square-foot area.~~

~~**5104.3.2 Segregated storage**~~**.**
~~Storage of Level 2 and 3 aerosol and plastic aerosol 3 products segregated into areas utilized exclusively for the storage of aerosol products shall comply with Table 5104.3.2 and Sections 5104.3.2.1 and 5104.3.2.2.~~

~~TABLE 5104.3.2 SEGREGATED STORAGE OF LEVEL 2 AND 3 AEROSOL PRODUCTS AND PLASTIC AEROSOL 3 PRODUCTS IN GENERAL PURPOSE WAREHOUSES~~

STORAGE SEPARATION	MAXIMUM SEGREGATED STORAGE AREA[a]		AUTOMATIC SPRINKLER SYSTEM REQUIREMENTS
	Percentage of building area (percent)	Area limitation (square feet)	
Separation area[e, f]	15	20,000	Notes b, c
Chain-link fence enclosure[d]	20	20,000	Notes b, c
1-hour fire-resistance-rated interior walls	20	30,000	Note b
2-hour fire-resistance-rated interior walls	25	40,000	Note b
3-hour fire-resistance-rated interior walls	30	50,000	Note b

~~For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m²~~.

- a. ~~The maximum segregated storage area shall be limited to the smaller of the two areas resulting from the percentage of building area limitation and the area limitation.~~
- b. ~~Automatic sprinkler system protection in aerosol product storage areas shall comply with NFPA 30B and be *approved*. Building areas not containing aerosol product storage shall be equipped throughout with an *approved* automatic sprinkler system in accordance with Section 903.3.1.1.~~
- c. ~~Automatic sprinkler system protection in aerosol product storage areas shall comply with NFPA 30B and be *approved*. Sprinkler system protection shall extend a minimum 20 feet beyond the aerosol storage area.~~
- d. ~~Chain-link fence enclosures shall comply with Section 5104.3.2.1.~~
- e. ~~A separation area shall be defined as an area extending outward from the periphery of the segregated aerosol product storage area as follows:~~
  1. ~~The limits of the aerosol product storage shall be clearly marked on the floor.~~
  2. ~~The separation distance shall be not less than 25 feet and maintained clear of all materials with a commodity classification greater than Class III in accordance with Section 903.3.1.1.~~
- f. ~~Separation areas shall only be permitted where *approved*.~~

~~5104.3.2.1 Chain-link fence enclosures.~~

~~Chain-link fence enclosures required by Table 5104.3.2 shall comply with the following:~~

1. ~~The fence shall be not less than No. 9 gage steel wire, woven into a maximum 2-inch (51 mm) diamond mesh.~~
2. ~~The fence shall be installed from the floor to the underside of the roof or ceiling above.~~
3. ~~Class IV and high-hazard commodities shall be stored outside of the aerosol storage area and not less than 8 feet (2438 mm) from the fence.~~
4. ~~Access openings in the fence shall be provided with either self- or automatic-closing devices or a labyrinth opening arrangement preventing aerosol containers from rocketing through the access openings.~~
5. ~~Not less than two *means of egress* shall be provided from the fenced enclosure.~~

~~5104.3.2.2 Aisles.~~

~~The minimum aisle requirements for segregated storage in general purpose warehouses shall comply with Table 5104.3.2.2.~~

~~TABLE 5104.3.2.2 SEGREGATED STORAGE AISLE WIDTHS AND DISTANCE TO AISLES IN GENERAL PURPOSE WAREHOUSES~~

STORAGE CONDITION	MINIMUM AISLE WIDTH (feet)	MAXIMUM DISTANCE FROM STORAGE TO AISLE (feet)
Solid pile or palletized[a]	4 feet between piles	25
Racks with ESFR sprinklers[a]	4 feet between racks and adjacent Level 2 and 3 aerosol product storage	25
Racks without ESFR sprinklers[a]	8 feet between racks and adjacent Level 2 and 3 aerosol product storage	25

~~For SI: 1 foot = 304.8 mm.~~

- a. ~~Sprinklers shall comply with NFPA 30B.~~

~~5104.3.3 Aerosol cooking spray products~~

~~**5104.3.3 Aerosol cooking spray products.**~~

~~Solid pile, palletized or rack storage of aerosol cooking spray products in a general purpose warehouse shall not be more than 2,500 pounds (1135 kg) net weight, unless protected in accordance with NFPA 30B.~~

~~**5104.4 Storage in aerosol product warehouses**~~**.**

~~The total quantity of Level 2 and 3 aerosol products, aerosol cooking sprays and plastic aerosol 3 products in a warehouse utilized for the storage, shipping and receiving of aerosol products shall not be restricted in structures complying with Sections 5104.4.1 through 5104.4.4.~~

~~**5104.4.1 Automatic sprinkler system**~~**.**

~~Aerosol product warehouses shall be protected by an *approved* wet-pipe *automatic sprinkler system* in accordance with NFPA 30B. Sprinkler protection shall be designed based on the highest classification level of aerosol product present.~~

~~**5104.4.2 Pile and palletized storage aisles.** Solid pile and palletized storage shall be arranged so the maximum travel distance to an aisle is 25 feet (7620 mm). Aisles shall have a minimum width of 4 feet (1219 mm).~~

~~**5104.4.3 Rack storage aisles.** Rack storage shall be arranged with a minimum aisle width of 8 feet (2438 mm) between rows of racks and 8 feet (2438 mm) between racks and adjacent solid pile or palletized storage. Where early suppression fast-response (ESFR) sprinklers provide automatic sprinkler protection, the minimum aisle width shall be 4 feet (1219 mm).~~

~~**5104.4.4 Combustible commodities.** Combustible commodities other than *flammable* and *combustible liquids* shall be permitted to be stored in an aerosol product warehouse.~~

> ~~**Exception:** *Flammable* and *combustible liquids* in 1-quart (946 ml) metal containers and smaller shall be permitted to be stored in an aerosol product warehouse.~~

~~**5104.5 Storage in inside flammable liquid storage rooms**~~**.**

~~Inside *flammable liquid* storage rooms shall comply with Section 5704.3.7. The maximum quantities of aerosol products shall comply with Section 5104.5.1 or 5104.5.2.~~

~~**5104.5.1 Storage rooms of 500 square feet or less.** The storage of aerosol products in *flammable liquid* storage rooms less than or equal to 500 square feet (46 m^2) in area shall not exceed the following quantities:~~

1. ~~A net weight of 1,000 pounds (454 kg) of Level 2 aerosol products.~~
2. ~~A net weight of 500 pounds (227 kg) of Level 3 aerosol and plastic aerosol 3 products.~~
3. ~~A combined net weight of 1,000 pounds (454 kg) of Level 2 and 3 aerosol and plastic aerosol 3 products.~~

~~**5104.5.2 Storage rooms greater than 500 square feet.**~~

~~The storage of aerosol products in *flammable liquid* storage rooms greater than 500 square feet (46 m^2) in area shall not exceed the following quantities:~~

1. ~~A net weight of 2,500 pounds (1135 kg) of Level 2 aerosol products.~~
2. ~~A net weight of 1,000 pounds (454 kg) of Level 3 aerosol products.~~
3. ~~A combined net weight of 2,500 pounds (1135 kg) of Level 2 and 3 aerosol and plastic aerosol 3 products.~~

~~The maximum aggregate storage quantity of Level 2 and 3 aerosol products permitted in separate inside storage rooms protected by an *approved automatic sprinkler system* in accordance with NFPA 30B shall be 5,000 pounds (2270 kg).~~

~~**5104.6 Storage in liquid warehouses**~~**.**

~~The storage of Level 2 and 3 aerosol products in liquid warehouses shall comply with NFPA 30B. The storage shall be located within segregated storage areas in accordance with Section 5104.3.2 and Sections 5104.6.1 through 5104.6.3.~~

~~**5104.6.1 Containment.** Spill control or drainage shall be provided to prevent the flow of liquid to within 8 feet (2438 mm) of the segregated storage area.~~

~~**5104.6.2 Sprinkler design.** Sprinkler protection shall be designed based on the highest level of aerosol product present.~~

~~**5104.6.3 Opening protection into segregated storage areas.** Fire doors or gates opening into the segregated storage area shall either be self-closing or provided with automatic-closing devices activated by sprinkler water flow or an *approved* fire detection system.~~

~~**5104.7 Storage in Group M occupancies**~~**.**

~~Storage of Level 2 and 3 aerosol products, aerosol cooking spray products and plastic aerosol 3 products in occupancies in Group M shall comply with Table 5104.7. Retail display shall comply with Section 5106.~~

~~**TABLE 5104.7 MAXIMUM QUANTITIES OF LEVEL 2 AND 3 AEROSOL PRODUCTS, AEROSOL COOKING SPRAY PRODUCTS AND PLASTIC AEROSOL 3 PRODUCTS IN RETAIL STORAGE AREAS**~~

MAXIMUM NET WEIGHT PER FLOOR (pounds)			
Floor	Nonsegregated storage[a, b]	Segregated storage	
		Storage cabinets[b]	Separated from retail area[c]
Basement	Not Permitted	Not Permitted	Not Permitted
Ground	2,500	5,000	Note d
Upper	500	1,000	Note d

~~For SI: 1 pound = 0.454 kg, 1 square foot = 0.0929 m²~~.

a. ~~The total aggregate quantity on display and in storage shall not exceed the maximum retail display quantity indicated in Section 5106.3.~~

b. ~~Storage quantities indicated are the maximum permitted in any 50,000-square-foot area.~~

c. ~~The storage area shall be separated from the retail area with a 1-hour fire-resistance-rated assembly.~~

d. ~~See Table 5104.3.2.~~

~~**5104.8 Storage of aerosol cooking spray products.** *Aerosol cooking spray products* shall be permitted to be stored in a general purpose warehouse.~~

~~**5104.8.1 Mixed storage.** Where *aerosol cooking spray products* are mixed with other higher-hazard aerosol products, the provided isolation, storage height restrictions and protection shall be based on the highest-hazard aerosol product present.~~

~~**5104.8.2 Storage conditions**~~**.**

~~The storage and handling of *aerosol cooking spray products* shall comply with this chapter and NFPA 30B.~~

SECTION 5105
OUTSIDE STORAGE

Revise as follows:

5105.1 General.
The outside storage of Level 2 and 3 aerosol products, plastic aerosol 2 products, and plastic aerosol 3 products, including storage in temporary storage trailers, shall be separated from exposures in accordance with Table 5105.1.

TABLE 5105.1 DISTANCE TO EXPOSURES FOR OUTSIDE STORAGE OF LEVEL 2 AND 3 AEROSOL PRODUCTS, PLASTIC AEROSOL 2 PRODUCTS, AND PLASTIC AEROSOL 3 PRODUCTS

EXPOSURE	MINIMUM DISTANCE FROM AEROSOL STORAGE (feet)[a]
Buildings	50
Exit discharge to a public way	50
Lot lines	20
Other outside storage	50
Public alleys, public ways, public streets	20

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

a. The minimum separation distance indicated is not required where exterior walls having a 2-hour fire-resistance rating without penetrations separate the storage from the exposure. The walls shall extend not less than 30 inches above and to the sides of Level 2 and 3 aerosol products, plastic aerosol 2 products, and plastic aerosol 3 products.

SECTION 5106
RETAIL DISPLAY

Revise as follows:

5106.1 General. ~~This section shall apply to t~~The retail display of 500 pounds (227 kg) or more of Level 2 and 3 aerosol products, aerosol cooking spray products, plastic aerosol 2 products and plastic aerosol 3 products shall comply with NFPA 30B.

Delete without substitution:

~~**5106.2 Aerosol display and normal merchandising not exceeding 8 feet in height.**~~
~~Aerosol display and normal merchandising not exceeding 8 feet (2438 mm) in height shall be in accordance with Sections 5106.2.1 through 5106.2.5.~~

~~**5106.2.1 Maximum quantities in retail display areas.**~~
~~Aerosol products, aerosol cooking spray products and plastic aerosol 3 products in retail display areas shall not exceed quantities needed for display and normal merchandising and shall not exceed the quantities in Table 5106.2.1.~~

~~**TABLE 5106.2.1 MAXIMUM QUANTITIES OF LEVEL 2 AND 3 AEROSOL PRODUCTS, AEROSOL COOKING SPRAY PRODUCTS AND PLASTIC AEROSOL 3 PRODUCTS IN RETAIL DISPLAY AREAS**~~

	MAXIMUM NET WEIGHT PER FLOOR (pounds)[b]		
Floor	Unprotected[a]	Protected inaccordance with Section 5106.2[a, c]	Protected inaccordance with Section 5106.3[c]
Basement	Not Allowed	500	500
Ground	2,500	10,000	10,000
Upper	500	2,000	Not Allowed

~~For SI: 1 pound = 0.454 kg, 1 square foot = 0.0929 m²~~~~.~~

a. ~~The total quantity shall not exceed 1,000 pounds net weight in any one 100-square-foot retail display area.~~

b. ~~Per 25,000-square-foot retail display area.~~

c. ~~Minimum Ordinary Hazard Group 2 wet-pipe automatic sprinkler system throughout the retail sales occupancy.~~

~~5106.2.2 Aerosol cooking spray product storage and fire protection~~.
~~The storage and handling of aerosol cooking spray products shall comply with this chapter and NFPA 30B.~~

~~5106.2.3 Display of aerosol products.~~ ~~Level 2 and 3 aerosol and plastic aerosol 3 products shall not be stacked more than 6 feet (1829 mm) high from the base of the aerosol product array to the top of the aerosol product array unless the aerosol products are placed on fixed shelving or otherwise secured in an *approved* manner. Where storage or retail display is on shelves, the height of such storage or retail display to the top of aerosol products shall not exceed 8 feet (2438 mm).~~

~~5106.2.4 Combustible cartons~~.
~~Aerosol products located in retail display areas shall be removed from combustible cartons.~~

~~Exceptions:~~

1. ~~Display areas that use a portion of combustible cartons that consist of only the bottom panel and not more than 2 inches (51 mm) of the side panel are allowed.~~
2. ~~Where the display area is protected in accordance with Tables 7.4.2.7(a) through 7.4.2.7(l) of NFPA 30B, storage of aerosol products in combustible cartons is allowed.~~

~~5106.2.5 Retail display automatic sprinkler system~~.
~~Where an *automatic sprinkler system* is required for the protected retail display of aerosol products, the wet-pipe *automatic sprinkler system* shall be in accordance with Section 903.3.1.1. The minimum system design shall be for an Ordinary Hazard Group 2 occupancy. The system shall be provided throughout the retail display area.~~

~~5106.3 Aerosol product display and normal merchandising exceeding 8 feet in height~~.
~~Aerosol product display and merchandising exceeding 8 feet (2438 mm) in height shall be in accordance with Sections 5106.3.1 through 5106.3.3.~~

~~5106.3.1 Maximum quantities in retail display areas~~.
~~Aerosol products in retail display areas shall not exceed quantities needed for display and normal merchandising and shall not exceed the quantities in Table 5106.2.1, with fire protection in accordance with Section 5106.3.2.~~

~~5106.3.2 Automatic sprinkler protection~~.
~~Aerosol product and plastic aerosol 3 product display and merchandising areas shall be protected by an *automatic sprinkler system* based on the requirements set forth in Tables 7.4.2.7(a) through 7.4.2.7(l) of NFPA 30B and the following:~~

1. ~~Protection shall be based on the highest level of aerosol product in the array and the packaging method of the storage located more than 6 feet (1829 mm) above the finished floor.~~
2. ~~Where using the cartoned aerosol products tables of NFPA 30B, uncartoned or display-cut Level 2 and 3 aerosol products and plastic aerosol 3 products shall not be permitted more than 6 feet (1829 mm) above the finished floor.~~

3. ~~The design area for Level 2 and 3 aerosol products and plastic aerosol 3 products shall extend not less than 20 feet (6096 mm) beyond the Level 2 and 3 aerosol product and plastic aerosol 3 product display and merchandising areas.~~
4. ~~Where ordinary and high-temperature ceiling sprinkler systems are adjacent to each other, noncombustible draft curtains shall be installed at the interface.~~

~~5106.3.3 Separation of Level 2 and 3 aerosol product and plastic aerosol 3 product areas~~.
~~Separation of Level 2 and 3 aerosol product areas or plastic aerosol 3 product areas shall comply with the following:~~

1. ~~Level 2 and 3 aerosol product or plastic aerosol 3 product display and merchandising areas shall be separated from each other by not less than 25 feet (7620 mm). See Table 5106.2.1.~~
2. ~~Level 2 and 3 aerosol product or plastic aerosol 3 product display and merchandising areas shall be separated from *flammable* and *combustible liquids* storage and display areas by one or a combination of the following:~~
   2.1. ~~Segregating areas from each other by horizontal distance of not less than 25 feet (7620 mm).~~
   2.2. ~~Isolating areas from each other by a noncombustible partition extending not less than 18 inches (457 mm) above the merchandise.~~
   2.3. ~~In accordance with Section 5106.5.~~
3. ~~Where Item 2.2 is used to separate Level 2 or 3 aerosol products or plastic aerosol 3 products from *flammable* or *combustible liquids*, and the aerosol products are located within 25 feet (7620 mm) of *flammable* or *combustible liquids*, the area below the noncombustible partition shall be liquid tight at the floor to prevent spilled liquids from flowing beneath the aerosol products.~~

~~5106.4 Maximum quantities in storage areas~~.
~~Aerosol products in storage areas adjacent to retail display areas shall not exceed the quantities in Table 5106.4.~~

~~TABLE 5106.4 MAXIMUM STORAGE QUANTITIES FOR STORAGE AREAS ADJACENT TO RETAIL DISPLAY OF LEVEL 2 AND 3 AEROSOL PRODUCTS AND PLASTIC AEROSOL 3 PRODUCTS~~

MAXIMUM NET WEIGHT PER FLOOR (pounds)			
		Separated	
Floor	Unseparated[a, b]	Storage cabinets[b]	1-hour occupancy separation
Basement	Not Allowed	Not Allowed	Not Allowed
Ground	2,500	5,000	In accordance with Sections 6.4.4.3 and 6.4.4.4 of NFPA 30B
Upper	500	1,000	In accordance with Sections 6.4.4.3 and 6.4.4.4 of NFPA 30B

~~For SI: 1 pound = 0.454 kg, 1 square foot = 0.0929 m~~^{2}.

a. ~~The aggregate quantity in storage and retail display shall not exceed the quantity limits for retail display.~~

b. ~~In any 50,000-square-foot area.~~

~~5106.5 Special protection design for Level 2 and 3 aerosol products adjacent to flammable and combustible liquids in double-row racks~~.
~~The display and merchandising of Level 2 and 3 aerosol products adjacent to *flammable* and *combustible liquids* in double-row racks shall be in accordance with Section 5106.3.3 or Sections 5106.5.1 through 5106.5.8.~~

~~5106.5.1 Fire protection~~.
~~Fire protection for the display and merchandising of Level 2 and 3 aerosols in double-row racks shall be in accordance with Table 8.5.1~~

~~and Figure 8.5.1 of NFPA 30B.~~

~~**5106.5.2 Cartoned aerosol products.** Level 2 and 3 aerosol products displayed or merchandised more than 8 feet (2438 mm) above the finished floor shall be in cartons.~~

~~**5106.5.3 Shelving.** Shelving in racks shall be limited to wire mesh shelving having uniform openings not more than 6 inches (152 mm) apart, with the openings comprising not less than 50 percent of the overall shelf area.~~

~~**5106.5.4 Aisles.** Racks shall be arranged so that aisles not less than 7 1/2 feet (2286 mm) wide are maintained between rows of racks and adjacent solid-piled or palletized merchandise.~~

~~**5106.5.5 Flue spaces.** Flue spaces in racks shall comply with the following:~~

1. ~~Transverse flue spaces—Nominal 3-inch (76 mm) transverse flue spaces shall be maintained between merchandise and rack uprights.~~
2. ~~Longitudinal flue spaces—Nominal 6-inch (152 mm) longitudinal flue spaces shall be maintained.~~

~~**5106.5.6 Horizontal barriers.**~~

~~Horizontal barriers constructed of minimum 3/8-inch-thick (10 mm) plywood or minimum 0.034-inch (0.086 mm) (No. 22 gage) sheet metal shall be provided and located in accordance with Table 8.5.1 and Figure 8.5.1 of NFPA 30B where in-rack sprinklers are installed.~~

~~**5106.5.7 Class I, II, III, IV and plastic commodities.**~~

~~Class I, II, III, IV and plastic commodities located adjacent to Level 2 and 3 aerosol products and plastic aerosol 3 products shall be protected in accordance with NFPA 13.~~

~~**5106.5.8 Flammable and combustible liquids.**~~

~~Class I, II, III A and III B liquids shall be allowed to be located adjacent to Level 2 and 3 aerosol products where both of the following conditions are met:~~

1. ~~Class I, II, IIIA and IIIB liquid containers: Containers for Class I, II, IIIA and IIIB liquids shall be limited to 1.06-gallon (4 L) metal-relieving and nonrelieving style containers and 5.3-gallon (20 L) metal-relieving style containers.~~
2. ~~Fire protection for Class I, II, IIIA and IIIB Liquids: Automatic sprinkler protection for Class I, II, IIIA and IIIB liquids shall be in accordance with Chapter 57.~~

SECTION 5107
MANUFACTURING FACILITIES

5107.1 General.

Manufacturing facilities shall be in accordance with NFPA 30B.

Reason: Portions of Chapter 51 rely solely on NFPA 30B while other portions refer the user of the Code to NFPA 30B with similar text included in the IFC. This causes confusion and results in differences between the reference standard and the IFC, especially if updates are not processed every revision cycle. In addition, NFPA 30B is more comprehensive and due to the references throughout the Chapter, must be used regardless of what is in the IFC. If a requirement exists in NFPA 30B but not in the IFC, does one have to meet that requirement given the fact that the Code takes precedence over the reference standard?

The section on outdoor storage has been retained since that is not addressed in NFPA 30B.

For example, last code change cycle a series of proposals were submitted to include plastic aerosol 2 products. They were appropriately disapproved because the test program was not yet completed. However, since that time the test program has been completed and the current edition of NFPA 30B addresses plastic aerosol 2 products, although the 2024 Edition of the IFC does not. If this proposal is not accepted, a significant package of changes will need to be submitted during the Public Comment period to properly align the IFC with NFPA 30B.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Industry is already typically required to comply with NFPA 30B for reasons in addition to the references in the IFC. If anything, the cost of construction may be reduced slightly due to the elimination of confusion regarding the applicable requirements.

F243-24

F244-24

IFC: 5303.16, 5303.16.14

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Robert J Davidson, Davidson Code Concepts LLC, Self (rjd@davidsoncodeconcepts.com); Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C., Self (jbengineer@aol.com)

2024 International Fire Code

5303.16 Vaults.
Generation, compression, storage and dispensing equipment for *compressed gases* shall be allowed to be located in either above- or below-grade vaults complying with Sections 5303.16.1 through 5303.16.14.

Revise as follows:

5303.16.14 Classified area.
The interior of a vault containing a flammable gas shall be designated a Class I, Division 1, location, as defined in NFPA 70.

Exception: Category 1B flammable gas with a fundamental burning velocity of less than 3.9 inches/second (99 mm/s).

Reason: Category 1B flammable gas refrigerants are difficult to ignite and do not present an explosion hazard. These vaults are required to provide a gas detection system detecting at 25% LFL. Vaults are also required to provide ventilation which either operates continuously or activates when 25% LFL is detected. The exclusion of Class 1, Div 1 is always based on adequate ventilation being present for Category 1B flammable gases. Section 5303.16.9 requires continuous ventilation which greatly reduces any hazard regarding Category 1B flammable gases. It would be inappropriate to require classified wiring pursuant to NFPA 70 when a vault is used for 1B flammable gas refrigerant storage.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0.00

Estimated Immediate Cost Impact Justification (methodology and variables):

There would be a decrease in costs by eliminating unnecessary classified wiring requirements This cost will depend upon the installation. In either case the code will be less restrictive.

F244-24

F245-24

IFC: 5307.1, 5307.2 (New), 5307.2, 5307.2.1

Proponents: Kevin Scott, KH Scott & Associates LLC, self (khscottassoc@gmail.com)

2024 International Fire Code

5307.1 General.
Compressed gases in storage or use not regulated by the material-specific provisions of Chapters 6, 54, 55, and 60 through 67, including asphyxiant, irritant and radioactive gases, shall comply with this section in addition to other requirements of this chapter.

Add new text as follows:

5307.2 **Asphyxiants, irritants and radioactive gases.** Asphyxiant, irritant or radioactive gases used or stored in quantities exceeding 1,000 cubic feet (28 m^3) shall comply with Sections 5307.2.1 or 5307.2.2.

Exception: Carbon dioxide systems regulated by Sections 5307.3 or 5307.4.

Revise as follows:

~~**5307.2**~~ 5307.2.1 **Ventilation.**
Indoor storage and use areas and storage buildings shall be provided with ventilation in accordance with Section 5004.3. Where mechanical ventilation is provided, the systems shall be operational during such time as the building or space is occupied.

~~**Exceptions:**~~

1. ~~A *gas detection system* complying with Section 5307.2.1 shall be permitted in lieu of mechanical ventilation.~~
2. ~~Areas containing insulated liquid carbon dioxide systems used in beverage dispensing applications shall comply with Section 5307.3.~~

~~**5307.2.1**~~ 5307.2.2 **Gas detection system.**
In rooms or areas not provided with ventilation in accordance with Section ~~5307.2~~ 5307.2.1, a *gas detection system* complying with Section 916 or, where *approved*, an oxygen depletion alarm system, either of which initiates audible and visible alarm signals in the room or area where sensors are installed, shall be provided.

Reason: This proposal intends to resolve an unintended loophole in the code.

Currently, Section 5307 regulates asphyxiant, irritant and radioactive gases in any quantity. These gases require require either ventilation or gas detection.

Section 5307.3 regulates liquid carbon dioxide systems for beverage dispensing, but does not make any requirements until the quantity exceeds 100 pounds.

Section 5307.4 regulates carbon dioxide enrichment systems, and again does not make any requirements until the quantity exceeds 100 pounds. This provision does not limit its application to liquid or gaseous CO2; it applies to both.

Carbon dioxide is an asphyxiant gas, and in fact that characteristic was the impetus for the regulations of beverage dispensing and CO2 enrichment. The inconsistency is that when CO2 is used for something other than beverage dispensing or CO2 enrichment the threshold of regulation drops to 0. There is no justification to regulate the other gases in any quantity, when the liquid asphyxiants (CO2) are not regulated until they exceed 100 pounds. This proposal provides a similar threshold for all other gases that fall under Section 5307, the asphyxiant, irritant and radioactive gases.

A new section 5307.2 is inserted to require that when asphyxiant, irritant and radioactive gases exceed 1,000 cubic feet, they must be provided with either ventilation or gas detection. This is the same approach used for beverage dispensing. The exceptions are relocated to Section 5307.2 in both the text and the new exception.

The 1,000 cubic feet is simply an approximation of an equivalent volume. 100 pounds of CO2 is equivalent to 875 cubic feet. Nitrogen is another common asphyxiant and 100 pounds of nitrogen is approximately 1380 cubic feet. Nitrogen is available in cylinders containing about 230 cubic feet, so 4 cylinders would be below the threshold of 1,000 cubic feet.

This proposal will provide some consistency between the requirements for CO2 in beverage dispensing or CO2 enrichment and other uses of CO2 or other asphyxiants.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

This proposal will decrease the cost of construction because mechanical ventilation or gas detection will not be required for rooms or areas not exceeding 1,000 cubic feet of gas. For a typical small storage room, an estimated $5,000 will be saved by not providing additional ventilation or a gas detection system.

Estimated Immediate Cost Impact Justification (methodology and variables):

The estimated cost is difficult to pinpoint because it would be based on the size of room and other variables. The estimate is based on a reasonable assumption of construction costs.

F245-24

F246-24

IFC: 5307.2, 5307.3, 5307.3.1, 5307.3.2, 5307.4.3, 916.8

Proponents: Scott Plumer, Arvada Fire Protection District, Arvada Fire Protection District

2024 International Fire Code

Revise as follows:

5307.2 Ventilation.
Indoor storage and use areas and storage buildings shall be provided with ventilation in accordance with Section 5004.3. Where mechanical ventilation is provided, the systems shall be operational during such time as the building or space is occupied.

Exceptions:

1. A *gas detection system* complying with Section 5307.2.1 shall be permitted in lieu of mechanical ventilation.
2. Areas containing ~~insulated liquid~~ carbon dioxide systems used in beverage dispensing applications shall comply with Section 5307.3.

5307.3 ~~Insulated liquid carbon~~ Carbon dioxide systems used in beverage dispensing applications.
~~Insulated liquid carbon~~ Carbon dioxide systems with more than 100 pounds (45.4 kg) of carbon dioxide used in beverage dispensing applications shall comply with Section 5307.3.1.

5307.3.1 Ventilation.
Where ~~insulated liquid~~ carbon dioxide storage tanks, cylinders, piping and equipment are located indoors, rooms or areas containing storage tanks, cylinders, piping and equipment, and other areas where a leak of carbon dioxide is expected to accumulate, shall be provided with mechanical ventilation in accordance with Section 5004.3 and designed to maintain the room containing carbon dioxide at a negative pressure in relation to the surrounding area.

Exception: A *gas detection system* complying with Section 5307.3.2 shall be permitted in lieu of mechanical ventilation.

5307.3.2 Gas detection system. Where ventilation is not provided in accordance with Section 5307.3.1, a *gas detection system* complying with Section 916 shall be provided in rooms or indoor areas and in below-grade outdoor locations with ~~insulated~~ carbon dioxide systems. Carbon dioxide sensors shall be provided within 12 inches (305 mm) of the floor in the area where the gas is expected to accumulate or other *approved* locations. The system shall be installed ~~as follows:~~in accordance with NFPA 55.

1. ~~Activates an audible and visible supervisory alarm at a normally attended location upon detection of a carbon dioxide concentration of 5,000 ppm (9000 mg/m^3).~~
2. ~~Activates an audible and visible alarm within the room or immediate area where the system is installed upon detection of a carbon dioxide concentration of 30,000 ppm (54 000 mg/m^3).~~

5307.4.3 Gas detection system. A *gas detection system* complying with Section 916 shall be provided in rooms or indoor areas in which the carbon dioxide enrichment process is located, in rooms or indoor areas in which container systems are located, and in other areas where carbon dioxide is expected to accumulate. Carbon dioxide sensors shall be provided within 12 inches (305 mm) of the floor in the area where the gas is expected to accumulate or leaks are most likely to occur. The system shall be installed ~~as follows:~~ in accordance with NFPA 55.

1. ~~Activates a low-level alarm upon detection of a carbon dioxide concentration of 5,000 ppm (9000 mg/m^3).~~
2. ~~Activates a high-level alarm upon detection of a carbon dioxide concentration of 30,000 ppm (54 000 mg/m^3).~~

916.8 System activation. A gas detection alarm shall be initiated where any sensor detects a concentration of gas exceeding the following thresholds:

1. For *flammable gases*, a gas concentration exceeding 25 percent of the lower flammability limit (LFL).

2. For nonflammable gases, a gas concentration exceeding one-half of the IDLH, unless a different threshold is specified by the section of this code requiring a *gas detection system*.

Upon activation of a gas detection alarm, alarm signals or other required responses shall be as specified by the section of this code requiring a *gas detection system*. Audible and visible alarm signals associated with a gas detection alarm shall be distinct from fire alarm and carbon monoxide alarm signals.

Exception: Systems installed in accordance with Section 5307.3 or 5307.4.

Reason: There is currently a discrepancy between the IFC requirements and the NFPA 55 requirements for CO2 detection. Namely, the IFC requires an instantaneous alarm actuation at 5,000ppm in section 5307.3.2. However, NFPA 55 requires a time weighted average trigger at 5,000ppm. In IFC section 916.8, the alarm value is "one-half of the IDLH unless a different threshold is specified by the section of this code requiring a gas detection system." For CO2, one-half of the IDLH is 20,000ppm per OSHA. Section 916.8 is not clear as to whether the lower level (20,000ppm) should be used or the higher level (30,000ppm) in chapter 53 should be used. Furthermore, NFPA 55 refers to OSHA and ACGIH determined levels rather than a specific value. Installers of these systems and AHJs are left trying to navigate the conflicting levels between different sections, standards, and agencies. This proposal provides clarity by moving the installation requirements out of the IFC and references NFPA 55, which is already a referenced standard. This will reduce conflicts between the code and standard and falls more in line with how other sections of the IFC deal with installation standards (NFPA 13, 13R, 17, 17A, 24, 72, etc). Furthermore, it removes the language about insulated systems. It should not matter whether the carbon dioxide is insulated or not, if there is a leak, it should be detected.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

There is no increase in installation costs for this proposal, it just cleans up the requirements and makes it easier to understand the installation requirements. There is no ongoing maintenance cost for this proposal as there are no ongoing maintenance requirements for these systems.

F246-24

F247-24

IFC: 5505.2, 5504.2.3 (New), 5504.2.3.1 (New), 5504.2.3.2 (New), 5504.2.3.3 (New)

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Fire Code

Revise as follows:

5505.2 Indoor use.
Indoor use of *cryogenic fluids* shall comply with the material-specific provisions of Section 5501.1 and Sections 5504.2.3 through 5504.2.3.3.

Add new text as follows:

5504.2.3 Oxygen Gas Detection. An oxygen gas detection system, complying with Section 916, shall be provided in rooms or indoor areas in which cryogenic fluids are stored. The system shall be designed as follows:

1. Activates a low-level alarm upon detection of an oxygen deficient atmosphere of 19.5% oxygen.
2. Activated a high-level alarm upon detection of an oxygen deficient atmosphere of 18% oxygen.

5504.2.3.1 Low level alarm activation. Activation of the low-level gas detection system alarm shall automatically do all of the following:

1. Stop the flow of cryogenic fluid to the piping system.
2. Activate the mechanical exhaust ventilation system.
3. Activate an audible and visible supervisory alarm signal at an approved location within the building.
4. Transmit a supervisory signal to an approved location in accordance with NFPA 72.

5504.2.3.2 High level alarm activation. Activation of the high-level gas detection system alarm shall automatically do all of the following:

1. Stop the flow of cryogenic fluid to the piping system.
2. Activate the mechanical exhaust ventilation system.
3. Activate an audible and visible evacuation alarm both inside and outside of the oxygen deficient area, and the area in which the cryogenic containers are located.
4. Transmit an alarm signal to an approved location in accordance with NFPA 72.

5504.2.3.3 Fire alarm system connections. The oxygen gas detection system shall be connected to a fire alarm system in accordance with fire alarm equipment manufacturer's instructions and NFPA 72.

Reason: Due the high expansion ratio of cryogenic fluids, a small leak of a cryogenic fluid can easily fill up a room or space and create an oxygen deficient or enriched atmosphere. An oxygen deficient atmosphere means that there will not be a sufficient amount of oxygen for someone to survive. An oxygen enriched atmosphere creates an environment that can easily catch fire for explode due to the fact that there is too much oxygen. These new code sections provide a oxygen detection so that the occupants are made aware of the dangerous situation and can safely evacuate. This new code language is in line with existing language for liquified compressed CO2.
FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC**

Website

Cost Impact: Increase

Estimated Immediate Cost Impact:

Many sensors cost between $20 and $100. Typically, labor costs for a sensor installation and tying into the fire alarm system are around $150.

Estimated Immediate Cost Impact Justification (methodology and variables):

The overall cost increase in minimal but that cost is really outweighed by the fact that we are providing life safety to those that are in areas that are in and around cryogenic fluids. Individuals in these areas would not know that there is a dangerous situation without this detection and notification system. Through our research, many sensors cost between $20 and $100 and labor costs for a sensor installation and tying into the fire alarm system are around $150.

F247-24

F248-24

IFC: 5505.2, 5505.2 (New), 5505.2.2.1 (New), 5505.2.2.2 (New)

Proponents: Adam Henson, U.S. Chemical Safety and Hazard Investigation Board (adam.henson@csb.gov)

2024 International Fire Code

Revise as follows:

5505.2 Indoor use. Indoor use of cryogenic fluids shall comply with the material-specific provisions of Section 5501.1.

Add new text as follows:

5505.2 Oxygen deficiency hazards. Oxygen deficiency monitoring, alarms and controls shall be in accordance with Sections 5502.2.1 and 5502.2.2.

5505.2.2.1 Atmospheric monitoring. Areas where cryogenic liquids are used and vaporization takes place shall be monitored for oxygen deficiency. When the concentration of oxygen measures 19.5% or below an audible alarm shall sound and a visual indication shall be given inside the area and immediately outside of all entrances to the area. The alarm shall be distinct from other facility alarms. Area monitors shall be permitted to be supplemented with personal monitors where necessary.

5505.2.2.2 Emergency Stop Devices. Manually operated control devices shall be provided to shut off the cryogenic fluid supply in case of emergency. These devices shall be located at each operator control station, at entrances and exits, at all locations where a human and machine interaction is expected by design, and other locations as determined by risk assessment.

Reason: On January 28, 2021, liquid nitrogen overflowed from an immersion-spiral freezer located inside the Plant 4 building at the Foundation Food Group (FFG) facility in Gainesville, GA. The release asphyxiated two employees working on the freezer immediately and continued undetected and uncontrolled for 30 to 60 minutes. Eventually, another employee noticed the freezer room had filled with a four- to five-foot-high vapor cloud and initiated an emergency response by notifying a supervisor.

During the response to this release as many as 14 other FFG employees, including members of management, traveled to the freezer room either to investigate the release or rescue the workers. Four additional FFG employees were killed by asphyxiation, and four additional people including one firefighter were seriously injured presenting asphyxiation symptoms as the result of the response. Six additional FFG employees and three additional firefighters were also treated in the emergency room for symptoms of asphyxiation but were released that day. In addition to the staggering human toll of this incident damages of roughly $1.7 million were reported by the facility.

The freezer involved in the incident was a liquid nitrogen immersion-spiral freezer operated in conjunction with “Line 4”. Liquid nitrogen was supplied to this freezer from a 13,000-gallon bulk liquid tank installed outside of the building. The freezer was subdivided from the adjacent area by four new walls. The freezer had an exhaust system which directed vaporized nitrogen gas from inside the equipment outside of the building, but the room where the freezer was located was not served by mechanical exhaust or an HVAC system.

Despite warnings from FFG’s nitrogen/equipment supplier, no atmospheric monitoring was installed or used in the area or room where the freezer was located. Manul shutoffs for the nitrogen supply were located at the bulk tanks on the opposite end of the building from the freezer. In addition, there were ten E-stop buttons designed to shut down the freezer and isolate the nitrogen supply upon activation. All ten E-stop buttons were located within the freezer room.

During its investigation the CSB concluded that had FFG installed atmospheric monitoring and an alarm system in and around the freezer room, workers would have been warned against entering the oxygen deficient atmosphere. The CSB also concluded that the placement of the E-stop buttons solely within the room containing the hazard is not a sensible design and delayed the response to this incident. The successful implementation of these devices in conjunction with effective emergency planning and response could have prevented or mitigated the fatalities and injuries that occurred during the response to this incident.

As part of its investigation into this incident, the CSB reviewed the requirements of the International Fire Code (IFC) and determined that the IFC Chapter 55 *Cryogenic Fluids* requires inert cryogenic fluids, including nitrogen, shall comply with ANSI/CGA P-18 along with requirements for storage and use and handling. Nothing in the code would have required FFG to use atmospheric monitoring for oxygen deficiency and an associated alarm. Additionally, no guidance is given in the code regarding the appropriate location of E-stop buttons.

As the result of the investigation, the CSB issued the following recommendation to the International Code Council:

CSB Recommendation No. 2021-03-I-GA-R12:

Update the International Fire Code to:

a) require the use of atmospheric monitoring with cryogenic asphyxiants in accordance with industry guidance such as is contained in CGA P-76 Hazards of Oxygen-Deficient Atmospheres and CGA P-12 Safe Handling of Cryogenic Liquids in addition to CGA P-18 Standard for Bulk Inert Gas Systems; and,

b) include guidance on the adequate safe location of manual shutoff valves and devices such as emergency push buttons used to activate remotely operated emergency isolation valves (ROEIVs) in cryogenic fluid service. At a minimum this guidance should be harmonized with the requirements of ISO 13850 Safety of machinery – Emergency stop function – Principles for design.

The language proposed is intended to satisfactorily implement this recommendation.

Bibliography: U.S. Chemical Safety and Hazard Investigation Board. (2023, December 12). *Foundation Food Group Fatal Chemical Release.* Retrieved from www.csb.gov: https://www.csb.gov/foundation-food-group-fatal-chemical-release-/

Cost Impact: Increase

Estimated Immediate Cost Impact:

$20,000

Estimated Immediate Cost Impact Justification (methodology and variables):

The cost of equipment is estimated at $12,000 on average and labor is estimated at $8,000 on average. The cost of the freezer unit involved in the incident at FFG was nearly $900,000. Installing the equipment described in this code change proposal would represent a ~2% increase in the total cost of that project.

$12,000 (Materials) + $8,000 (Labor) = $20,000

Cost Source:

This is an analogous estimate based on information from representatives from plant management and an engineering firm.

Estimated Life Cycle Cost Impact:

N/A

Estimated Life Cycle Cost Impact Justification (methodology and variables):

N/A

F248-24

F249-24

IFC: SECTION 202 (New), 5601.1.3, SECTION 5609, 5609.1, APPENDIX P (New), SECTION P101 (New), P101.1 (New), P101.2 (New), P101.2.1 (New), P101.2.2 (New), P101.2.3 (New), P101.2.4 (New), P101.2.5 (New), P101.2.6 (New), P101.2.7 (New), P101.2.7.1 (New), P101.2.7.2 (New), P101.2.7.3 (New), P101.2.7.4 (New), P101.2.7.5 (New), P101.2.8 (New), P101.2.9 (New), P101.2.10 (New), P101.2.11 (New), P101.2.11.1 (New), P101.2.11.2 (New), P101.2.12 (New), P101.2.12.1 (New), P101.2.13 (New), SECTION P102 (New), P102.1 (New)

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Fire Code

Add new definition as follows:

FIREWORKS RETAIL SALES (FRS) STRUCTURE. A tent, membrane structure, or temporary structure that is used only for the retail display and sale or storage of consumer fireworks to the public.

Revise as follows:

5601.1.3 Fireworks.
The possession, manufacture, storage, sale, handling and use of fireworks are prohibited.

Exceptions:

1. Storage and handling of fireworks as allowed in Section 5604.
2. Manufacture, assembly and testing of fireworks as allowed in Section 5605.
3. The use of fireworks for fireworks displays as allowed in Section 5608.
4. ~~The possession, storage, sale, handling and use of specific types of Division 1.4G fireworks where allowed by applicable laws, ordinances and regulations, provided that such fireworks and facilities comply with the 2006 edition of NFPA 1124, CPSC 16 CFR Parts 1500 and 1507, and DOTn 49 CFR Parts 100–185, as applicable for consumer fireworks.~~Retail sale of fireworks shall be permitted where approved and shall comply with the rules and limitations established by the jurisdiction.

Delete without substitution:

~~SECTION 5609~~
~~TEMPORARY STORAGE OF CONSUMER FIREWORKS~~

~~5609.1 General~~.
~~Where the display or temporary storage of fireworks 1.4G (consumer fireworks) is allowed by Section 5601.1.3, Exception 4, such display or storage shall comply with the applicable requirements of NFPA 1124.~~

Add new text as follows:

APPENDIX P RETAIL SALE OF CONSUMER FIREWORKS

SECTION P101
GENERAL

P101.1 Requirements. Retail display and sales of 1.4G fireworks, including related temporary storage of 1.4G fireworks, shall comply with the requirements of this section unless otherwise indicated.

P101.2 FRS sales of fireworks.. FRS sales of fireworks where allowed by applicable laws, ordinances and regulations shall comply with regulations of the U.S. Consumer Product Safety Commission as set forth in 16 CFR 1500 and 1507 and the regulations of the U.S. Department of Transportation as set forth in 49 CFR 100 to 178, including related storage and display for sale.

P101.2.1 **FRS structures. .** FRS Structures that are used for the retail display, and sales or temporary storage of 1.4G fireworks shall not exceed a floor area of 1000 ft2 (92.9 m2) individually, or in aggregate where the separation distance between individual FRS structures is less than the distances specified in Table P101.2.6, and shall be one of the following types of structures:

P101.2.2 **Temporary use..** Temporary Tents, membrane structures and other temporary structures used as FRS structures shall be erected for a period not to exceed 30 days and shall comply with this section, Chapter 31 of this code, and the International Building Code.

P101.2.3 **Construction Permit and approval..** A construction permit is required for the construction of an FRS structure as required by Section 105.6.24, or in accordance with the *International Building Code*, as applicable.

P101.2.4 **Operational permits..** Operational permits are required in accordance with Sections 105.5.16 and 105.5.49.

P101.2.5 **Construction documents. .** Detailed plans for FRS structures and the site they are to be erected on shall be submitted to the code official for review and approval. The construction plans shall comply with this code and the International Building code as applicable and additionally include the following details:

1. Separation distances from the following site features:
   - 1.1 Public ways
   - 1.2 Buildings
   - 1.3 Other FRS structures
   - 1.4 Vehicle fuel dispensing
   - 1.5 Propane-cylinder exchange stations
   - 1.6 Flammable and combustible liquid or gas aboveground tank storage
   - 1.7 Flammable gas and flammable liquefied gas bulk aboveground storage and dispensing areas within 300 ft (91.5 m) of the FRS structure
   - 1.8 Combustible storage
   - 1.9 Permanent or temporary generators
   - 1.10 Additional fireworks storage location
2. Vehicle access and parking areas
3. Location and type of portable fire extinguishers
4. Means of egress exit discharge paths of buildings on the same site.

P101.2.6 **Separation Distances.** FRS structures shall be located with the minimum separation distances required by Table P101.2.6.

P101.2.6 MINIMUM SEPARATION DISTANCES

EXPOSURE	SEPARATION DISTANCE
Public Ways	20ft (6.1m)
Buildings	20ft (6.1m)
Other FRS structures	100ft (30.4 m)
Vehicle Fuel Dispensing	100ft (30.4 m)
Propane cylinder exchange stations	100ft (30.4 m)
Flammable gas and flammable liquefied gas bulk aboveground storage or dispensing areas	300ft (91.4 m)

Flammable and combustible liquid or gas aboveground tank storage	300ft (91.4 m)
Vehicle access and parking areas	20ft (6.1m)
Combustible storage	20ft (6.1m)
Generators	20ft (6.1m)
Fireworks Storage location	20ft (6.1m)

P101.2.7 Source of Ignition. Sources of ignition shall be controlled and comply with Sections P101.2.7.1 through P101.2.7.5.

P101.2.7.1 Electrical equipment and wiring. FRS structure electrical equipment and wiring shall be in accordance with NFPA 70.

P101.2.7.2 Portable Generators. Portable generators and generator fuel supplies shall be located not less than 20 ft (6.1 m) from a FRS structure or the location of additional fireworks storage.

P101.2.7.3 Cooking Equipment . Cooking equipment of any type shall not be permitted within 25 ft (7.6 m) of FRS structures or the location of additional fireworks storage.

P101.2.7.4 Covered Fuses. Consumer fireworks within reach access of the public shall be required to have covered fuses. The device shall be considered as having a covered fuse if the fireworks device is contained within a packaged arrangement, container, or wrapper that is arranged and configured such that the fuse of the fireworks device cannot be touched directly by a person handling the fireworks without the person having to puncture or tear the packaging or wrapper, unseal or break open a package or container, or otherwise damage or destroy the packaging material, wrapping, or container within which the fireworks are contained.

P101.2.7.5 No Smoking Signs. “FIREWORKS — NO SMOKING” signs complying with Section 310 shall be conspicuously posted on all four sides where required by the fire code official. Smoking shall not be permitted inside or within 25 ft (15.5 m) of the FRS structure or the location of additional fireworks storage.

P101.2.8 Sales Display . The following shall apply to the sale and display of consumer fireworks in FRS structures.:

1. FRS structure retail sales shall not allow access to the interior of the structure by the public:
2. Consumer fireworks shall be displayed in a manner that prevents the fireworks from being handled by persons other than those operating, supervising, or working in the FRS structure.
3. In FRS structures the maximum height of sales displays shall be limited to 8 ft (2.44 m).

P101.2.9 Fireworks Discharge. Fireworks shall not be discharged within three hundred feet of a FRS structure or any fireworks storage structure. Signs reading "NO FIREWORKS DISCHARGE WITHIN 300 FEET" will be in letters at least two inches high, with a principal stroke of not less than one-half inch, on a contrasting background, will be conspicuously posted on all four sides of the FRS structure and any fireworks storage structures.

P101.2.10 Portable Fire Extinguisher. Portable fire extinguishers complying with Section 906 shall be provided and placed in locations approved by the fire code official. FRS structures of less than 200 ft2 (18.6 m2) shall be required to have only one portable fire extinguisher.

P101.2.11 Means of Egress. Retail sales areas within FRS structures shall have a minimum of two egress exit paths for staff with a minimum clear with of 32in. (0.8 m) and otherwise comply with Chapter 10 of this code.

P101.2.11.1 Exit markings. Exit paths and exit doors shall be clearly indicated as approved by the *fire code official.*

P101.2.11.2 Means of egress illumination. . Means of egress shall be illuminated in accordance with Chapter 10.

P101.2.12 Security. FRS structures and storage shall be secured against unauthorized entry and safeguarded in a manner approved by the *fire code official*.

P101.2.12.1 Security management plan. The owner or owner's authorized representative shall prepare a security management plan when the FRS is not open to the public and shall be *approved* by the *fire code official*.

P101.2.13 Storage . Temporary storage associated with FRS structures shall meet the requirements of this section or shall comply with the applicable requirements of Section 5604.

SECTION P102
REFERENCED STANDARDS

P102.1 General. See Table P102.1 for standards that are referenced in various sections of this appendix. Standards are listed by the standard identification with the effective date, standard title, and the section or sections of this appendix that reference the standard.

P102.1 REFERENCED STANDARDS

STANDARD ACRONYM	STANDARD NAME	SECTIONS HEREIN REFERENCED
49 CFR 100-178 - 2015	Department of Transportation Hazardous Materials Regulation	P101.2
16 CFR 1500-2009	CPSC Hazardous Substances and Articles; Administration and Enforcement Regulations	P101.2
16 CFR 1507 - 2002	CPSC - Firework Devices	P101.2

Staff Analysis: The proposed referenced standards are currently referenced in the ***IFC.***

- ***CPSC Hazardous Substances and Articles; Administration and Enforcement Regulations (CPSC 16 CFR 1500-2009)***
- ***CPSC - Firework Devices (CPSC 16 CFR 1507-2002)***
- ***Department of Transportation Hazardous Materials Regulations (DOT 49 CFR 100-185 - 2015)***

Reason: Forty-nine out of the fifty states permit the sale of some type of consumer fireworks. Currently the 2021 and 2024 codes reference the 2006 NFPA 1124 which contains requirements for indoor sales of consumer fireworks. Later versions of NFPA 1124 no longer include any requirements due to concern that the provisions were not adequate and proper data needs to be developed to support the requirement. Regardless of whether provisions are available within codes or standards jurisdictions are looking for guidance as to how to enforce.

This proposal removes reference to the 2006 edition of NFPA 1124.

The proposal does not address indoor sales and instead is limited to outdoor sales with the use of stands. The focus is on separation, types of outdoor structures, ignition sources, security, signage, how the consumer fireworks are displayed, fire extinguisher availability and basic exit width, markings and illumination.

Due to the sensitivity of this issue it was suggested that this would be better suited for an appendix. This eliminates the need for a jurisdiction to justify removing from the body of the code during adoption.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: Increase

Estimated Immediate Cost Impact:

$0.00

Estimated Immediate Cost Impact Justification (methodology and variables):

This proposal provides a new appendix to provide needed guidance to jurisdictions that must address consumer fireworks that are permitted within their state. It has no affect on construction costs.

F249-24

F250-24

IFC: CHAPTER 57

Proponents: Darcy Davidson, Carlsbad Fire Department, California Fire Prevention Officers (darcy.davidson@carlsbadca.gov)

2024 International Fire Code

CHAPTER 57 FLAMMABLE AND COMBUSTIBLE LIQUIDS

SECTION 5701 GENERAL

5701.1 Scope and application.
Prevention, control and mitigation of dangerous conditions related to storage, use, dispensing, mixing and handling of *flammable* and *combustible liquids* shall be in accordance with Chapter 50 and this chapter.

5701.2 Nonapplicability.
This chapter shall not apply to liquids as otherwise provided in other laws or regulations or chapters of this code, including:

1. Specific provisions for *flammable liquids* in motor fuel-dispensing facilities, repair garages, airports and marinas in Chapter 23.
2. Medicines, foodstuffs, cosmetics and commercial or institutional products containing not more than 50 percent by volume of water-miscible liquids and with the remainder of the solution not being flammable, provided that such materials are packaged in individual containers not exceeding 1.3 gallons (5 L).
3. Quantities of alcoholic beverages in retail or wholesale sales or storage occupancies, provided that the liquids are packaged in individual containers not exceeding 1.3 gallons (5 L).
4. Storage and use of fuel oil in tanks and containers connected to oil-burning equipment. Such storage and use shall be in accordance with Section 605. For abandonment of fuel oil tanks, this chapter applies.
5. Refrigeration systems (see Section 608).
6. Storage and display of aerosol products complying with Chapter 51.
7. Storage and use of liquids that do not have a fire point when tested in accordance with ASTM D92.
8. Liquids with a *flash point* greater than 95°F (35°C) in a water-miscible solution or dispersion with a water and inert (noncombustible) solids content of more than 80 percent by weight, which do not sustain combustion.
9. Liquids without *flash points* that can be flammable under some conditions, such as certain halogenated hydrocarbons and mixtures containing halogenated hydrocarbons.
10. The storage of beer, distilled spirits and wines in barrels and casks.
11. Commercial cooking oil storage tank systems located within a building and designed and installed in accordance with Section 607 and NFPA 30.
12. Application and release of pesticide and agricultural products and materials intended for use in weed abatement, erosion control, soil amendment or similar applications where applied in accordance with the manufacturer's instructions and label directions.
13. The off-site transportation of *flammable* or *combustible liquids* where in accordance with Department of Transportation (DOTn) regulation.

Revise as follows:

5701.3 Referenced documents.
The applicable requirements of Chapter 50, other chapters of this code, the *International Building Code* and the *International Mechanical*

Code pertaining to *flammable* and combustible *liquids* shall apply.

5701.4 Permits.

Permits shall be required as set forth in Sections 105.5 and 105.6.

5701.5 Material classification.

Flammable and *combustible liquids* shall be classified in accordance with the definitions in Chapter 2.
When mixed with lower flash-point liquids, Class II or III liquids are capable of assuming the characteristics of the lower flash-point liquids. Under such conditions, the appropriate provisions of this chapter for the actual *flash point* of the mixed liquid shall apply.

When heated above their *flash points*, Class II and III liquids assume the characteristics of Class I liquids. Under such conditions, the appropriate provisions of this chapter for *flammable liquids* shall apply.

SECTION 5703
GENERAL REQUIREMENTS

5703.1 Electrical.

Electrical wiring and equipment shall be installed and maintained in accordance with Section 603 and NFPA 70.

5703.1.1 Classified locations for flammable liquids.

Areas where *flammable liquids* are stored, handled, dispensed or mixed shall be in accordance with Table 5703.1.1. A classified area shall not extend beyond an unpierced floor, roof or other solid partition.
The extent of the classified area is allowed to be reduced, or eliminated, where sufficient technical justification is provided to the *fire code official* that a concentration in the area in excess of 25 percent of the lower flammable limit (LFL) cannot be generated.

TABLE 5703.1.1 CLASS I ELECTRICAL EQUIPMENT LOCATIONS[a]

LOCATION	GROUP D DIVISION	EXTENT OF CLASSIFIED AREA
Underground tank fill opening	1	Pits, boxes or spaces below grade level, any part of which is within the Division 1 or 2 classified area.
	2	Up to 18 inches above grade level within a horizontal radius of 10 feet from a loose-fill connection and within a horizontal radius of 5 feet from a tight-fill connection.
Vent—Discharging upward	1	Within 3 feet of open end of vent, extending in all directions.
	2	Area between 3 feet and 5 feet of open end of vent, extending in all directions.
Drum and container filling		
Outdoor or indoor with adequate ventilation	1	Within 3 feet of vent and fill opening, extending in all directions.
	2	Area between 3 feet and 5 feet from vent of fill opening, extending in all directions. Also up to 18 inches above floor or grade level within a horizontal radius of 10 feet from vent or fill opening.
Pumps, bleeders, withdrawal fittings, meters and similar devices		
Indoor	2	Within 5 feet of any edge of such devices, extending in all directions, and up to 3 feet above floor or grade level within 25 feet horizontally from any edge of such devices.
Outdoor	2	Within 3 feet of any edge of such devices, extending in all directions, and up to 18 inches above floor or grade level within 10 feet horizontally from an edge of such devices.
Pits		
Without mechanical ventilation	1	Entire area within pit if any part is within a Division 1 or 2 classified area.
With mechanical ventilation	2	Entire area within pit if any part is within a Division 1 or 2 classified area.
Containing valves, fittings or piping, and not within a Division 1 or 2 classified area	2	Entire pit.
Drainage ditches, separators, impounding basins		
Indoor	1 or 2	Same as pits.
Outdoor	2	Area up to 18 inches above ditch, separator or basin, and up to 18 inches above grade within 15 feet horizontal from any edge.
Tank vehicle and tank car[b]		
Loading through open dome	1	Within 3 feet of edge of dome, extending in all directions.
	2	Area between 3 feet and 15 feet from edge of dome, extending in all directions.
Loading through bottom connections with atmospheric venting	1	Within 3 feet of point of venting to atmosphere, extending in all directions.
	2	Area between 3 feet and 15 feet from point of venting to atmosphere, extending in all directions. Also up to 18 inches above grade within a horizontal radius of 10 feet from point of loading connection.
Loading through closed dome with atmospheric venting	1	Within 3 feet of open end of vent, extending in all directions.
	2	Area between 3 feet and 15 feet from open end of vent, extending in all directions, and within 3 feet of edge of dome, extending in all directions.
Loading through closed dome with vapor control	2	Within 3 feet of point of connection of both fill and vapor lines, extending in all directions.
Bottom loading with vapor control or any bottom unloading	2	Within 3 feet of point of connection, extending in all directions, and up to 18 inches above grade within a horizontal radius of 10 feet from point of connection.

LOCATION	GROUP D DIVISION	EXTENT OF CLASSIFIED AREA
Storage and repair garage for tank vehicles	1	Pits or spaces below floor level.
	2	Area up to 18 inches above floor or grade level for entire storage or repair garage.
Garages for other than tank vehicles	Ordinary	Where there is an opening to these rooms within the extent of an outdoor classified area, the entire room shall be classified the same as the area classification at the point of the opening.
Outdoor drum storage	Ordinary	—
Indoor warehousing where there is no flammable liquid transfer	Ordinary	Where there is an opening to these rooms within the extent of an indoor classified area, the room shall be classified the same as if the wall, curb or partition did not exist.
Indoor equipment where flammable vapor/air mixtures could exist under normal operations	1	Area within 5 feet of any edge of such equipment, extending in all directions.
	2	Area within 5 feet of any edge of such equipment, extending in all directions. Area between 5 feet and 8 feet of any edge of such equipment, extending in all directions, and the area up to 3 feet above floor or grade level within 5 feet to 25 feet horizontally from any edge of such equipment.[c]
Outdoor equipment where flammable vapor/air mixtures could exist under normal operations	1	Area within 3 feet of any edge of such equipment, extending in all directions.
	2	Area between 3 feet and 8 feet of any edge of such equipment extending in all directions, and the area up to 3 feet above floor or grade level within 3 feet to 10 feet horizontally from any edge of such equipment.
Tank—Above ground		
Shell, ends or roof and dike area	1	Area inside dike where dike height is greater than the distance from the tank to the dike for more than 50 percent of the tank circumference.
	2	Area within 10 feet from shell, ends or roof of tank. Area inside dikes to level of top of dike.
Vent	1	Area within 5 feet of open end of vent, extending in all directions.
	2	Area between 5 feet and 10 feet from open end of vent, extending in all directions.
Floating roof	1	Area above the roof and within the shell.
Office and restrooms	Ordinary	Where there is an opening to these rooms within the extent of an indoor classified location, the room shall be classified the same as if the wall, curb or partition did not exist.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

a. Locations as classified in NFPA 70.

b. When classifying extent of area, consideration shall be given to the fact that tank cars or tank vehicles can be spotted at varying points. Therefore, the extremities of the loading or unloading positions shall be used.

c. The release of Class I liquids can generate vapors to the extent that the entire building, and possibly a zone surrounding it, are considered a Class I, Division 2, location.

Revise as follows:

5703.1.2 Classified locations for combustible liquids.
Areas where Class II or III liquids are heated above their *flash points* shall have electrical installations in accordance with Section 5703.1.1.

Exception: Solvent distillation units in accordance with Section ~~5705.4~~ 5706.2.13.

5703.1.3 Other applications.
The *fire code official* is authorized to determine the extent of the Class I electrical equipment and wiring location where a condition is not specifically covered by these requirements or NFPA 70.

5703.2 Fire protection.
Fire protection for the storage, use, dispensing, mixing, handling and on-site transportation of *flammable* and *combustible liquids* shall be in accordance with this chapter and applicable sections of Chapter 9.

5703.2.1 Portable fire extinguishers and hose lines.
Portable fire extinguishers shall be provided in accordance with Section 906. Hose lines shall be provided in accordance with Section 905.

5703.3 Site assessment. In the event of a spill, leak or discharge from a tank system, a site assessment shall be completed by the *owner* or operator of such tank system if the *fire code official* determines that a potential fire or explosion hazard exists. Such site assessments shall be conducted to ascertain potential fire hazards and shall be completed and submitted to the fire department within a time period established by the *fire code official*, not to exceed 60 days.

Revise as follows:

~~5703.4 Spill control and secondary containment~~.

~~Where the *maximum allowable quantity per control area* is exceeded, and where required by Section 5004.2, rooms, buildings or areas used for storage, dispensing, use, mixing or handling of Class I, II and IIIA liquids shall be provided with spill control and secondary containment in accordance with Section 5004.2.~~

~~5703.5~~5703.4 Labeling and signage.

The *fire code official* is authorized to require warning signs for the purpose of identifying the hazards of storing or using *flammable liquids*. Signage for identification and warning such as for the inherent hazard of flammable liquids or smoking shall be provided in accordance with this chapter and Sections 5003.5 and 5003.6.

~~5703.5.1~~5703.4.1 Style. Warning signs shall be of a durable material. Signs warning of the hazard of *flammable liquids* shall have white lettering on a red background and shall read: "DANGER—FLAMMABLE LIQUIDS." Letters shall be not less than 3 inches (76 mm) in height and $^1/_2$ inch (12.7 mm) in stroke.

~~5703.5.2~~5703.4.2 Location.

Signs shall be posted in locations as required by the *fire code official*. Piping containing *flammable liquids* shall be identified in accordance with ASME A13.1.

~~5703.5.3~~5703.4.3 Warning labels. Individual containers, packages and cartons shall be identified, marked, labeled and placarded in accordance with federal regulations and applicable state laws.

~~5703.5.4~~5703.4.4 Identification. Color coding or other *approved* identification means shall be provided on each loading and unloading riser for *flammable* or *combustible liquids* to identify the contents of the tank served by the riser.

~~5703.6~~5703.5 Piping systems.

Piping systems, and their component parts, for *flammable* and *combustible liquids* shall be in accordance with Sections ~~5703.6.1~~ 5703.5.1 through ~~5703.6.11~~5703.5.11.

~~5703.6.1~~5703.5.1 Nonapplicability.

The provisions of Section ~~5703.6~~5703.5 shall not apply to gas or oil well installations; piping that is integral to stationary or portable engines, including aircraft, watercraft and motor vehicles; and piping in connection with boilers and pressure vessels regulated by the *International Mechanical Code*.

~~5703.6.2~~5703.5.2 Design and fabrication of piping systems and components.

Piping system components shall be designed and fabricated in accordance with the applicable standard listed in Table ~~5703.6.2~~ 5703.5.2 and Chapter 27 of NFPA 30, except as modified by Section ~~5703.6.2.1~~5703.5.2.1.

TABLE ~~5703.6.2~~5703.5.2 PIPING STANDARDS

PIPING USE	STANDARD
Power piping	ASME B31.1
Process piping	ASME B31.3
Pipeline transportation systems for liquid hydrocarbons and other liquids	ASME B31.4
Building services piping	ASME B31.9
Double containment piping	UL 971A, UL 1369

~~5703.6.2.1~~5703.5.2.1 Special materials.

Low-melting-point materials (such as aluminum, copper or brass), materials that soften on fire exposure (such as nonmetallic materials) and nonductile material (such as cast iron) shall be acceptable for use underground in accordance with the applicable standard listed in Table ~~5703.6.2~~5703.5.2. Where such materials are used outdoors in above-ground piping systems or within buildings, they shall be in accordance with the applicable standard listed in Table ~~5703.6.2~~5703.5.2 and one of the following:

1. Suitably protected against fire exposure.
2. Located where leakage from failure would not unduly expose people or structures.

3. Located where leakage can be readily controlled by operation of remotely located valves in a location provided with *ready access*.

In all cases, nonmetallic piping shall be used in accordance with Section 27.4.6 of NFPA 30.

~~5703.6.3~~5703.5.3 Testing.
Unless tested in accordance with the applicable section of ASME B31.9, piping, before being covered, enclosed or placed in use, shall be hydrostatically tested to 150 percent of the maximum anticipated pressure of the system, or pneumatically tested to 110 percent of the maximum anticipated pressure of the system, but not less than 5 pounds per square inch gauge (psig) (34.47 kPa) at the highest point of the system. This test shall be maintained for a sufficient time period to complete visual inspection of joints and connections. For not less than 10 minutes, there shall be no leakage or permanent distortion. Care shall be exercised to ensure that these pressures are not applied to vented storage tanks. Such storage tanks shall be tested independently from the piping.

~~5703.6.3.1~~5703.5.3.1 Existing piping. Existing piping shall be tested in accordance with this section where the *fire code official* has reasonable cause to believe that a leak exists. Piping that could contain flammable or *combustible liquids* shall not be tested pneumatically. Such tests shall be at the expense of the *owner* or operator.

Exception: Vapor-recovery piping is allowed to be tested using an inert gas.

~~5703.6.4~~5703.5.4 Protection from vehicles.
Guard posts or other *approved* means shall be provided to protect piping, valves or fittings subject to vehicular damage in accordance with Section 312.

~~5703.6.5~~5703.5.5 Protection from external corrosion and galvanic action. Where subject to external corrosion, piping, related fluid-handling components and supports for both underground and above-ground applications shall be fabricated from noncorrosive materials, and coated or provided with corrosion protection. Dissimilar metallic parts that promote galvanic action shall not be joined.

~~5703.6.6~~5703.5.6 Valves. Piping systems shall contain a sufficient number of manual control valves and check valves to operate the system properly and to protect the plant under both normal and emergency conditions. Piping systems in connection with pumps shall contain a sufficient number of such valves to control properly the flow of liquids in normal operation and in the event of physical damage or fire exposure.

~~5703.6.6.1~~5703.5.6.1 Backflow protections. Connections to pipelines or piping by which equipment (such as tank cars, tank vehicles or marine vessels) discharges liquids into storage tanks shall be provided with check valves or block valves for automatic protection against backflow where the piping arrangement is such that backflow from the system is possible. Where loading and unloading is done through a common pipe system, a check valve is not required. However, a block valve, located in an area where it is provided with *ready access* or remotely operable, shall be provided.

~~5703.6.6.2~~5703.5.6.2 Manual drainage. Manual drainage-control valves shall be located at *approved* locations remote from the tanks, diked area, drainage system and impounding basin to ensure their operation in a fire condition.

~~5703.6.7~~5703.5.7 Connections. Above-ground tanks with connections located below normal liquid level shall be provided with internal or external isolation valves located as close as practical to the shell of the tank. Except for liquids whose chemical characteristics are incompatible with steel, such valves, where external, and their connections to the tank shall be of steel.

~~5703.6.8~~5703.5.8 Piping supports. Piping systems shall be substantially supported and protected against physical damage and excessive stresses arising from settlement, vibration, expansion, contraction or exposure to fire. The supports shall be protected against exposure to fire by one of the following:

1. Draining liquid away from the piping system at a minimum slope of not less than 1 percent.
2. Providing protection with a *fire-resistance rating* of not less than 2 hours.
3. Other *approved* methods.

~~5703.6.9~~5703.5.9 Flexible joints. Flexible joints shall be *listed* and *approved* and shall be installed on underground liquid, vapor and vent piping at all of the following locations:

1. Where piping connects to underground tanks.
2. Where piping ends at pump islands and vent risers.
3. At points where differential movement in the piping can occur.

~~5703.6.9.1~~5703.5.9.1 Fiberglass-reinforced plastic piping. Fiberglass-reinforced plastic (FRP) piping is not required to be provided with flexible joints in locations where both of the following conditions are present:

1. Piping does not exceed 4 inches (102 mm) in diameter.
2. Piping has a straight run of not less than 4 feet (1219 mm) on one side of the connection where such connections result in a change of direction.

In lieu of the minimum 4-foot (1219 mm) straight run length, *approved* and *listed* flexible joints are allowed to be used under dispensers and suction pumps, at submerged pumps and tanks, and where vents extend above ground.

~~5703.6.10~~5703.5.10 Pipe joints.
Joints shall be liquid tight and shall be welded, flanged or threaded except that *listed* flexible connectors are allowed in accordance with Section ~~5703.6.9~~5703.5.9. Threaded or flanged joints shall fit tightly by using *approved* methods and materials for the type of joint. Joints in piping systems used for Class I liquids shall be welded where located in concealed spaces within buildings.
Nonmetallic joints shall be *approved* and shall be installed in accordance with the manufacturer's instructions.

Pipe joints that are dependent on the friction characteristics or resiliency of combustible materials for liquid tightness of piping shall not be used in buildings. Piping shall be secured to prevent disengagement at the fitting.

~~5703.6.11~~5703.5.11 Bends.
Pipe and tubing shall be bent in accordance with ASME B31.9.

SECTION 5704
STORAGE IN CONTAINERS AND PORTABLE TANKS

5704.1 General.
The storage of *flammable* and *combustible liquids* in containers and tanks shall be in accordance with this section and the applicable sections of Chapter 50. Storage of *flammable* and *combustible liquids* in closed containers not exceeding 60 gallons (227 L) in individual capacity and portable tanks not exceeding 660 gallons (2498 L) in individual capacity, and limited transfers incidental thereto, shall comply with applicable Sections of 5703 and Sections 5704.1.1 through 5704.4.8 as follows:

1. Storage in containers and portable tank storage shall comply with Sections 5704.1 through 5704.1.3.11.
2. Storage of quantities not exceeding the maximum allowable quantities for indoor storage per control area shall comply with the additional requirements in Sections 5704.2 through 5704.2.3.5.5.
3. Storage of quantities exceeding the maximum allowable quantities for indoor storage per control area shall comply with the additional requirements in Sections 5704.3 through 5704.3.2.5.
4. Outdoor storage of containers and portable tanks shall comply with Sections 5704.4 through 5704.4.8.

~~5704.3 Container and portable tank storage~~.
~~Storage of *flammable* and *combustible liquids* in closed containers that do not exceed 60 gallons (227 L) in individual capacity and portable tanks that do not exceed 660 gallons (2498 L) in individual capacity, and limited transfers incidental thereto, shall comply with Sections 5704.3.1 through 5704.3.8.5.~~

~~5704.3.1~~ 5704.1.1 Design, construction and capacity of containers and portable tanks.
The design, construction and capacity of containers for the storage of Class I, II and IIIA liquids shall be in accordance with this section

and Section 9.4 of NFPA 30.

~~5704.3.1.1~~ 5704.1.1.1 Approved containers. Only *approved* containers and portable tanks shall be used.

~~5704.3.2~~ 5704.1.2 Liquid storage cabinets.
Where other sections of this code require that liquid containers be stored in storage cabinets, such cabinets and storage shall be in accordance with Sections ~~5704.3.2.1~~ 5704.1.2.1 through ~~5704.3.2.2~~ 5704.1.2.2.

~~5704.3.2.1~~ 5704.1.2.1 Design and construction of storage cabinets.
Design and construction of liquid storage cabinets shall be in accordance with Sections ~~5704.3.2.1.1~~ 5704.1.2.1.1 through ~~5704.3.2.1.4~~ 5704.1.2.1.4.

~~5704.3.2.1.1~~ 5704.1.2.1.1 Materials.
Cabinets shall be *listed* in accordance with UL 1275, or constructed of *approved* wood or metal in accordance with the following:

1. Unlisted metal cabinets shall be constructed of steel having a thickness of not less than 0.044 inch (1.12 mm) (18 gage). The cabinet, including the door, shall be double walled with $1^1/_2$-inch (38 mm) airspace between the walls. Joints shall be riveted or welded and shall be tight fitting.
2. Unlisted wooden cabinets, including doors, shall be constructed of not less than 1-inch (25 mm) exterior grade plywood. Joints shall be rabbeted and shall be fastened in two directions with wood screws. Door hinges shall be of steel or brass. Cabinets shall be painted with an intumescent-type paint.

~~5704.3.2.1.2~~ 5704.1.2.1.2 Labeling. Cabinets shall be provided with a conspicuous label in red letters on contrasting background that reads: “FLAMMABLE—KEEP FIRE AWAY.”

~~5704.3.2.1.3~~ 5704.1.2.1.3 Doors. Doors shall be well fitted, self-closing and equipped with a three-point latch.

~~5704.3.2.1.4~~ 5704.1.2.1.4 Bottom. The bottom of the cabinet shall be liquid tight to a height of not less than 2 inches (51 mm).

~~5704.3.2.2~~ 5704.1.2.2 Capacity. The combined total quantity of liquids in a cabinet shall not exceed 120 gallons (454 L).

~~5704.3.3~~ 5704.1.3 Indoor storage. Storage of *flammable* and *combustible liquids* inside buildings in containers and portable tanks shall be in accordance with Sections ~~5704.3.3.1~~ 5704.1.3.1 through ~~5704.3.3.10~~5704.1.3.11.

Exceptions:

1. Liquids in the fuel tanks of motor vehicles, aircraft, boats or portable or stationary engines.
2. The storage of distilled spirits and wines in wooden barrels or casks.

~~5704.3.3.1~~ 5704.1.3.1 Portable fire extinguishers.
Approved portable fire extinguishers shall be provided in accordance with specific sections of this chapter and Section 906.

~~5704.3.3.2~~ 5704.1.3.2 Incompatible materials.
Materials that will react with water or other liquids to produce a hazard shall not be stored in the same room with *flammable* and *combustible liquids* except where stored in accordance with Section 5003.9.8.

~~5704.3.3.3~~ 5704.1.3.3 Clear means of egress. Storage of any liquids, including stock for sale, shall not be stored near or be allowed to obstruct physically the route of egress.

~~5704.3.3.4~~5704.1.3.4 Empty containers or portable tank storage. The storage of empty tanks and containers previously used for the storage of *flammable* or *combustible liquids*, unless free from explosive vapors, shall be stored as required for filled containers and portable tanks. Portable tanks and containers, when emptied, shall have the covers or plugs immediately replaced in openings.

~~5704.3.3.5~~5704.1.3.5 Shelf storage.
Shelving shall be of *approved* construction, adequately braced and anchored. Seismic requirements shall be in accordance with the *International Building Code*.

~~5704.3.3.5.1~~5704.1.3.5.1 Use of wood. Wood of not less than 1 inch (25 mm) nominal thickness is allowed to be used as shelving, racks, dunnage, scuffboards, floor overlay and similar installations.

~~5704.3.3.5.2~~5704.1.3.5.2 Displacement protection. Shelves shall be of sufficient depth and provided with a lip or guard to prevent individual containers from being displaced.

Exception: Shelves in storage cabinets or on laboratory furniture specifically designed for such use.

~~5704.3.3.5.3~~5704.1.3.5.3 Orderly storage. Shelf storage of *flammable* and *combustible liquids* shall be maintained in an orderly manner.

~~5704.3.3.6~~5704.1.3.6 Rack storage. Where storage on racks is allowed elsewhere in this code, a minimum 4-foot-wide (1219 mm) aisle shall be provided between adjacent rack sections and any adjacent storage of liquids. Main aisles shall be not less than 8 feet (2438 mm) wide.

~~5704.3.3.7~~5704.1.3.7 Pile or palletized storage. Solid pile and palletized storage in liquid warehouses shall be arranged so that piles are separated from each other by not less than 4 feet (1219 mm). Aisles shall be provided and arranged so that containers or portable tanks are not more than 20 feet (6096 mm) from an aisle. Main aisles shall be not less than 8 feet (2438 mm) wide.

~~5704.3.3.8~~ 5704.1.3.8 Limited combustible storage.
Limited quantities of combustible commodities are allowed to be stored in liquid storage areas where the ordinary combustibles, other than those used for packaging the liquids, are separated from the liquids in storage by not less than 8 feet (2438 mm) horizontally, either by open aisles or by open racks, and where protection is provided in accordance with Chapter 9.

~~5704.3.3.9~~5704.1.3.9 Idle combustible pallets.
Storage of empty or idle combustible pallets inside an unprotected liquid storage area shall be limited to a maximum pile size of 2,500 square feet (232 m^2) and to a maximum storage height of 6 feet (1829 mm). Storage of empty or idle combustible pallets inside a protected liquid storage area shall comply with NFPA 13. Pallet storage shall be separated from liquid storage by aisles that are not less than 8 feet (2438 mm) wide.

~~5704.3.3.10~~5704.1.3.10 Containers in piles. Containers in piles shall be stacked in such a manner as to provide stability and to prevent excessive stress on container walls. Portable tanks stored more than one tier high shall be designed to nest securely, without dunnage. Material-handling equipment shall be suitable to handle containers and tanks safely at the upper tier level.

~~5704.3.4.4~~5704.1.3.11 Liquids for maintenance and operation of equipment.
In all occupancies, quantities of *flammable* and *combustible liquids* in excess of 10 gallons (38 L) used for maintenance purposes and the operation of equipment shall be stored in liquid storage cabinets in accordance with Section ~~5704.3.2~~ 5704.1.2. Quantities not exceeding 10 gallons (38 L) are allowed to be stored outside of a cabinet where in *approved* containers located in private garages or other *approved* locations.

~~5704.3.4~~5704.2 ~~Quantity limits for storage~~ Indoor storage of quantities not exceeding the maximum allowable quantity per control area.
~~Liquids storage quantity limitations~~
Indoor storage of quantities not exceeding the maximum allowable quantity per control area shall comply with Sections ~~5704.3.4.1~~ 5704.2.1 through ~~5704.3.4.4~~ 5704.3.4.2.4.

~~5704.3.4.1~~5704.2.1 Maximum allowable quantity per control area. For occupancies other than Group M wholesale and retail sales uses, indoor storage of *flammable* and *combustible liquids* shall not exceed the *maximum allowable quantities per control area* indicated in Table 5003.1.1(1) and shall not exceed the additional limitations set forth in this section.For Group M occupancy wholesale and retail sales uses, indoor storage of *flammable* and *combustible liquids* shall not exceed the *maximum allowable quantities per control area* indicated in Table ~~5704.3.4.1~~5704.2.1.

Storage of hazardous production material *flammable* and *combustible liquids* in Group H-5 occupancies shall be in accordance with Chapter 27.

TABLE ~~5704.3.4.1~~5704.2.1 MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF FLAMMABLE AND COMBUSTIBLE LIQUIDS IN WHOLESALE AND RETAIL SALES OCCUPANCIES[a]

TYPE OF LIQUID	MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA (gallons)		
	Sprinklered[b] in accordance with footnote densities and arrangements	Sprinklered in accordance with Tables 5704.3.6.3(4) through 5704.3.6.3(8) and Table 5704.3.7.5.1	Nonsprinklered
Class IA	60	60	30
Class IB, IC, II and IIIA	7,500[c]	15,000[c]	1,600
Class IIIB	Unlimited	Unlimited	13,200

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m^2, 1 gallon = 3.785 L, 1 gallon per minute per square foot = 40.75 L/min/m^2.

a. Control areas shall be separated from each other by not less than a 1-hour fire barrier.

b. To be considered as sprinklered, a building shall be equipped throughout with an *approved* automatic sprinkler system with a design providing minimum densities as follows:

   1. For uncartoned commodities on shelves 6 feet or less in height where the ceiling height does not exceed 18 feet, quantities are those allowed with a minimum sprinkler design density of Ordinary Hazard Group 2.

   2. For cartoned, palletized or racked commodities where storage is 4 feet 6 inches or less in height and where the ceiling height does not exceed 18 feet, quantities are those allowed with a minimum sprinkler design density of 0.21 gallon per minute per square foot over the most remote 1,500-square-foot area.

c. Where wholesale and retail sales or storage areas exceed 50,000 square feet in area, the maximum allowable quantities are allowed to be increased by 2 percent for each 1,000 square feet of area in excess of 50,000 square feet, up to not more than 100 percent of the table amounts. A control area separation is not required. The cumulative amounts, including amounts attained by having an additional control area, shall not exceed 30,000 gallons.

~~5704.3.4.2~~5704.2.2 Occupancy quantity limits.

The following limits for quantities of stored *flammable* or *combustible liquids* shall not be exceeded:

1. Group A occupancies: Quantities in Group A occupancies shall not exceed that necessary for demonstration, treatment, laboratory work, maintenance purposes and operation of equipment, and shall not exceed quantities set forth in Table 5003.1.1(1).
2. Group B occupancies: Quantities in drinking, dining, office and school uses within Group B occupancies shall not exceed that necessary for demonstration, treatment, laboratory work, maintenance purposes and operation of equipment, and shall not exceed quantities set forth in Table 5003.1.1(1).
3. Group E occupancies: Quantities in Group E occupancies shall not exceed that necessary for demonstration, treatment, laboratory work, maintenance purposes and operation of equipment, and shall not exceed quantities set forth in Table 5003.1.1(1).
4. Group F occupancies: Quantities in dining, office, and school uses within Group F occupancies shall not exceed that necessary for demonstration, laboratory work, maintenance purposes and operation of equipment, and shall not exceed quantities set forth in Table 5003.1.1(1).
5. Group I occupancies: Quantities in Group I occupancies shall not exceed that necessary for demonstration, laboratory work, maintenance purposes and operation of equipment, and shall not exceed quantities set forth in Table 5003.1.1(1).
6. Group M occupancies: Quantities in dining, office, and school uses within Group M occupancies shall not exceed that necessary for demonstration, laboratory work, maintenance purposes and operation of equipment, and shall not exceed quantities set forth in Table 5003.1.1(1). The maximum allowable quantities for storage in wholesale and retail sales areas shall be in accordance with Section ~~5704.3.4.1~~5704.2.1.

7. Group R occupancies: Quantities in Group R occupancies shall not exceed that necessary for maintenance purposes and operation of equipment, and shall not exceed quantities set forth in Table 5003.1.1(1).
8. Group S occupancies: Quantities in dining and office uses within Group S occupancies shall not exceed that necessary for demonstration, laboratory work, maintenance purposes and operation of equipment, and shall not exceed quantities set forth in Table 5003.1.1(1).

~~5704.3.5~~5704.2.3 Storage in control areas.
Storage of *flammable* and *combustible liquids* in *control areas* shall be in accordance with Sections ~~5704.3.5.1~~5704.2.3.1 through ~~5704.3.5.4~~5704.2.3.4.

~~5704.3.5.1~~5704.2.3.1 Basement storage.
Class I liquids shall be allowed to be stored in *basements* in amounts not exceeding the *maximum allowable quantity per control area* for use-*open systems* in Table 5003.1.1(1), provided that *fire protection systems* are provided in accordance with Chapter 9. Class II and IIIA liquids shall be allowed to be stored in *basements*, provided that automatic suppression and other fire protection are provided in accordance with Chapter 9.

~~5704.3.5.2~~5704.2.3.2 Storage pile heights. Containers having less than a 30-gallon (114 L) capacity that contain Class I or II liquids shall not be stacked more than 3 feet (914.4 mm) or two containers high, whichever is greater, unless stacked on fixed shelving or otherwise satisfactorily secured. Containers of Class I or II liquids having a capacity of 30 gallons (114 L) or more shall not be stored more than one container high. Containers shall be stored in an upright position.

~~5704.3.5.3~~5704.2.3.3 Storage distance from ceilings and roofs. Piles of containers or portable tanks shall not be stored closer than 3 feet (914 mm) to the nearest beam, chord, girder or other obstruction, and shall be 3 feet (914 mm) below sprinkler deflectors or discharge orifices of water spray or other overhead *fire protection system*.

~~5704.3.5.4~~5704.2.3.4 Combustible materials. In areas that are not open to the public, Class I, II and IIIA liquids shall not be stored in the same pile or rack section as ordinary combustible commodities unless such materials are packaged together as kits.

~~5704.3.6~~5704.2.3.5 Wholesale and retail sales uses.
Flammable and *combustible liquids* in Group M occupancy wholesale and retail sales uses shall be in accordance with Sections ~~5704.3.6.1~~ 5704.2.3.5.1 through ~~5704.3.6.5~~ 5704.2.3.5.5, or Sections 10.10.2, 12.3.6, 16.4.1 through 16.4.3, 16.5.1 through 16.5.2.12, Figures 16.4.1(a) through 16.4.1(c) and Tables 16.5.2.1 through 16.5.2.12, of NFPA 30.

~~5704.3.6.1~~5704.2.3.5.1 Container type. Containers for Class I liquids shall be metal.

Exception: In sprinklered buildings, an aggregate quantity of 120 gallons (454 L) of water-miscible Class IB and Class IC liquids is allowed in nonmetallic containers, each having a capacity of 16 ounces (0.473 L) or less.

~~5704.3.6.2~~5704.2.3.5.2 Container capacity.
Containers for Class I liquids shall not exceed a capacity of 5 gallons (19 L).

Exception: Metal containers not exceeding 55 gallons (208 L) are allowed to store up to 240 gallons (908 L) of the *maximum allowable quantity per control area* of Class IB and IC liquids in a *control area*. The building shall be equipped throughout with an *approved automatic sprinkler system* in accordance with Table ~~5704.3.4.1~~5704.2.1. The containers shall be provided with plastic caps without cap seals and shall be stored upright. Containers shall not be stacked or stored in racks and shall not be located in areas open to the public.

~~5704.3.6.3~~5704.2.3.5.3 Fire protection and storage arrangements. Fire protection and container storage arrangements shall be in accordance with Table ~~5704.3.6.3(1)~~5704.2.3.5.3(1) or the following:
1. Storage on shelves shall not exceed 6 feet (1829 mm) in height, and shelving shall be metal.

2. Storage on pallets or in piles greater than 4 feet 6 inches (1372 mm) in height, or where the ceiling exceeds 18 feet (5486 mm) in height, shall be protected in accordance with Table ~~5704.3.6.3(4)~~5704.2.3.5.3(4), and the storage heights and arrangements shall be limited to those specified in Table ~~5704.3.6.3(2)~~5704.2.3.5.3(2).
3. Storage on racks greater than 4 feet 6 inches (1372 mm) in height, or where the ceiling exceeds 18 feet (5486 mm) in height shall be protected in accordance with Tables 5704.3.6.3(5), ~~5704.3.6.3(6)~~5704.2.3.5.3(6), and ~~5704.3.6.3(7)~~5704.2.3.5.3(7) as appropriate, and the storage heights and arrangements shall be limited to those specified in Table ~~5704.3.6.3(3)~~5704.2.3.5.3(3).

Combustible commodities shall not be stored above *flammable* and *combustible liquids*.

TABLE ~~5704.3.6.3(1)~~ 5704.2.3.5.3(1) MAXIMUM STORAGE HEIGHT IN CONTROL AREA

TYPE OF LIQUID	NONSPRINKLERED AREA (feet)	SPRINKLERED AREA[a] (feet)	SPRINKLERED WITH IN-RACK PROTECTION[a, b] (feet)
Flammable liquids:			
Class IA	4	4	4
Class IB	4	8	12
Class IC	4	8	12
Combustible liquids:			
Class II	6	8	12
Class IIIA	8	12	16
Class IIIB	8	12	20

For SI: 1 foot = 304.8 mm.

a In buildings protected by an automatic sprinkler system, the storage height for containers and portable tanks shall not exceed the maximum storage height permitted for the fire protection scheme set forth in NFPA 30 or the maximum storage height demonstrated in a full-scale fire test, whichever is greater. NFPA 30 criteria and fire test results for metallic containers and portable tanks shall not be applied to nonmetallic containers and portable tanks.

b. In-rack protection shall be in accordance with Table ~~5704.3.6.3(5)~~5704.2.3.5.3(5), ~~5704.3.6.3(6)~~5704.2.3.5.3(6) or ~~5704.3.6.3(7)~~5704.2.3.5.3(7).

TABLE ~~5704.3.6.3(2)~~ 5704.2.3.5.3(2) STORAGE ARRANGEMENTS FOR PALLETIZED OR SOLID-PILE STORAGE IN LIQUID STORAGE ROOMS AND WAREHOUSES

CLASS	STORAGE LEVEL	MAXIMUM STORAGE HEIGHT			MAXIMUM QUANTITY PER PILE (gallons)		MAXIMUM QUANTITY PER ROOM[a] (gallons)	
		Drums	Containers[b] (feet)	Portable tanks[b] (feet)	Containers	Portable tanks	Containers	Portable tanks
IA	Ground floor	1	5	Not Allowed	3,000	Not Allowed	12,000	Not Allowed
	Upper floors	1	5	Not Allowed	2,000	Not Allowed	8,000	Not Allowed
	Basements	0	Not Allowed	Not Allowed	Not Allowed	Not Allowed	Not Allowed	Not Allowed
IB	Ground floor	1	6.5	7	5,000	20,000	15,000	40,000
	Upper floors	1	6.5	7	3,000	10,000	12,000	20,000
	Basements	0	Not Allowed	Not Allowed	Not Allowed	Not Allowed	Not Allowed	Not Allowed
IC	Ground floor[d]	1	6.5[c]	7	5,000	20,000	15,000	40,000
	Upper floors	1	6.5[c]	7	3,000	10,000	12,000	20,000
	Basements	0	Not Allowed	Not Allowed	Not Allowed	Not Allowed	Not Allowed	Not Allowed
II	Ground floor[d]	3	10	14	10,000	40,000	25,000	80,000
	Upper floors	3	10	14	10,000	40,000	25,000	80,000
	Basements	1	5	7	7,500	20,000	7,500	20,000
III	Ground floor	5	20	14	15,000	60,000	50,000	100,000
	Upper floors	5	20	14	15,000	60,000	50,000	100,000
	Basements	3	10	7	10,000	20,000	25,000	40,000

For SI: 1 foot = 304.8 mm, 1 gallon = 3.785 L.

a. See Section ~~5704.3.8.1~~5704.3.2.1 for unlimited quantities in liquid storage warehouses.

b. In buildings protected by an automatic sprinkler system, the storage height for containers and portable tanks shall not exceed the maximum storage height permitted for the fire protection scheme set forth in NFPA 30 or the maximum storage height demonstrated in a full-scale fire test, whichever is greater. NFPA 30 criteria and fire test results for metallic containers and portable tanks shall not be applied to nonmetallic containers and portable tanks.

c. These height limitations are allowed to be increased to 10 feet for containers having a capacity of 5 gallons or less.

d. For palletized storage of unsaturated polyester resins (UPR) in relieving-style metal containers with 50 percent or less by weight Class IC or II liquid and no Class IA or IB liquid, height and pile quantity limits shall be permitted to be 10 feet and 15,000 gallons, respectively, provided that such storage is protected by sprinklers in accordance with NFPA 30 and that the UPR storage area is not located in the same containment area or drainage path for other Class I or II liquids.

TABLE ~~5704.3.6.3(3)~~ 5704.2.3.5.3(3) STORAGE ARRANGEMENTS FOR RACK STORAGE IN LIQUID STORAGE ROOMS AND WAREHOUSES

CLASS	TYPE RACK	STORAGE LEVEL	MAXIMUM STORAGE HEIGHT[b] (feet)	MAXIMUM QUANTITY PER ROOM[a] (gallons)
			Containers	Containers
IA	Double row or Single row	Ground floor	25	7,500
		Upper floors	15	4,500
		Basements	Not Allowed	Not Allowed
IB IC	Double row or Single row	Ground floor	25	15,000
		Upper floors	15	9,000
		Basements	Not Allowed	Not Allowed
II	Double row or Single row	Ground floor	25	24,000
		Upper floors	25	24,000
		Basements	15	9,000
III	Multirow	Ground floor	40	48,000
	Double row	Upper floors	20	48,000
	Single row	Basements	20	24,000

For SI: 1 foot = 304.8 mm, 1 gallon = 3.785 L.

a. See Section ~~5704.3.8.1~~5704.3.2.1 for unlimited quantities in liquid storage warehouses.

b. In buildings protected by an automatic sprinkler system, the storage height for containers and portable tanks shall not exceed the maximum storage height permitted for the fire protection scheme set forth in NFPA 30 or the maximum storage height demonstrated in a full-scale fire test, whichever is greater. NFPA 30 criteria and fire test results for metallic containers and portable tanks shall not be applied to nonmetallic containers and portable tanks.

TABLE ~~5704.3.6.3(4)~~ 5704.2.3.5.3(4) AUTOMATIC SPRINKLER PROTECTION FOR SOLID-PILE AND PALLETIZED STORAGE OF LIQUIDS IN METAL CONTAINERS AND PORTABLE TANKS[a]

STORAGE CONDITIONS		CEILING SPRINKLER DESIGN AND DEMAND				MINIMUM HOSE STREAM DEMAND (gpm)	MINIMUM DURATION SPRINKLERS AND HOSE STREAMS (hours)
Class liquid	Container size and arrangement	Density (gpm/ft^2)	Area (square feet) High-temperature sprinklers	Area (square feet) Ordinary temperature sprinklers	Maximum spacing (square feet)		
IA	5 gallons or less, with or without cartons, palletized or solid pile[b]	0.30	3,000	5,000	100	750	2
	Containers greater than 5 gallons, on end or side, palletized or solid pile	0.60	5,000	8,000	80	750	
IB, IC and II	5 gallons or less, with or without cartons, palletized or solid pile[b]	0.30	3,000	5,000	100	500	2
	Containers greater than 5 gallons on pallets or solid pile, one high	0.25	5,000	8,000	100		
II	Containers greater than 5 gallons on pallets or solid pile, more than one high, on end or side	0.60	5,000	8,000	80	750	2
IB, IC and II	Portable tanks, one high	0.30	3,000	5,000	100	500	2
II	Portable tanks, two high	0.60	5,000	8,000	80	750	2
III	5 gallons or less, with or without cartons, palletized or solid pile	0.25	3,000	5,000	120	500	1

	STORAGE CONDITIONS	CEILING SPRINKLER DESIGN AND DEMAND					
			Area (square feet)				
Class liquid	Container size and arrangement	Density (gpm/ft)	High-temperature sprinklers	Ordinary temperature sprinklers	Maximum spacing (square feet)	MINIMUM HOSE STREAM DEMAND (gpm)	MINIMUM DURATION SPRINKLERS AND HOSE STREAMS (hours)
	Containers greater than 5 gallons on pallets or solid pile, on end or sides, up to three high	0.25	3,000	5,000	120	500	1
	Containers greater than 5 gallons, on pallets or solid pile, on end or sides, up to 18 feet high	0.35	3,000	5,000	100	750	2
	Portable tanks, one high	0.25	3,000	5,000	120	500	1
	Portable tanks, two high	0.50	3,000	5,000	80	750	2

For SI: 1 foot = 304.8 mm, 1 gallon = 3.785 L, 1 square foot = 0.0929 m^2, 1 gallon per minute = 3.785 L/m, 1 gallon per minute per square foot = 40.75 L/min/m^2.

a. The design area contemplates the use of Class II standpipe systems. Where Class I standpipe systems are used, the area of application shall be increased by 30 percent without revising density.

b. For storage heights above 4 feet or ceiling heights greater than 18 feet, an *approved* engineering design shall be provided in accordance with Section 104.2.2.

TABLE ~~5704.3.6.3(5)~~ 5704.2.3.5.3(5) AUTOMATIC SPRINKLER PROTECTION REQUIREMENTS FOR RACK STORAGE OF LIQUIDS IN METAL CONTAINERS OF 5-GALLON CAPACITY OR LESS WITH OR WITHOUT CARTONS ON CONVENTIONAL WOOD PALLETS[a]

	~~CEILING SPRINKLER DESIGN AND DEMAND~~				~~IN-RACK SPRINKLER ARRANGEMENT AND DEMAND~~					
	CEILING SPRINKLER DESIGN AND DEMAND				IN-RACK SPRINKLER ARRANGEMENT AND DEMAND					
		Area (square feet)								
CLASS LIQUID	Density (gpm/ft^2)	High-temperature sprinklers	Ordinary temperature sprinklers	Maximum spacing	Racks up to 9 feet deep	Racks more than 9 feet to 12 feet deep	30 psi (standard orifice) 14 psi (large orifice)	Number of sprinklers operating	MINIMUM HOSE STREAM DEMAND (gpm)	MINIMUM DURATION SPRINKLER AND HOSE STREAM (hours)
I (maximum 25-foot height) Option 1	0.40	3,000	5,000	80 ft^2/head	1. Ordinary temperature, quick-response sprinklers, maximum 8 feet 3 inches horizontal spacing 2. One line sprinklers above each level of storage 3. Locate in longitudinal flue space, staggered vertical 4. Shields required where multiple-level	1. Ordinary temperature, quick-response sprinklers, maximum 8 feet 3 inches horizontal spacing 2. One line sprinklers above each level of storage 3. Locate in transverse flue spaces, staggered vertical and within 20 inches of aisle 4. Shields required where multiple-level	30 psi (0.5-inch orifice)	1. Eight sprinklers if only one level 2. Six sprinklers each on two levels if only two levels 3. Six sprinklers each on top three levels, if three or more levels 4. Hydraulically most remote	750	2
I (maximum 25-foot height) Option 2	0.55	2,000[b]	Not Applicable	100 ft^2/head	1. Ordinary temperature, quick-response sprinklers, maximum 8 feet 3 inches horizontal spacing 2. See 2 above 3. See 3 above 4. See 4 above	1. Ordinary temperature, quick-response sprinklers, maximum 8 feet 3 inches horizontal spacing 2. See 2 above 3. See 3 above 4. See 4 above	14 psi (0.53-inch orifice)	See 1 through 4 above	500	2
I and II (maximum 14-foot storage height) (maximum three tiers)	0.55[c]	2,000[d]	Not Applicable	100 ft^2/head	Not Applicable None for maximum 6-foot-deep racks	Not Applicable	Not Applicable	Not Applicable	500	2

	~~CEILING SPRINKLER DESIGN AND DEMAND~~			~~IN-RACK SPRINKLER ARRANGEMENT AND DEMAND~~						
	CEILING SPRINKLER DESIGN AND DEMAND				IN-RACK SPRINKLER ARRANGEMENT AND DEMAND					
		Area (square feet)					30 psi (standard orifice)			
CLASS LIQUID	Density (gpm/ft)	High-temperature sprinklers	Ordinary temperature sprinklers	Maximum spacing	Racks up to 9 feet deep	Racks more than 9 feet to 12 feet deep	14 psi (large orifice)	Number of sprinklers operating	MINIMUM HOSE STREAM DEMAND (gpm)	MINIMUM DURATION SPRINKLER AND HOSE STREAM (hours)
II (maximum 25-foot height)	0.30	3,000	5,000	100 ft^2/head	1. Ordinary temperature sprinklers 8 feet apart horizontally 2. One line sprinklers between levels at nearest 10-foot vertical intervals 3. Locate in longitudinal flue space, staggered vertical 4. Shields required where multiple-level	1. Ordinary temperature sprinklers 8 feet apart horizontally 2. Two lines between levels at nearest 10-foot vertical intervals 3. Locate in transverse flue spaces, staggered vertical and within 20 inches of aisle 4. Shields required where multiple-level	30 psi	Hydraulically most remote—six sprinklers at each level, up to a maximum of three levels	750	2
III (40-foot height)	0.25	3,000	5,000	120 ft^2/head	Same as for Class II liquids	Same as for Class II liquids	30 psi	Same as for Class II liquids	500	2

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 square foot = 0.0929 m^2, 1 pound per square inch = 6.895 kPa, 1 gallon = 3.785 L, 1 gallon per minute = 3.785 L/m, 1 gallon per minute per square foot = 40.75 L/min/m^2.

a. The design area contemplates the use of Class II standpipe systems. Where Class I standpipe systems are used, the area of application shall be increased by 30 percent without revising density.

b. Using listed or approved extra-large orifices, high-temperature quick-response or standard element sprinklers under a maximum 30-foot ceiling with minimum 7.5-foot aisles.

c. For friction lid cans and other metal containers equipped with plastic nozzles or caps, the density shall be increased to 0.65 gpm per square foot using listed or approved extra-large orifice, high-temperature quick-response sprinklers.

d. Using listed or approved extra-large orifice, high-temperature quick-response or standard element sprinklers under a maximum 18-foot ceiling with minimum 7.5-foot aisles and metal containers.

TABLE ~~5704.3.6.3(6)~~ 5704.2.3.5.3(6) AUTOMATIC SPRINKLER PROTECTION REQUIREMENTS FOR RACK STORAGE OF LIQUIDS IN METAL CONTAINERS GREATER THAN 5-GALLON CAPACITY[a]

	~~CEILING SPRINKLER DESIGN AND DEMAND~~			~~IN-RACK SPRINKLER ARRANGEMENT AND DEMAND~~						
	CEILING SPRINKLER DESIGN AND DEMAND				IN-RACK SPRINKLER ARRANGEMENT AND DEMAND					
		Area (square feet)								
CLASS LIQUID	Density (gpm/ft^2)	High-temperature sprinklers	Ordinary temperature sprinklers	Maximum spacing	On-side storage racks up to 9-foot-deep racks	On-end storage (on pallets) up to 9-foot-deep racks	Minimum nozzle pressure	Number of sprinklers operating	MINIMUM HOSE STREAM DEMAND (gpm)	MINIMUM DURATION SPRINKLER AND HOSE STREAM (hours)
IA (maximum 25-foot height)	0.60	3,000	5,000	80 ft^2/head	1. Ordinary temperature sprinklers 8 feet apart horizontally 2. One line sprinklers above each tier of storage 3. Locate in longitudinal flue space, staggered vertical 4. Shields required where multiple-level	1. Ordinary temperature sprinklers 8 feet apart horizontally 2. One line sprinklers above each tier of storage 3. Locate in longitudinal flue space, staggered vertical 4. Shields required where multiple-level	30 psi	Hydraulically most remote—six sprinklers at each level	1,000	2

	~~CEILING SPRINKLER DESIGN AND DEMAND~~			~~IN-RACK SPRINKLER ARRANGEMENT AND DEMAND~~						
	CEILING SPRINKLER DESIGN AND DEMAND				IN-RACK SPRINKLER ARRANGEMENT AND DEMAND					
		Area (square feet)								
CLASS LIQUID	Density (gpm/ft)	High-temperature sprinklers	Ordinary temperature sprinklers	Maximum spacing	On-side storage racks up to 9-foot-deep racks	On-end storage (on pallets) up to 9-foot-deep racks	Minimum nozzle pressure	Number of sprinklers operating	MINIMUM HOSE STREAM DEMAND (gpm)	MINIMUM DURATION SPRINKLER AND HOSE STREAM (hours)
IB, IC and II (maximum 25-foot height)	0.60	3,000	5,000	100 ft^2/head	1. See 1 above 2. One line sprinklers every three tiers of storage 3. See 3 above 4. See 4 above	1. See 1 above 2. See 2 above 3. See 3 above 4. See 4 above	30 psi	Hydraulically most remote—six sprinklers at each level	750	2
III (maximum 40-foot height)	0.25	3,000	5,000	120 ft^2/head	1. See 1 above 2. One line sprinklers every sixth level (maximum) 3. See 3 above 4. See 4 above	1. See 1 above 2. One line sprinklers every third level (maximum) 3. See 3 above 4. See 4 above	15 psi	Hydraulically most remote—six sprinklers at each level	500	1

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m^2, 1 pound per square inch = 6.895 kPa, 1 gallon = 3.785 L, 1 gallon per minute = 3.785 L/m, 1 gallon per minute per square foot = 40.75 L/min/m^2.

a. The design assumes the use of Class II standpipe systems. Where a Class I standpipe system is used, the area of application shall be increased by 30 percent without revising density.

TABLE ~~5704.3.6.3(7)~~ 5704.2.3.5.3(7) AUTOMATIC AFFF WATER PROTECTION REQUIREMENTS FOR RACK STORAGE OF LIQUIDS IN METAL CONTAINERS GREATER THAN 5-GALLON CAPACITY[a, b]

	CEILING SPRINKLER DESIGN AND DEMAND			IN-RACK SPRINKLER ARRANGEMENT AND DEMAND[c]					
		Area (square feet)							
CLASS LIQUID	Density (gpm/ft^2)	High-temperature sprinklers	Ordinary temperature sprinklers	On-end storage of drumson pallets, up to 25 feet	Minimum nozzle pressure (psi)	Number of sprinklers operating	Hose stream demand[d] (gpm)	DURATION AFFF SUPPLY (minimum)	DURATION WATER SUPPLY (hours)
IA, IB, IC and II	0.30	1,500	2,500	1. Ordinary temperature sprinkler up to 10 feet apart horizontally 2. One line sprinklers above each level of storage 3. Locate in longitudinal flue space, staggered vertically 4. Shields required for multiple-level	30	Three sprinklers per level	500	15	2

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 square foot = 0.0929 m^2, 1 pound per square inch = 6.895 kPa, 1 gallon = 3.785 L, 1 gallon per minute = 3.785 L/m, 1 gallon per minute per square foot = 40.75 L/min/m^2.

a. System shall be a closed-head wet system with approved devices for proportioning aqueous film-forming foam.

b. Except as modified herein, in-rack sprinklers shall be installed in accordance with NFPA 13.

c. The height of storage shall not exceed 25 feet.

d. Hose stream demand includes $1^1/_2$-inch inside hose connections, where required.

TABLE ~~5704.3.6.3(8)~~ 5704.2.3.5.3(8) AUTOMATIC SPRINKLER PROTECTION REQUIREMENTS FOR CLASS I LIQUID STORAGE IN METAL CONTAINERS OF 1-GALLON CAPACITY OR LESS WITH UNCARTONED OR CASE-CUT SHELF DISPLAY UP TO 6.5 FEET, AND PALLETIZED STORAGE ABOVE IN A DOUBLE-ROW RACK ARRAY[a]

STORAGE HEIGHT	CEILING SPRINKLER DESIGN AND DEMAND				IN-RACK SPRINKLER ARRANGEMENT AND DEMAND				MINIMUM HOSE STREAM DEMAND (gpm)	MINIMUM DURATION SPRINKLERS AND HOSE STREAM (hours)
	Density (gpm/ft^2)	Area (square feet) High temperature	Area (square feet) Ordinary temperature	Maximum spacing	Racks up to 9 feet deep	Racks 9 to 12 feet	Minimum nozzle pressure	Number of sprinklers operating		
Maximum 20-foot storage height	0.60	2,000[b]	Not Applicable	100 ft^2/head	1. Ordinary temperature, quick-response sprinklers, maximum 8 feet 3 inches horizontal spacing 2. One line of sprinklers at the 6-foot level and the 11.5-foot level of storage 3. Locate in longitudinal flue space, staggered vertical 4. Shields required where multiple-level	Not Applicable	30 psi (standard orifice) or 14 psi (large orifice)	1. Six sprinklers each on two levels 2. Hydraulically most remote 12 sprinklers	500	2

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 square foot = 0.0929 m^2, 1 pound per square inch = 6.895 kPa, 1 gallon = 3.785 L, 1 gallon per minute = 3.785 L/m, 1 gallon per minute per square foot = 40.75 L/min/m^2.

a. This table shall not apply to racks with solid shelves.

b. Using extra-large orifice sprinklers under a ceiling 30 feet or less in height. Minimum aisle width is 7.5 feet.

~~5704.3.6.4~~5704.2.3.5.4 Warning for containers. Cans, containers and vessels containing *flammable liquids* or *flammable liquid* compounds or mixtures offered for sale shall be provided with a warning indicator, painted or printed on the container and stating that the liquid is flammable, and shall be kept away from heat and an open flame.

~~5704.3.6.5~~5704.2.3.5.5 Storage plan.

Where required by ~~fire~~ the fire code official, *aisle* and storage plans shall be submitted in accordance with Chapter 50.

~~5704.3.4.3~~5704.3 ~~Quantities exceeding limits for control areas~~Indoor storage of quantities exceeding the maximum allowable quantity per control area.

Quantities exceeding ~~those~~ the limits allowed in *control areas* set forth in Section ~~5704.3.4.1~~5704.2.1 shall be in liquid storage rooms or liquid storage warehouses in accordance with Sections ~~5704.3.7~~5704.3.1 and ~~5704.3.8~~5704.3.2.

~~5704.3.7~~ 5704.3.1 Liquid storage rooms.

Liquid storage rooms shall comply with Sections ~~5704.3.7.1~~5704.3.1.1 through ~~5704.3.7.5.2~~5704.3.1.6.

~~5704.3.7.1~~ 5704.3.1.1 General.

Quantities of liquids exceeding those set forth in Section ~~5704.3.4.1~~5704.2.1 for storage in *control areas* shall be stored in a liquid storage room complying with this section and constructed and separated as required by the *International Building Code*.

~~5704.3.7.2~~ 5704.3.1.2 Quantities and arrangement of storage.

The quantity limits and storage arrangements in liquid storage rooms shall be in accordance with Tables ~~5704.3.6.3(2)~~5704.2.3.5.3(2) and ~~5704.3.6.3(3)~~5704.2.3.5.3(3) and Sections ~~5704.3.7.2.1~~5704.3.1.2.1 through ~~5704.3.7.2.3~~5704.3.1.2.3.

~~5704.3.7.2.1~~ 5704.3.1.2.1 Mixed storage.

Where two or more classes of liquids are stored in a pile or rack section, both of the following shall apply:

1. The quantity in that pile or rack shall not exceed the smallest of the maximum quantities for the classes of liquids stored in accordance with Table ~~5704.3.6.3(2)~~5704.2.3.5.3(2) or ~~5704.3.6.3(3)~~5704.2.3.5.3(3).
2. The height of storage in that pile or rack shall not exceed the smallest of the maximum heights for the classes of liquids stored in accordance with Table ~~5704.3.6.3(2)~~5704.2.3.5.3(2) or ~~5704.3.6.3(3)~~5704.2.3.5.3(3).

~~5704.3.7.2.2~~ 5704.3.1.2.2 Separation and aisles. Piles shall be separated from each other by not less than 4-foot (1219 mm) aisles. Aisles shall be provided so that all containers are 20 feet (6096 mm) or less from an aisle. Where the storage of liquids is on racks, a

minimum 4-foot-wide (1219 mm) aisle shall be provided between adjacent rows of racks and adjacent storage of liquids. Main aisles shall be not less than 8 feet (2438 mm) wide.
Additional aisles shall be provided for access to doors, required windows and ventilation openings, standpipe connections, mechanical equipment and switches. Such aisles shall be not less than 3 feet (914 mm) in width, unless greater widths are required for separation of piles or racks, in which case the greater width shall be provided.

~~5704.3.7.2.3~~ 5704.3.1.2.3 Stabilizing and supports.
Containers and piles shall be separated by pallets or dunnage to provide stability and to prevent excessive stress to container walls. Portable tanks stored over one tier shall be designed to nest securely without dunnage.
Requirements for portable tank design shall be in accordance with Chapters 9 and 12 of NFPA 30. Shelving, racks, dunnage, scuffboards, floor overlay and similar installations shall be of noncombustible construction or of wood not less than a 1-inch (25 mm) nominal thickness. Adequate material-handling equipment shall be available to handle tanks safely at upper tier levels.

~~5704.3.7.3~~ 5704.3.1.3 Spill control and secondary containment.
Liquid storage rooms shall be provided with spill control and secondary containment in accordance with Section 5004.2.

~~5704.3.7.4~~ 5704.3.1.4 Ventilation.
Liquid storage rooms shall be ventilated in accordance with Section 5004.3.

~~5704.3.7.5~~ 5704.3.1.5 Fire protection.
Fire protection for liquid storage rooms shall comply with Sections ~~5704.3.7.5.1~~5704.3.1.5.1 and ~~5704.3.7.5.2~~5704.3.1.5.2.

~~5704.3.7.5.1~~ 5704.3.1.5.1 Fire-protection systems.
Liquid storage rooms shall be protected by *automatic sprinkler systems* installed in accordance with Chapter 9 and Tables ~~5704.3.6.3(4)~~ 5704.2.3.5.3(4) through ~~5704.3.6.3(7)~~5704.2.3.5.3(7) and Table ~~5704.3.7.5.1~~5704.3.1.5.1. In-rack sprinklers shall also comply with NFPA 13.
Automatic foam-water systems and automatic aqueous film-forming foam (AFFF) water sprinkler systems shall not be used except where *approved*.

Protection criteria developed from fire modeling or full-scale fire testing conducted at an *approved* testing laboratory are allowed in lieu of the protection as shown in Tables ~~5704.3.6.3(2)~~5704.2.3.5.3(2) through ~~5704.3.6.3(7)~~5704.2.3.5.3(7) and Table ~~5704.3.7.5.1~~ 5704.3.1.5.1 where *approved*.

TABLE ~~5704.3.7.5.1~~ 5704.3.1.5.1 AUTOMATIC AFFF-WATER PROTECTION REQUIREMENTS FOR SOLID-PILE AND PALLETIZED STORAGE OF LIQUIDS IN METAL CONTAINERS OF 5-GALLON CAPACITY OR LESS[a, b]

PACKAGE TYPE	CLASS LIQUID	CEILING SPRINKLER DESIGN AND DEMAND: Density (gpm/ft^2)	Area (square feet)	Temperature rating	Maximum spacing	Orifice size (inch)	STORAGE HEIGHT (feet)	HOSE DEMAND (gpm)[c]	DURATION AFFF SUPPLY (minimum)	DURATION WATER SUPPLY (hours)
Cartoned	IB, IC, II and III	0.40	2,000	286°F	100 ft^2/head	0.531	11	500	15	2
Uncartoned	IB, IC, II and III	0.30	2,000	286°F	100 ft^2/head	0.5 or 0.531	12	500	15	2

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 square foot = 0.0929 m^2, 1 gallon per minute = 3.785 L/m, 1 gallon per minute per square foot = 40.75 L/min/m^2, °C = (°F – 32)/1.8.

a. System shall be a closed-head wet system with *approved* devices for proportioning aqueous film-forming foam.

b. Maximum ceiling height of 30 feet.

c. Hose stream demand includes $1^1/_2$-inch inside hose connections, where required.

~~5704.3.7.5.2~~ 5704.3.1.5.2 Portable fire extinguishers. Not less than one *approved* portable fire extinguisher complying with Section 906 and having a rating of not less than 20-B shall be located not less than 10 feet (3048 mm) or more than 50 feet (15 240 mm) from any Class I or II liquid storage area located outside of a liquid storage room.
Not less than one portable fire extinguisher having a rating of not less than 20-B shall be located outside of, but not more than 10 feet

(3048 mm) from, the door opening into a liquid storage room.

~~5704.3.8~~ 5704.3.2 Liquid storage warehouses.

Buildings used for storage of *flammable* or *combustible liquids* in quantities exceeding those set forth in Section ~~5704.3.4~~5704.2 for *control areas* and Section ~~5704.3.7~~5704.3.1 for liquid storage rooms shall comply with Sections ~~5704.3.8.1~~5704.3.2.1 through ~~5704.3.8.5~~ 5704.3.2.5 and shall be constructed and separated as required by the *International Building Code*.

~~5704.3.8.1~~ 5704.3.2.1 Quantities and storage arrangement.

The total quantities of liquids in a liquid storage warehouse shall not be limited. The arrangement of storage shall be in accordance with Table ~~5704.3.6.3(2)~~5704.2.3.5.3(2) or ~~5704.3.6.3(3)~~5704.2.3.5.3(3).

~~5704.3.8.1.1~~ 5704.3.2.1.1 Mixed storage.

Mixed storage shall be in accordance with Section ~~5704.3.7.2.1~~5704.3.1.2.1.

~~5704.3.8.1.2~~ 5704.3.2.1.2 Separation and aisles.

Separation and aisles shall be in accordance with Section ~~5704.3.7.2.2~~5704.3.1.2.2.

~~5704.3.8.2~~ 5704.3.2.2 Spill control and secondary containment.

Liquid storage warehouses shall be provided with spill control and secondary containment as set forth in Section 5004.2.

~~5704.3.8.3~~ 5704.3.2.3 Ventilation.

Liquid storage warehouses storing containers greater than 5 gallons (19 L) in capacity shall be ventilated at a rate of not less than 0.25 cfm per square foot (0.00127 $m^3/s \times m^2$) of floor area over the storage area.

~~5704.3.8.4~~ 5704.3.2.4 Automatic sprinkler systems.

Liquid storage warehouses shall be protected by *automatic sprinkler systems* installed in accordance with Chapter 9 and Tables ~~5704.3.6.3(4)~~5704.2.3.5.3(4) through ~~5704.3.6.3(7)~~5704.2.3.5.3(7) and Table ~~5704.3.7.5.1~~5704.3.1.5.1, or Sections 16.4.1 through 16.4.3, 16.5.1 through 16.5.3.12, and Figures 16.4.1(a) through 16.4.1(c) and Tables 16.5.3.1 through 16.5.3.12 of NFPA 30. In-rack sprinklers shall also comply with NFPA 13.
Automatic foam-water systems and automatic AFFF water sprinkler systems shall not be used except where *approved*.

Protection criteria developed from fire modeling or full-scale fire testing conducted at an *approved* testing laboratory are allowed in lieu of the protection as shown in Tables ~~5704.3.6.3(2)~~5704.2.3.5.3(2) through ~~5704.3.6.3(7)~~5704.2.3.5.3(7) and Table ~~5704.3.7.5.1~~ 5704.3.1.5.1 where *approved*.

~~5704.3.8.5~~ 5704.3.2.5 Warehouse hose lines.

In liquid storage warehouses, either $1^1/_2$-inch (38 mm) lined or 1-inch (25 mm) hard rubber hose lines shall be provided in sufficient number to reach all liquid storage areas and shall be in accordance with Section 903 or 905.

5704.4 Outdoor storage of containers and portable tanks.

Storage of *flammable* and *combustible liquids* in closed containers and portable tanks outside of buildings shall be in accordance with Section 5703 and Sections 5704.4.1 through 5704.4.8. Capacity limits for containers and portable tanks shall be in accordance with Section ~~5704.3~~5704.1.

5704.4.1 Plans. Storage shall be in accordance with *approved* plans.

5704.4.2 Location on property.

Outdoor storage of liquids in containers and portable tanks shall be in accordance with Table 5704.4.2. Storage of liquids near buildings located on the same lot shall be in accordance with this section.

Revise as follows:

TABLE 5704.4.2 OUTDOOR LIQUID STORAGE IN CONTAINERS AND PORTABLE TANKS

CLASS OF LIQUID	CONTAINER STORAGE—MAXIMUM PER PILE Quantity[a, b] (gallons)	Height (feet)	PORTABLE TANK STORAGE—MAXIMUM PER PILE Quantity[a, b] (gallons)	Height (feet)	MINIMUM DISTANCE BETWEEN PILES OR RACKS (feet)	MINIMUM DISTANCE TO LOT LINE OF PROPERTY THAT CAN BE BUILT ON[c, d] (feet)	MINIMUM DISTANCE TO PUBLIC STREET, PUBLIC ALLEY OR PUBLIC WAY[d] (feet)
IA	1,100	10	2,200	7	5	50	10
IB	2,200	12	4,400	14	5	50	10
IC	4,400	12	8,800	14	5	50	10
II	8,800	12	17,600	14	5	25	5
III	22,000	18	44,000	14	5	10	5

For SI: 1 foot = 304.8 mm, 1 gallon 3.785 L.

a. For mixed class storage, see Section ~~5704.4.2~~5704.4.2.1.

b. For storage in racks, the quantity limits per pile do not apply, but the rack arrangement shall be limited to not more than 50 feet in length and two rows or 9 feet in depth.

c. If protection by a public fire department or private fire brigade capable of providing cooling water streams is not available, the distance shall be doubled.

d. Where the total quantity stored does not exceed 50 percent of the maximum allowed per pile, the distances are allowed to be reduced 50 percent, but not less than 3 feet.

5704.4.2.1 Mixed liquid piles. Where two or more classes of liquids are stored in a single pile, the quantity in the pile shall not exceed the smallest of maximum quantities for the classes of material stored.

5704.4.2.2 Access.
Storage of containers or portable tanks shall be provided with fire apparatus access roads in accordance with Chapter 5.

5704.4.2.3 Security. The storage area shall be protected against tampering or trespassers where necessary and shall be kept free from weeds, debris and other combustible materials not necessary to the storage.

5704.4.2.4 Storage adjacent to buildings.
Not more than 1,100 gallons (4163 L) of liquids stored in closed containers and portable tanks is allowed adjacent to a building located on the same premises and under the same management, provided that one of the following requirements is met:

1. The building does not exceed one story in height. Such building shall be of *fire-resistance-rated* construction with noncombustible exterior surfaces or noncombustible construction and shall be used principally for the storage of liquids.
2. The exterior building wall adjacent to the storage area shall have a *fire-resistance rating* of not less than 2 hours, having no openings to above-grade areas within 10 feet (3048 mm) horizontally of such storage and no openings to below-grade areas within 50 feet (15 240 mm) horizontally of such storage.

The quantity of liquids stored adjacent to a building protected in accordance with Item 2 is allowed to exceed 1,100 gallons (4163 L), provided that the maximum quantity per pile does not exceed 1,100 gallons (4163 L) and each pile is separated by a 10-foot-minimum (3048 mm) clear space along the common wall.
Where the quantity stored exceeds 1,100 gallons (4163 L) adjacent to a building complying with Item 1, or the provisions of Item 1 cannot be met, a minimum distance in accordance with Table 5704.4.2, column 7 (“Minimum Distance to Lot Line of Property That Can Be Built On”) shall be maintained between buildings and the nearest container or portable tank.

Revise as follows:

5704.4.3 Spill control and secondary containment.
Storage areas shall be provided with spill control and secondary containment in accordance with Section ~~5703.4~~5004.2.

Exception: Containers stored on *approved* containment pallets in accordance with Section 5004.2.3 and containers stored in cabinets and lockers with integral spill containment.

5704.4.4 Security. Storage areas shall be protected against tampering or trespassers by fencing or other *approved* control measures.

5704.4.5 Protection from vehicles.
Guard posts or other means shall be provided to protect exterior storage tanks from vehicular damage. Where guard posts are installed, the posts shall be installed in accordance with Section 312.

5704.4.6 Clearance from combustibles. The storage area shall be kept free from weeds, debris and combustible materials not necessary to the storage. The area surrounding an exterior storage area shall be kept clear of such materials for a minimum distance of 15 feet (4572 mm).

5704.4.7 Weather protection.
Weather protection for outdoor storage shall be in accordance with Section 5004.13.

5704.4.8 Empty containers and tank storage. The storage of empty tanks and containers previously used for the storage of *flammable* or *combustible liquids*, unless free from explosive vapors, shall be stored as required for filled containers and tanks. Tanks and containers when emptied shall have the covers or plugs immediately replaced in openings.

Add new text as follows:

5705
STORAGE IN STATIONARY TANKS

Revise as follows:

~~**5704.2**~~ **5705.1 Tank storage.** The provisions of this section shall apply to:

1. The storage of *flammable* and *combustible liquids* in fixed above-ground and underground tanks.
2. The storage of *flammable* and *combustible liquids* in fixed above-ground tanks inside of buildings.
3. The storage of *flammable* and *combustible liquids* in portable tanks whose capacity exceeds 660 gallons (2498 L).
4. The installation of such tanks and portable tanks.

The provisions of this section apply as follows:

1. General requirements for tanks shall be in accordance with Sections 5705.1 through 5705.1.10
2. Tank design, fabrication, construction, installation and protection shall comply with Sections 5705.2 through 5705.2.4.4.

~~**5704.2.1**~~ **5705.1.1 Change of tank contents.** Tanks subject to change in contents shall be in accordance with Section ~~5704.2.7~~ 5705.2. Prior to a change in contents, the *fire code official* is authorized to require testing of a tank.Tanks that have previously contained Class I liquids shall not be loaded with Class II or Class III liquids until such tanks and all piping, pumps, hoses and meters connected thereto have been completely drained and flushed.

~~**5704.2.2**~~ **5705.1.2 Use of tank vehicles and tank cars as storage tanks.** Tank cars and tank vehicles shall not be used as storage tanks.

~~**5704.2.3**~~ **5705.1.3 Labeling and signs.**
Labeling and signs for storage tanks and storage tank areas shall comply with Sections ~~5704.2.3.1~~ 5705.1.3.1 and ~~5704.2.3.2~~ 5705.1.3.2.

~~**5704.2.3.1**~~ **5705.1.3.1 Smoking and open flame.**
Signs shall be posted in storage areas prohibiting open flames and smoking. Signs shall comply with Section ~~5703.5~~ 5703.4.

~~**5704.2.3.2**~~ **5705.1.3.2 Label or placard.**

Tanks more than 100 gallons (379 L) in capacity, which are permanently installed or mounted and used for the storage of Class I, II or III liquids, shall bear a label and placard identifying the material therein. Placards shall be in accordance with NFPA 704.

Exceptions:

1. Tanks of 300-gallon (1136 L) capacity or less located on private property and used for heating and cooking fuels in single-family *dwellings*.
2. Tanks located underground.

~~5704.2.4~~ 5705.1.4 Sources of ignition.

Smoking and open flames are prohibited in storage areas in accordance with Section 5003.7.

Exception: Areas designated as smoking and hot work areas, and areas where hot work permits have been issued in accordance with this code.

~~5704.2.5~~ 5705.1.5 Explosion control.

Explosion control shall be provided in accordance with Section 911 for indoor tanks.

~~5704.2.6~~ 5705.1.6 Separation from incompatible materials.

Storage of *flammable* and *combustible liquids* shall be separated from *incompatible materials* in accordance with Section 5003.9.8. Grass, weeds, combustible materials and waste Class I, II or IIIA liquids shall not be accumulated in an unsafe manner at a storage site.

~~5704.2.12~~ 5705.1.7 Testing.

Tank testing shall comply with Sections ~~5704.2.12.1~~5705.1.7.1 and ~~5704.2.12.2~~5705.1.7.2.

~~5704.2.12.1~~ 5705.1.7.1 Acceptance testing.

Prior to being placed into service, tanks shall be tested in accordance with Section 21.5 of NFPA 30.

~~5704.2.12.2~~ 5705.1.7.2 Testing of underground tanks.

Before being covered or placed in use, tanks and piping connected to underground tanks shall be tested for tightness in the presence of the *fire code official*. Piping shall be tested in accordance with Section ~~5703.6.3~~5703.5.3. The system shall not be covered until it has been *approved*.

~~5704.2.13~~ 5705.1.8 Abandonment and status of tanks.

Tanks taken out of service shall be removed in accordance with Section ~~5704.2.14~~5705.1.8.3, or safeguarded in accordance with Sections ~~5704.2.13.1~~5705.1.8.1 through ~~5704.2.13.2.3~~5705.1.8.2.3 and API 1604.

~~5704.2.13.1~~ 5705.1.8.1 Underground tanks.

Underground tanks taken out of service shall comply with Sections ~~5704.2.13.1.1~~5705.1.8.1.1 through ~~5704.2.13.1.5~~5705.1.8.1.5.

~~5704.2.13.1.1~~ 5705.1.8.1.1 Temporarily out of service.

Underground tanks temporarily out of service shall have the fill line, gauge opening, vapor return and pump connection secure against tampering. Vent lines shall remain open and be maintained in accordance with Sections ~~5704.2.7.3~~5705.2.1.3 and ~~5704.2.7.4~~5705.2.1.4.

~~5704.2.13.1.2~~ 5705.1.8.1.2 Out of service for 90 days.

Underground tanks not used for a period of 90 days shall be safeguarded in accordance with all the following or be removed in accordance with Section ~~5704.2.14~~5705.1.9:

1. *Flammable* or *combustible liquids* shall be removed from the tank.
2. All piping, including fill line, gauge opening, vapor return and pump connection, shall be capped or plugged and secured from tampering.
3. Vent lines shall remain open and be maintained in accordance with Sections ~~5704.2.7.3~~5705.2.1.3 and ~~5704.2.7.4~~5705.2.1.4.

~~5704.2.13.1.3~~ 5705.1.8.1.3 Out of service for one year.
Underground tanks that have been out of service for a period of one year shall be removed from the ground in accordance with Section ~~5704.2.14~~5705.1.9 or abandoned in place in accordance with Section ~~5704.2.13.1.4~~5705.1.8.1.4.

~~5704.2.13.1.4~~ 5705.1.8.1.4 Tanks abandoned in place. Tanks abandoned in place shall be as follows:

1. *Flammable* and *combustible liquids* shall be removed from the tank and connected piping.
2. The suction, inlet, gauge, vapor return and vapor lines shall be disconnected.
3. The tank shall be filled completely with an *approved* inert solid material.
4. Remaining underground piping shall be capped or plugged.
5. A record of tank size, location and date of abandonment shall be retained.
6. All exterior above-grade fill piping shall be permanently removed when tanks are abandoned or removed.

~~5704.2.13.1.5~~ 5705.1.8.1.5 Reinstallation of underground tanks.
Tanks that are to be reinstalled for *flammable* or *combustible liquid* service shall be in accordance with this chapter, *ASME Boiler and Pressure Vessel Code* (Section VIII), API 1615, UL 58 and UL 1316.

~~5704.2.13.2~~ 5705.1.8.2 Above-ground tanks.
Above-ground tanks taken out of service shall comply with Sections ~~5704.2.13.2.1~~5705.1.8.2.1 through ~~5704.2.13.2.3~~5705.1.8.2.3.

~~5704.2.13.2.1~~ 5705.1.8.2.1 Temporarily out of service. Above-ground tanks temporarily out of service shall have all connecting lines isolated from the tank and be secured against tampering.

Exception: In-place fire protection (foam) system lines.

~~5704.2.13.2.2~~ 5705.1.8.2.2 Out of service for 90 days.
Above-ground tanks not used for a period of 90 days shall be safeguarded in accordance with Section ~~5704.2.13.1.2~~5705.1.8.1.2 or removed in accordance with Section ~~5704.2.14~~5705.1.8.3.

Exceptions:

1. Tanks and containers connected to oil burners that are not in use during the warm season of the year or are used as a backup heating system to gas.
2. In-place, active fire protection (foam) system lines.

~~5704.2.13.2.3~~ 5705.1.8.2.3 Out of service for one year.
Above-ground tanks that have been out of service for a period of 1 year shall be removed in accordance with Section ~~5704.2.14~~5705.1.9.

Exception: Tanks within operating facilities.

~~5704.2.14~~ 5705.1.9 Removal and disposal of tanks.
Removal and disposal of tanks shall comply with Sections ~~5704.2.14.1~~5705.1.9.1 and ~~5704.2.14.2~~5705.1.9.2.

~~5704.2.14.1~~ 5705.1.9.1 Removal. Removal of above-ground and underground tanks shall be in accordance with all of the following:

1. *Flammable* and *combustible liquids* shall be removed from the tank and connected piping.
2. Piping at tank openings that is not to be used further shall be disconnected.
3. Piping shall be removed from the ground.

   Exception: Piping is allowed to be abandoned in place where the *fire code official* determines that removal is not practical. Abandoned piping shall be capped and safeguarded as required by the *fire code official*.
4. Tank openings shall be capped or plugged, leaving a $^{1}/_{8}$-inch to $^{1}/_{4}$-inch-diameter (3.2 mm to 6.4 mm) opening for pressure equalization.

5. Tanks shall be purged of vapor and inerted prior to removal.
6. All exterior above-grade fill and vent piping shall be permanently removed.

   Exception: Piping associated with bulk plants, terminal facilities and refineries.

~~5704.2.14.2~~ 5705.1.9.2 **Disposal.** Tanks shall be disposed of in accordance with federal, state and local regulations.

~~5704.2.15~~ 5705.1.10 **Maintenance.** Above-ground tanks, connected piping and ancillary equipment shall be maintained in a safe operating condition. Tanks shall be maintained in accordance with their listings. Damage to above-ground tanks, connected piping or ancillary equipment shall be repaired using materials having equal or greater strength and *fire resistance* or the equipment shall be replaced or taken out of service.

~~5704.2.7.6~~ 5705.1.11 **Repair, alteration or reconstruction of tanks and piping.**
The repair, alteration or reconstruction, including welding, cutting and hot tapping of storage tanks and piping that have been placed in service, shall be in accordance with NFPA 30. Hot work, as defined in Section 202, on such tanks shall be conducted in accordance with Section 3510.

Add new text as follows:

5705.2 Tank design, fabrication, construction, installation and protection. Design, construction, fabrication, installation and protection of tanks shall comply with Section 5705.2.1 and the following:

1. Tank Vaults shall also comply with Section 5705.2.2.
2. Aboveground tanks and protected aboveground tanks shall also comply with Section 5705.2.3.
3. Underground Tanks shall also comply with Section 5705.2.4.

Revise as follows:

~~5704.2.7~~ 5705.2.1 **Design, fabrication and construction requirements for tanks.**
The design, fabrication and construction of tanks shall comply with NFPA 30. Each tank shall bear a permanent nameplate or marking indicating the standard used as the basis of design.

~~5704.2.7.1~~ 5705.2.1.1 **Materials used in tank construction.**
The materials used in tank construction shall be in accordance with NFPA 30. The materials of construction for tanks and their appurtenances shall be compatible with the liquids to be stored.

~~5704.2.7.2~~ 5705.2.1.2 **Pressure limitations for tanks.**
Tanks shall be designed for the pressures to which they will be subjected in accordance with NFPA 30.

~~5704.2.7.3~~ 5705.2.1.3 **Tank vents for normal venting.**
Tank vents for normal venting shall be installed and maintained in accordance with Sections ~~5704.2.7.3.1~~ 5705.2.1.3.1 through ~~5704.2.7.3.5.3~~ 5705.2.1.3.5.3.

~~5704.2.7.3.1~~ 5705.2.1.3.1 **Vent lines.** Vent lines from tanks shall not be used for purposes other than venting unless *approved*.

~~5704.2.7.3.2~~ 5705.2.1.3.2 **Vent-line flame arresters and pressure-vacuum vents.**
Listed or *approved* flame arresters or pressure-vacuum (PV) vents that remain closed unless venting under pressure or vacuum conditions shall be installed in normal vents of tanks containing Class IB and IC liquids.
Vent-line flame arresters shall be installed in accordance with their listing or API 2000 and maintained in accordance with Section 21.8.6 of NFPA 30 or API 2000. In-line flame arresters in piping systems shall be installed and maintained in accordance with their listing or API 2028. Pressure-vacuum vents shall be installed in accordance with Section 21.4.3 of NFPA 30 or API 2000 and maintained in

accordance with Section 21.8.6 of NFPA 30 or API 2000.

Exception: Where determined by the *fire code official* that the use of these devices can result in damage to the tank.

~~5704.2.7.3.3~~ 5705.2.1.3.3 Vent pipe outlets. Vent pipe outlets for tanks storing Class I, II or IIIA liquids shall be located such that the vapors are released at a safe point outside of buildings and not less than 12 feet (3658 mm) above the finished ground level. Vapors shall be discharged upward or horizontally away from adjacent walls to assist in vapor dispersion. Vent outlets shall be located such that flammable vapors will not be trapped by eaves or other obstructions and shall be not less than 5 feet (1524 mm) from building openings or *lot lines* of properties that can be built on. Vent outlets on atmospheric tanks storing Class IIIB liquids are allowed to discharge inside a building where the vent is a normally closed vent.

Exception: Vent pipe outlets on tanks storing Class IIIB liquid inside buildings and connected to fuel-burning equipment shall be located such that the vapors are released to a safe location outside of buildings.

~~5704.2.7.3.4~~ 5705.2.1.3.4 Installation of vent piping.
Vent piping shall be designed, sized, constructed and installed in accordance with Section ~~5703.6~~ 5703.5. Vent pipes shall be installed such that they will drain toward the tank without sags or traps in which liquid can collect. Vent pipes shall be installed in such a manner so as not to be subject to physical damage or vibration.

~~5704.2.7.3.5~~ 5705.2.1.3.5 Manifolding. Tank vent piping shall not be manifolded unless required for special purposes such as vapor recovery, vapor conservation or air pollution control.

~~5704.2.7.3.5.1~~ 5705.2.1.3.5.1 Above-ground tanks. For above-ground tanks, manifolded vent pipes shall be adequately sized to prevent system pressure limits from being exceeded where manifolded tanks are subject to the same fire exposure.

~~5704.2.7.3.5.2~~ 5705.2.1.3.5.2 Underground tanks. For underground tanks, manifolded vent pipes shall be sized to prevent system pressure limits from being exceeded when manifolded tanks are filled simultaneously.

~~5704.2.7.3.5.3~~ 5705.2.1.3.5.3 Tanks storing Class I liquids. Vent piping for tanks storing Class I liquids shall not be manifolded with vent piping for tanks storing Class II and III liquids unless positive means are provided to prevent the vapors from Class I liquids from entering tanks storing Class II and III liquids, to prevent contamination and possible change in classification of less volatile liquid.

~~5704.2.7.4~~ 5705.2.1.4 Emergency venting.
Stationary, above-ground tanks shall be equipped with additional venting that will relieve excessive internal pressure caused by exposure to fires. Emergency vents for Class I, II and IIIA liquids shall not discharge inside buildings. The venting shall be installed and maintained in accordance with Section 22.7 of NFPA 30.

Exceptions:

1. Tanks larger than 12,000 gallons (45 420 L) in capacity storing Class IIIB liquids that are not within the diked area or the drainage path of Class I or II liquids do not require emergency relief venting.
2. Emergency vents on protected above-ground tanks complying with UL 2085 containing Class II or IIIA liquids are allowed to discharge inside the building.

~~5704.2.7.5~~ 5705.2.1.5 Tank openings other than vents.
Tank openings for other than vents shall comply with Sections ~~5704.2.7.5.1~~ 5705.2.1.5.1 through ~~5704.2.7.5.8~~ 5705.2.1.5.8.

~~5704.2.7.5.1~~ 5705.2.1.5.1 Connections below liquid level. Connections for tank openings below the liquid level shall be liquid tight.

~~5704.2.7.5.2~~ 5705.2.1.5.2 Filling, emptying and vapor recovery connections. Filling, emptying and vapor recovery connections to tanks containing Class I, II or IIIA liquids shall be located outside of buildings in accordance with Section ~~5704.2.7.5.6~~ 5705.2.1.5.6 at a location free from sources of ignition and not less than 5 feet (1524 mm) away from building openings or *lot lines* of property that can be built on. Such openings shall be properly identified and provided with a liquid-tight cap that shall be closed when not in use.Filling and emptying connections to indoor tanks containing Class IIIB liquids and connected to fuel-burning equipment shall be located at a finished ground level location outside of buildings. Such openings shall be provided with a liquid-tight cap that shall be closed when not in use. A sign in accordance with Section 5003.6 that displays the following warning shall be permanently attached at the filling location:

TRANSFERRING FUEL OTHER THAN
CLASS IIIB COMBUSTIBLE LIQUID TO
THIS TANK CONNECTION IS A VIOLATION
OF THE FIRE CODE AND IS STRICTLY
PROHIBITED

~~5704.2.7.5.3~~ 5705.2.1.5.3 Piping, connections and fittings.
Piping, connections, fittings and other appurtenances shall be installed in accordance with Section ~~5703.6~~ 5703.5.

~~5704.2.7.5.4~~ 5705.2.1.5.4 Manual gauging. Openings for manual gauging, if independent of the fill pipe, shall be provided with a liquid-tight cap or cover. Covers shall be kept closed when not gauging. If inside a building, such openings shall be protected against liquid overflow and possible vapor release by means of a spring-loaded check valve or other *approved* device.

~~5704.2.7.5.5~~ 5705.2.1.5.5 Fill pipes and discharge lines. For top-loaded tanks, a metallic fill pipe shall be designed and installed to minimize the generation of static electricity by terminating the pipe within 6 inches (152 mm) of the bottom of the tank, and it shall be installed in a manner that avoids excessive vibration.

~~5704.2.7.5.5.1~~ 5705.2.1.5.5.1 Class I liquids. For Class I liquids other than crude oil, gasoline and asphalt, the fill pipe shall be designed and installed in a manner that will minimize the possibility of generating static electricity by terminating within 6 inches (152 mm) of the bottom of the tank.

~~5704.2.7.5.5.2~~ 5705.2.1.5.5.2 Underground tanks. For underground tanks, fill pipe and discharge lines shall enter only through the top. Fill lines shall be sloped toward the tank. Underground tanks for Class I liquids having a capacity greater than 1,000 gallons (3785 L) shall be equipped with a tight fill device for connecting the fill hose to the tank.

~~5704.2.7.5.6~~ 5705.2.1.5.6 Location of connections that are made or broken. Filling, withdrawal and vapor-recovery connections for Class I, II and IIIA liquids that are made and broken shall be located outside of buildings, not more than 5 feet (1524 mm) above the finished ground level, in an *approved* location in close proximity to the parked delivery vehicle. Such location shall be away from sources of ignition and not less than 5 feet (1524 mm) away from building openings. Such connections shall be closed and liquid tight when not in use and shall be properly identified.

~~5704.2.7.5.7~~ 5705.2.1.5.7 Protection against vapor release. Tank openings provided for purposes of vapor recovery shall be protected against possible vapor release by means of a spring-loaded check valve or dry-break connections, or other *approved* device, unless the opening is a pipe connected to a vapor processing system. Openings designed for combined fill and vapor recovery shall be protected against vapor release unless connection of the liquid delivery line to the fill pipe simultaneously connects the vapor recovery line. Connections shall be vapor tight.

~~5704.2.7.5.8~~ 5705.2.1.5.8 Overfill prevention. An *approved* means or method in accordance with Section ~~5704.2.9.7.5~~ 5705.2.3.7.5 shall be provided to prevent the overfill of all Class I, II and IIIA liquid storage tanks. Storage tanks in refineries, bulk plants or terminals regulated by Section ~~5706.4~~

5707.4 or ~~5706.7~~ 5707.7 shall have overfill protection in accordance with API 2350.An *approved* means or method in accordance with Section ~~5704.2.9.7.5~~ 5705.2.3.7.5 shall be provided to prevent the overfilling of Class IIIB liquid storage tanks connected to fuel-burning equipment inside buildings.

Exception: Outside above-ground tanks with a capacity of 1,320 gallons (5000 L) or less.

~~5704.2.7.7~~ 5705.2.1.6 Design of supports.
The design of the supporting structure for tanks shall be in accordance with the *International Building Code* and NFPA 30.

~~5704.2.7.8~~ 5705.2.1.7 Locations subject to flooding.
Where a tank is located in an area where it is subject to buoyancy because of a rise in the water table, flooding or accumulation of water

from fire suppression operations, uplift protection shall be provided in accordance with Sections 22.14 and 23.14 of NFPA 30.

~~5704.2.7.9~~ 5705.2.1.8 Corrosion protection.
Where subject to external corrosion, tanks shall be fabricated from corrosion-resistant materials, coated or provided with corrosion protection in accordance with Section 23.3.5 of NFPA 30.

~~5704.2.7.10~~ 5705.2.1.9 Leak reporting and leaking tank disposition. A consistent or accidental loss of liquid, or other indication of a leak from a tank system, shall be reported immediately to the fire department, the *fire code official* and other authorities having jurisdiction. Leaking tanks shall be promptly emptied, repaired and returned to service, abandoned or removed in accordance with Section 5705.1.8 or 5705.1.9.

~~5704.2.7.10.1 Leaking tank disposition.~~
~~Leaking tanks shall be promptly emptied, repaired and returned to service, abandoned or removed in accordance with Section 5704.2.13 or 5704.2.14.~~

~~5704.2.7.11~~ 5705.2.1.10 Tank lining. Steel tanks are allowed to be lined only for the purpose of protecting the interior from corrosion or providing compatibility with a material to be stored. Only those liquids tested for compatibility with the lining material are allowed to be stored in lined tanks.

~~5704.2.10~~ 5705.2.1.11 Drainage and diking. The area surrounding a tank or group of tanks shall be provided with drainage control or shall be diked to prevent accidental discharge of liquid from endangering adjacent tanks, adjoining property or reaching waterways.

Exceptions:

1. The *fire code official* is authorized to alter or waive these requirements based on a technical report that demonstrates that such tank or group of tanks does not constitute a hazard to other tanks, waterways or adjoining property, after consideration of special features such as topographical conditions, nature of occupancy and proximity to buildings on the same or adjacent property, capacity, and construction of proposed tanks and character of liquids to be stored, and nature and quantity of private and public fire protection provided.
2. Drainage control and diking is not required for *listed* secondary containment tanks.

~~5704.2.10.1~~ 5705.2.1.11.1 Volumetric capacity. The volumetric capacity of the diked area shall be not less than the greatest amount of liquid that can be released from the largest tank within the diked area. The capacity of the diked area enclosing more than one tank shall be calculated by deducting the volume of the tanks other than the largest tank below the height of the dike.

~~5704.2.10.2~~ 5705.2.1.11.2 Diked areas containing two or more tanks.
Diked areas containing two or more tanks shall be subdivided in accordance with NFPA 30.

~~5704.2.10.3~~ 5705.2.1.11.3 Protection of piping from exposure fires. Piping shall not pass through adjacent diked areas or impounding basins, unless provided with a sealed sleeve or otherwise protected from exposure to fire.

~~5704.2.10.4~~ 5705.2.1.11.4 Combustible materials in diked areas. Diked areas shall be kept free from combustible materials, drums and barrels.

~~5704.2.10.5~~ 5705.2.1.11.5 Equipment, controls and piping in diked areas. Pumps, manifolds and fire protection equipment or controls shall not be located within diked areas or drainage basins or in a location where such equipment and controls would be endangered by fire in the diked area or drainage basin. Piping above ground shall be minimized and located as close as practical to the shell of the tank in diked areas or drainage basins.

Exceptions:

1. Pumps, manifolds and piping integral to the tanks or equipment being served, which is protected by intermediate diking, berms, drainage or fire protection such as water spray, monitors or resistive coating.

2. Fire protection equipment or controls that are appurtenances to the tanks or equipment being protected, such as foam chambers or foam piping and water or foam monitors and hydrants, or hand and wheeled extinguishers.

~~5704.2.8~~ 5705.2.2 Vaults.
Vaults shall be allowed to be either above or below grade and shall comply with Sections ~~5704.2.8.1~~ 5705.2.2.1 through ~~5704.2.8.18~~ 5705.2.2.18.

~~5704.2.8.1~~ 5705.2.2.1 Listing required.
Vaults shall be *listed* in accordance with UL 2245.

Exception: Where *approved* by the *fire code official*, below-grade vaults are allowed to be constructed on site, provided that the design is in accordance with the *International Building Code* and that special inspections are conducted to verify structural strength and compliance of the installation with the *approved* design in accordance with Section 1707 of the International Building Code. Installation plans for below-grade vaults that are constructed on site shall be prepared by, and the design shall bear the stamp of, a professional engineer. Consideration shall be given to soil and hydrostatic loading on the floors, walls and lid; anticipated seismic forces; uplifting by groundwater or flooding; and to loads imposed from above such as traffic and equipment loading on the vault lid.

~~5704.2.8.2~~ 5705.2.2.2 Design and construction.
The vault shall completely enclose each tank. There shall not be openings in the vault enclosure except those necessary for access to, inspection of, and filling, emptying and venting of the tank. The walls and floor of the vault shall be constructed of reinforced concrete not less than 6 inches (152 mm) thick. The top of an above-grade vault shall be constructed of noncombustible material and shall be designed to be weaker than the walls of the vault, to ensure that the thrust of an explosion occurring inside the vault is directed upward before significantly high pressure can develop within the vault.
The top of an at-grade or below-grade vault shall be designed to relieve safely or contain the force of an explosion occurring inside the vault. The top and floor of the vault and the tank foundation shall be designed to withstand the anticipated loading, including loading from vehicular traffic, where applicable. The walls and floor of a vault installed below grade shall be designed to withstand anticipated soil and hydrostatic loading.

Vaults shall be designed to be wind and earthquake resistant, in accordance with the *International Building Code*.

~~5704.2.8.3~~ 5705.2.2.3 Secondary containment. Vaults shall be substantially liquid tight and there shall not be backfill around the tank or within the vault. The vault floor shall drain to a sump. For premanufactured vaults, liquid tightness shall be certified as part of the listing provided by a nationally recognized testing laboratory. For field-erected vaults, liquid tightness shall be certified in an *approved* manner.

~~5704.2.8.4~~ 5705.2.2.4 Internal clearance. There shall be sufficient clearance between the tank and the vault to allow for visual inspection and maintenance of the tank and its appurtenances. Dispensing devices are allowed to be installed on tops of vaults.

~~5704.2.8.5~~ 5705.2.2.5 Anchoring. Vaults and their tanks shall be suitably anchored to withstand uplifting by ground water or flooding, including when the tank is empty.

~~5704.2.8.6~~ 5705.2.2.6 Vehicle impact protection.
Vaults shall be resistant to damage from the impact of a motor vehicle, or vehicle impact protection shall be provided in accordance with Section 312.

~~5704.2.8.7~~ 5705.2.2.7 Arrangement. Tanks shall be *listed* for above-ground use, and each tank shall be in its own vault. Compartmentalized tanks shall be allowed and shall be considered as a single tank. Adjacent vaults shall be allowed to share a common wall. The common wall shall be liquid and vapor tight and shall be designed to withstand the load imposed when the vault on either side of the wall is filled with water.

~~5704.2.8.8~~ 5705.2.2.8 Connections. Connections shall be provided to permit venting of each vault to dilute, disperse and remove vapors prior to personnel entering the vault.

~~5704.2.8.9~~ 5705.2.2.9 Ventilation.

Vaults that contain tanks of Class I liquids shall be provided with an exhaust ventilation system installed in accordance with Section 5004.3. The ventilation system shall operate continuously or be designed to operate upon activation of the vapor or liquid detection system. The system shall provide ventilation at a rate of not less than 1 cubic foot per minute (cfm) per square foot of floor area [0.00508 $m^3/(s \times m^2)$], but not less than 150 cfm (4 m^3/min). The exhaust system shall be designed to provide air movement across all parts of the vault floor. Supply and exhaust ducts shall extend to within 3 inches (76 mm), but not more than 12 inches (305 mm), of the floor. The exhaust system shall be installed in accordance with the *International Mechanical Code*.

~~5704.2.8.10~~ 5705.2.2.10 Liquid detection. Vaults shall be equipped with a detection system capable of detecting liquids, including water, and activating an alarm.

~~5704.2.8.11~~ 5705.2.2.11 Monitoring and detection. Vaults shall be provided with *approved* vapor and liquid detection systems and equipped with on-site audible and visual warning devices with battery backup. Vapor detection systems shall sound an alarm when the system detects vapors that reach or exceed 25 percent of the lower explosive limit (LEL) of the liquid stored. Vapor detectors shall be located not higher than 12 inches (305 mm) above the lowest point in the vault. Liquid detection systems shall sound an alarm upon detection of any liquid, including water. Liquid detectors shall be located in accordance with the manufacturer's instructions. Activation of either vapor or liquid detection systems shall cause a signal to be sounded at an *approved*, constantly attended location within the facility serving the tanks or at an *approved* location. Activation of vapor detection systems shall shut off dispenser pumps.

~~5704.2.8.12~~ 5705.2.2.12 Liquid removal.
Means shall be provided to recover liquid from the vault. Where a pump is used to meet this requirement, the pump shall not be permanently installed in the vault. Electric-powered portable pumps shall be suitable for use in Class I, Division 1, or Zone 0 locations, as defined in NFPA 70.

~~5704.2.8.13~~ 5705.2.2.13 Normal vents. Vent pipes that are provided for normal tank venting shall terminate not less than 12 feet (3658 mm) above ground level.

~~5704.2.8.14~~ 5705.2.2.14 Emergency vents. Emergency vents shall be vapor tight and shall be allowed to discharge inside the vault. Long-bolt manhole covers shall not be allowed for this purpose.

~~5704.2.8.15~~ 5705.2.2.15 Accessway. Vaults shall be provided with an *approved* personnel accessway with a minimum dimension of 30 inches (762 mm) and with a permanently affixed, nonferrous ladder. Accessways shall be designed to be nonsparking. Travel distance from any point inside a vault to an accessway shall not exceed 20 feet (6096 mm). At each entry point, a warning sign indicating the need for procedures for safe entry into confined spaces shall be posted. Entry points shall be secured against unauthorized entry and vandalism.

~~5704.2.8.16~~ 5705.2.2.16 Fire protection. Vaults shall be provided with a suitable means to admit a fire suppression agent.

~~5704.2.8.17~~ 5705.2.2.17 Classified area.
The interior of a vault containing a tank that stores a Class I liquid shall be designated a Class I, Division 1, or Zone 0 location, as defined in NFPA 70.

~~5704.2.8.18~~ 5705.2.2.18 Overfill protection.
Overfill protection shall be provided in accordance with Section ~~5704.2.9.7.5~~ 5705.2.3.7.5. The use of a float vent valve shall be prohibited.

~~5704.2.9~~ 5705.2.3 Above-ground tanks.
Above-ground storage of *flammable* and *combustible liquids* in tanks shall comply with Section ~~5704.2~~ 5705.1 and Sections ~~5704.2.9.1~~ 5705.2.3.1 through ~~5704.2.9.7.9~~ 5705.2.3.7.9.

~~5704.2.9.1~~ 5705.2.3.1 Existing noncompliant installations.
Existing above-ground tanks shall be maintained in accordance with the code requirements that were applicable at the time of installation. Above-ground tanks that were installed in violation of code requirements applicable at the time of installation shall be made

code compliant or shall be removed in accordance with Section ~~5704.2.14~~ 5705.1.9, regardless of whether such tank has been previously inspected (see Section 109.4).

~~5704.2.9.2~~ 5705.2.3.2 Fire protection.
Fire protection for above-ground tanks shall comply with Sections ~~5704.2.9.2.1~~ 5705.2.3.2.1 through ~~5704.2.9.2.4~~ 5705.2.3.2.4.

~~5704.2.9.2.1~~ 5705.2.3.2.1 Required foam fire protection systems. Where required by the *fire code official*, foam fire protection shall be provided for above-ground tanks, other than pressure tanks operating at or above 1 pound per square inch gauge (psig) (6.89 kPa) where such tank, or group of tanks spaced less than 50 feet (15 240 mm) apart measured shell to shell, has a liquid surface area in excess of 1,500 square feet (139 m^2), and is in accordance with one of the following:

1. Used for the storage of Class I or II liquids.
2. Used for the storage of crude oil.
3. Used for in-process products and is located within 100 feet (30 480 mm) of a fired still, heater, related fractioning or processing apparatus or similar device at a processing plant or petroleum refinery as herein defined.
4. Considered by the *fire code official* as posing an unusual exposure hazard because of topographical conditions; nature of occupancy, proximity on the same or adjoining property, and height and character of liquids to be stored; degree of private fire protection to be provided; and facilities of the fire department to cope with *flammable liquid* fires.

~~5704.2.9.2.2~~ 5705.2.3.2.2 Foam fire protection system installation.
Where foam fire protection is required, it shall be installed in accordance with NFPA 11.

~~5704.2.9.2.2.1~~ 5705.2.3.2.2.1 Foam storage. Where foam fire protection is required, foam-producing materials shall be stored on the premises.

Exception: Storage of foam-producing materials off the premises is allowed as follows:

1. Such materials stored off the premises shall be of the proper type suitable for use with the equipment at the installation where required.
2. Such materials shall be readily available at the storage location at all times.
3. Adequate loading and transportation facilities shall be provided.
4. The time required to deliver such materials to the required location in the event of fire shall be consistent with the hazards and fire scenarios for which the foam supply is intended.
5. At the time of a fire, these off-premises supplies shall be accumulated in sufficient quantities before placing the equipment in operation to ensure foam production at an adequate rate without interruption until extinguishment is accomplished.

~~5704.2.9.2.3~~ 5705.2.3.2.3 Fire protection of supports.
Supports or pilings for above-ground tanks storing Class I, II or IIIA liquids elevated more than 12 inches (305 mm) above grade shall have a *fire-resistance rating* of not less than 2 hours in accordance with the fire exposure criteria specified in ASTM E1529.

Exceptions:

1. Structural supports tested as part of a protected above-ground tank in accordance with UL 2085.
2. Stationary tanks located outside of buildings where protected by an *approved* water-spray system designed in accordance with Chapter 9 and NFPA 15.
3. Stationary tanks located inside of buildings equipped throughout with an *approved automatic sprinkler system* designed in accordance with Section 903.3.1.1.

~~5704.2.9.2.4~~ 5705.2.3.2.4 Inerting of tanks storing boilover liquids. Liquids with boilover characteristics shall not be stored in fixed roof tanks larger than 150 feet (45 720 mm) in diameter unless an *approved* gas enrichment or inerting system is provided on the tank.

Exception: Crude oil storage tanks in production fields with no other exposures adjacent to the storage tank.

~~5704.2.9.3~~ 5705.2.3.3 Supports, foundations and anchorage.
Supports, foundations and anchorages for above-ground tanks shall be designed and constructed in accordance with NFPA 30 and the *International Building Code*.

~~5704.2.9.4~~ 5705.2.3.4 Stairways, platforms and walkways.
Stairways, platforms and walkways shall be of noncombustible construction and shall be designed and constructed in accordance with NFPA 30 and the *International Building Code*.

~~5704.2.9.5~~ 5705.2.3.5 Above-ground tanks inside of buildings.
Above-ground tanks inside of buildings shall comply with Sections ~~5704.2.9.5.1~~ 5705.2.3.5.1 and ~~5704.2.9.5.2~~ 5705.2.3.5.2.

~~5704.2.9.5.1~~ 5705.2.3.5.1 Overfill prevention.
Above-ground tanks storing Class I, II and IIIA liquids inside buildings shall be equipped with a device or other means to prevent overflow into the building including, but not limited to: a float valve; a preset meter on the fill line; a valve actuated by the weight of the tank's contents; a low-head pump that is incapable of producing overflow; or a liquid-tight overflow pipe not less than one pipe size larger than the fill pipe and discharging by gravity back to the outside source of liquid or to an *approved* location. Tanks containing Class IIIB liquids and connected to fuel-burning equipment shall be provided with a means to prevent overflow into buildings in accordance with Section ~~5704.2.7.5.8~~ 5705.2.1.5.8.

~~5704.2.9.5.2~~ 5705.2.3.5.2 Fill pipe connections.
Fill pipe connections for tanks storing Class I, II and IIIA liquids and Class IIIB liquids connected to fuel-burning equipment shall be in accordance with Section ~~5704.2.9.7.6~~ 5705.2.3.7.6.

~~5704.2.9.6~~ 5705.2.3.6 Above-ground tanks outside of buildings.
Above-ground tanks outside of buildings shall comply with Sections ~~5704.2.9.6.1~~ 5705.2.3.6.1 through ~~5704.2.9.6.3~~ 5705.2.3.6.3.

~~5704.2.9.6.1~~ 5705.2.3.6.1 Locations where above-ground tanks are prohibited. Storage of Class I and II liquids in above-ground tanks outside of buildings is prohibited within the limits established by law as set forth in the fire code adoption ordinance or other regulation adopted by the jurisdiction .

~~5704.2.9.6.1.1~~ 5705.2.3.6.1.1 Location of tanks with pressures 25 psig or less.
Above-ground tanks operating at pressures not exceeding 2.5 psig (17.2 kPa) for storage of Class I, II or IIIA liquids, which are designed with a floating roof, a weak roof-to-shell seam or equipped with emergency venting devices limiting pressure to 2.5 psig (17.2 kPa), shall be located in accordance with Table 22.4.1.1(a) of NFPA 30.

Exceptions:

1. Vertical tanks having a weak roof-to-shell seam and storing Class IIIA liquids are allowed to be located at one-half the distances specified in Table 22.4.1.1(a) of NFPA 30, provided that the tanks are not within a diked area or drainage path for a tank storing Class I or II liquids.
2. Liquids with boilover characteristics and unstable liquids in accordance with Sections ~~5704.2.9.6.1.3~~ 5705.2.3.6.1.3 and ~~5704.2.9.6.1.4~~ 5705.2.3.6.1.4.
3. For protected above-ground tanks in accordance with Section ~~5704.2.9.7~~5705.2.3.7 and tanks in at-grade or above-grade vaults in accordance with Section ~~5704.2.8~~ 5705.2.2, the distances in Table 22.4.1.1(b) of NFPA 30 shall apply and shall be reduced by one-half, but not to less than 5 feet (1524 mm).

~~5704.2.9.6.1.2~~ 5705.2.3.6.1.2 Location of tanks with pressures exceeding 25 psig.
Above-ground tanks for the storage of Class I, II or IIIA liquids operating at pressures exceeding 2.5 psig (17.2 kPa) or equipped with emergency venting allowing pressures to exceed 2.5 psig (17.2 kPa) shall be located in accordance with Table 22.4.1.3 of NFPA 30.

Exception: Liquids with boilover characteristics and unstable liquids in accordance with Sections ~~5704.2.9.6.1.3~~ 5705.2.3.6.1.3 and ~~5704.2.9.6.1.4~~ 5705.2.3.6.1.4.

~~5704.2.9.6.1.3~~ 5705.2.3.6.1.3 Location of tanks storing boilover liquids.
Above-ground tanks for storage of liquids with boilover characteristics shall be located in accordance with Table 2204.1.4.1 of NFPA 30.

~~5704.2.9.6.1.4~~ 5705.2.3.6.1.4 Location of tanks storing unstable liquids.
Above-ground tanks for the storage of unstable liquids shall be located in accordance with Table 22.4.1.5 of NFPA 30.

~~5704.2.9.6.1.5~~ 5705.2.3.6.1.5 Location of tanks storing Class IIIB liquids.
Above-ground tanks for the storage of Class IIIB liquids, excluding unstable liquids, shall be located in accordance with Table 22.1.5 of NFPA 30, except where located within a diked area or drainage path for a tank or tanks storing Class I or II liquids. Where a Class IIIB liquid storage tank is within the diked area or drainage path for a Class I or II liquid, distances required by Section ~~5704.2.9.6.1.1~~ 5705.2.3.6.1.1 shall apply.

~~5704.2.9.6.1.6~~ 5705.2.3.6.1.6 Reduction of separation distances to adjacent property.
Where two tank properties of diverse ownership have a common boundary, the *fire code official* is authorized to, with the written consent of the *owners* of the two properties, apply the distances in Sections ~~5704.2.9.6.1.2~~ 5705.2.3.6.1.2 through ~~5704.2.9.6.1.5~~ 5705.2.3.6.1.5 assuming a single property.

~~5704.2.9.6.2~~ 5705.2.3.6.2 Separation between adjacent stable or unstable liquid tanks.
The separation between tanks containing stable liquids shall be in accordance with Table 22.4.2.1 of NFPA 30. Where tanks are in a diked area containing Class I or II liquids, or in the drainage path of Class I or II liquids, and are compacted in three or more rows or in an irregular pattern, the *fire code official* is authorized to require greater separation than specified in Table 22.4.2.1 of NFPA 30 or other means to make tanks in the interior of the pattern open for firefighting purposes.
The separation between tanks containing unstable liquids shall be not less than one-half the sum of their diameters.

Exception: Tanks used for storing Class IIIB liquids are allowed to be spaced 3 feet (914 mm) apart unless within a diked area or drainage path for a tank storing Class I or II liquids.

~~5704.2.9.6.3~~ 5705.2.3.6.3 Separation between adjacent tanks containing flammable or combustible liquids and LP-gas. The minimum horizontal separation between an LP-gas container and a Class I, II or IIIA liquid storage tank shall be 20 feet (6096 mm) except in the case of Class I, II or IIIA liquid tanks operating at pressures exceeding 2.5 psig (17.2 kPa) or equipped with emergency venting allowing pressures to exceed 2.5 psig (17.2 kPa), in which case the provisions of Section ~~5704.2.9.6.2~~ 5705.2.3.6.2 shall apply. An *approved* means shall be provided to prevent the accumulation of Class I, II or IIIA liquids under adjacent LP-gas containers such as by dikes, diversion curbs or grading. Where *flammable* or *combustible liquid* storage tanks are within a diked area, the LP-gas containers shall be outside the diked area and not less than 10 feet (3048 mm) away from the centerline of the wall of the diked area.

Exceptions:

1. Liquefied petroleum gas containers of 125 gallons (473 L) or less in capacity installed adjacent to fuel-oil supply tanks of 660 gallons (2498 L) or less in capacity.
2. Horizontal separation is not required between above-ground LP-gas containers and underground *flammable* and *combustible liquid* tanks.

~~5704.2.9.7~~ 5705.2.3.7 Additional requirements for protected above-ground tanks.
In addition to the requirements of this chapter for above-ground tanks, the installation of protected above-ground tanks shall be in accordance with Sections ~~5704.2.9.7.1~~ 5705.2.3.7.1 through ~~5704.2.9.7.9~~ 5705.2.3.7.9.

~~5704.2.9.7.1~~ 5705.2.3.7.1 Tank construction.
The construction of a protected above-ground tank and its primary tank shall be in accordance with Section ~~5704.2.7~~ 5705.2.1.

~~5704.2.9.7.2~~ 5705.2.3.7.2 Normal and emergency venting.
Normal and emergency venting for protected above-ground tanks shall be provided in accordance with Sections ~~5704.2.7.3~~ 5705.2.1.3 and ~~5704.2.7.4~~ 5705.2.1.4. The vent capacity reduction factor shall not be allowed.

~~5704.2.9.7.3~~ 5705.2.3.7.3 Secondary containment.
Protected above-ground tanks shall be provided with secondary containment, drainage control or diking in accordance with Section 5004.2. A means shall be provided to establish the integrity of the secondary containment in accordance with NFPA 30.

~~5704.2.9.7.4~~ 5705.2.3.7.4 Vehicle impact protection.
Where protected above-ground tanks, piping, electrical conduit or dispensers are subject to vehicular impact, they shall be protected therefrom, either by having the impact protection incorporated into the system design in compliance with the impact test protocol of UL 2085, or by meeting the provisions of Section 312, or where necessary, a combination of both. Where guard posts or other *approved* barriers are provided, they shall be independent of each above-ground tank.

~~5704.2.9.7.5~~ 5705.2.3.7.5 Overfill prevention. Protected above-ground tanks shall not be filled in excess of 95 percent of their capacity. An overfill prevention system shall be provided for each tank. During tank-filling operations, the system shall comply with one of the following:

1. The overfill prevention system shall include the following:
   1.1. An independent means of notifying the person filling the tank that the fluid level has reached 90 percent of tank capacity by providing an audible or visual alarm signal, providing a tank level gauge marked at 90 percent of tank capacity, or other *approved* means.
   1.2. Automatic shut off of the flow of fuel to the tank when the quantity of liquid in the tank reaches 95 percent of tank capacity. For rigid hose fuel-delivery systems, an *approved* means shall be provided to empty the fill hose into the tank after the automatic shutoff device is activated.
2. The system shall reduce the flow rate to not more than 15 gallons per minute (0.95 L/s) so that at the reduced flow rate, the tank will not overfill for 30 minutes, and automatically shut off flow into the tank so that none of the fittings on the top of the tank are exposed to product because of overfilling.

~~5704.2.9.7.5.1~~ 5705.2.3.7.5.1 Information signs. A permanent sign shall be provided at the fill point for the tank, documenting the filling procedure and the tank calibration chart.

Exception: Where climatic conditions are such that the sign has the potential to be obscured by ice or snow, or weathered beyond readability or otherwise impaired, said procedures and chart shall be located in the office window, lock box or other area available to the person filling the tank.

~~5704.2.9.7.5.2~~ 5705.2.3.7.5.2 Determination of available tank capacity. The filling procedure shall require the person filling the tank to determine the gallonage (literage) required to fill it to 90 percent of capacity before commencing the fill operation.

~~5704.2.9.7.6~~ 5705.2.3.7.6 Fill pipe connections. The fill pipe shall be provided with a means for making a direct connection to the tank vehicle's fuel delivery hose so that the delivery of fuel is not exposed to the open air during the filling operation. Where any portion of the fill pipe exterior to the tank extends below the level of the top of the tank, a check valve shall be installed in the fill pipe not more than 12 inches (305 mm) from the fill hose connection.

~~5704.2.9.7.7~~ 5705.2.3.7.7 Spill containers. A spill container having a capacity of not less than 5 gallons (19 L) shall be provided for each fill connection. For tanks with a top fill connection, spill containers shall be noncombustible and shall be fixed to the tank and equipped with a manual drain valve that drains into the primary tank. For tanks with a remote fill connection, a portable spill container shall be allowed.

~~5704.2.9.7.8~~ 5705.2.3.7.8 Tank openings. Tank openings in protected above-ground tanks shall be through the top only.

~~5704.2.9.7.9~~ 5705.2.3.7.9 Antisiphon devices. *Approved* antisiphon devices shall be installed in each external pipe connected to the protected above-ground tank where the pipe extends below the level of the top of the tank.

~~5704.2.11~~ 5705.2.4 Underground tanks.
Underground storage of *flammable* and *combustible liquids* in tanks shall comply with Section ~~5704.2~~ 5705.2 and Sections ~~5704.2.11.1~~

5705.2.4.1 through ~~5704.2.11.4.2.1~~ 5705.2.4.4.

~~5704.2.11.1~~ 5705.2.4.1 Location. *Flammable* and *combustible liquid* storage tanks located underground, either outside or under buildings, shall be in accordance with all of the following:

1. Tanks shall be located with respect to existing foundations and supports such that the loads carried by the latter cannot be transmitted to the tank.
2. The distance from any part of a tank storing liquids to the nearest wall of a *basement*, pit, cellar or *lot line* shall be not less than 3 feet (914 mm).
3. A minimum distance of 1 foot (305 mm), shell to shell, shall be maintained between underground tanks.

~~5704.2.11.2~~ 5705.2.4.2 Depth and cover. Excavation for underground storage tanks shall be made with due care to avoid undermining of foundations of existing structures. Underground tanks shall be set on firm foundations and surrounded with not less than 6 inches (152 mm) of noncorrosive inert material, such as clean sand.

~~5704.2.11.3~~ 5705.2.4.3 Overfill protection and prevention systems.
Fill pipes shall be equipped with a spill container and an overfill prevention system in accordance with NFPA 30.

~~5704.2.11.4~~ 5705.2.4.4 Leak prevention.
~~Leak prevention~~An *approved* method of leak detection shall be provided for underground tanks and shall comply with ~~Sections 5704.2.11.4.1 and 5704.2.11.4.2.~~the following:

1. The leak detection system shall be capable of detecting a leak from any component of the underground storage tank system.
2. The leak detection shall be designed and installed in accordance with NFPA 30.
3. Daily inventory records for underground storage tank systems shall be maintained.
4. The leak detection panel status shall be annunciated at an *approved* on-site location.

~~**5704.2.11.4.1 Inventory control.** Daily inventory records for underground storage tank systems shall be maintained.~~

~~**5704.2.11.4.2 Leak detection.**~~
~~Underground storage tank systems shall be provided with an *approved* method of leak detection from any component of the system that is designed and installed in accordance with NFPA 30.~~

~~**5704.2.11.4.2.1 Location.** The leak detection panel status shall be annunciated at an *approved* on-site location.~~

SECTION ~~5705~~5706
DISPENSING, USE, MIXING AND HANDLING

~~5705.1~~5706.1 Scope and application.
Dispensing, use, mixing and handling of *flammable liquids* shall be in accordance with the applicable provisions in Section 5703~~, and this section~~ Section 5706.2 and the following.~~ Tank vehicle and tank car loading and unloading and other special operations shall be in accordance with Section 5706.~~

> ~~**Exception:** Containers of organic coatings having no fire point and which are opened for pigmentation are not required to comply with this section.~~

1. Indoor dispensing, use, mixing and handling in quantities not exceeding the maximum allowable quantity per control area shall also comply with Section 5706.3.
2. Indoor dispensing, use, mixing and handling in quantities exceeding the maximum allowable quantity per control area shall also comply with Section 5706.4.

3. Outdoor dispensing, use, mixing and handling in quantities exceeding the maximum allowable quantity per control area shall also comply with Section 5706.5.

Tank vehicle and tank car loading and unloading and other special operations shall be in accordance with Section 5707.

~~5705.2~~5706.2 ~~Liquid transfer~~General.
Liquid transfer equipment and methods for transfer of Class I, II and IIIA liquids shall be *approved* and be in accordance with Sections ~~5705.2.1~~5706.2.1 through ~~5705.2.6~~5706.2.6.

~~5705.2.1~~5706.2.1 Pumps. Where positive-displacement pumps are used, they shall be provided with pressure relief discharging back to the tank, pump suction or other *approved* location, or shall be provided with interlocks to prevent over-pressure.

~~5705.2.2~~5706.2.2 Pressured systems. Where gases are introduced to provide for transfer of Class I liquids, or Class II and III liquids transferred at temperatures at or above their *flash points* by pressure, only inert gases shall be used. Controls, including pressure relief devices, shall be provided to limit the pressure so that the maximum working pressure of tanks, containers and piping systems cannot be exceeded. Where devices operating through pressure within a tank or container are used, the tank or container shall be a pressure vessel *approved* for the intended use. Air or oxygen shall not be used for pressurization.

Exception: Air transfer of Class II and III liquids at temperatures below their *flash points*.

~~5705.2.3~~5706.2.3 Piping, hoses and valves. Piping, hoses and valves used in liquid transfer operations shall be *approved* or *listed* for the intended use.

~~5705.2.4~~5706.2.4 Class I, II and III liquids.
Class I liquids or, when heated to or above their flash points, Class II and Class III liquids, shall be transferred by one of the following methods:

1. From safety cans complying with UL 30.
2. Through an *approved* closed piping system.
3. From containers or tanks by an *approved* pump taking suction through an opening in the top of the container or tank.
4. For Class IB, IC, II and III liquids, from containers or tanks by gravity through an *approved* self-closing or automatic-closing valve where the container or tank and dispensing operations are provided with spill control and secondary containment in accordance with Section ~~5703.4~~5004.2. Class IA liquids shall not be dispensed by gravity from tanks.
5. *Approved* engineered liquid transfer systems.

Exception: Liquids in original shipping containers not exceeding a 5.3-gallon (20 L) capacity.

~~5705.2.5~~5706.2.5 Manual container filling operations. Class I liquids or Class II and Class III liquids that are heated up to or above their *flash points* shall not be transferred into containers unless the nozzle and containers are electrically interconnected. Acceptable methods of electrical interconnection include either of the following:

1. Metallic floor plates on which containers stand while filling, where such floor plates are electrically connected to the fill stem.
2. Where the fill stem is bonded to the container during filling by means of a bond wire.

~~5705.2.6~~5706.2.6 Automatic container-filling operations for Class I liquids. Container-filling operations for Class I liquids involving conveyor belts or other automatic-feeding operations shall be designed to prevent static accumulations.

~~5705.3~~5706.2.7 Use, dispensing and mixing inside of buildings.
Indoor use, dispensing and mixing of *flammable* and *combustible liquids* shall also be in accordance with ~~Section 5705.2 and~~ Sections ~~5705.3.1~~5706.2.7.1 through ~~5705.3.5.3~~5706.2.13.9.

~~5705.3.1~~5706.2.7.1 Closure of mixing or blending vessels. Vessels used for mixing or blending of Class I liquids and Class II or III liquids heated up to or above their *flash points* shall be provided with self-closing, tight-fitting, noncombustible lids that will control a fire within such vessel.

Exception: Where such devices are impractical, *approved* automatic or manually controlled fire-extinguishing devices shall be provided.

~~5705.3.2~~5706.2.8 **Bonding of vessels.** Where differences of potential could be created, vessels containing Class I liquids or liquids handled at or above their *flash points* shall be electrically connected by bond wires, ground cables, piping or similar means to a static grounding system to maintain equipment at the same electrical potential to prevent sparking.

~~5705.3.3~~5706.2.9 **Heating, lighting and cooking appliances.** Heating, lighting and cooking appliances that utilize Class I liquids shall not be operated within a building or structure.

Exception: Operation in single-family *dwellings*.

~~5705.3.4~~5706.2.10 **Location of processing vessels.**
Processing vessels shall be located with respect to distances to *lot lines* of adjoining property that can be built on, in accordance with Tables ~~5705.3.4(1)~~5706.2.10(1) and ~~5705.3.4(2)~~5706.2.10(2).

Exception: Where the *exterior wall* facing the adjoining *lot line* is a blank wall having a *fire-resistance rating* of not less than 4 hours, the *fire code official* is authorized to modify the distances. The distance shall be not less than that set forth in the *International Building Code*, and where Class IA or unstable liquids are involved, explosion control shall be provided in accordance with Section 911.

TABLE ~~5705.3.4(1)~~5706.2.10(1) SEPARATION OF PROCESSING VESSELS FROM LOT LINES

PROCESSING VESSELS WITH EMERGENCY RELIEF VENTING	LOCATION[a]	
	Stable liquids	Unstable liquids
Not in excess of 2.5 psig	Table ~~5705.3.4(2)~~5706.2.10(2)	2.5 times Table ~~5705.3.4(2)~~5706.2.10(2)
Over 2.5 psig	1.5 times Table ~~5705.3.4(2)~~5706.2.10(2)	4 times Table ~~5705.3.4(2)~~5706.2.10(2)

For SI: 1 pound per square inch gauge = 6.895 kPa.

a. Where protection of exposures by a public fire department or private fire brigade capable of providing cooling water streams on structures is not provided, distances shall be doubled.

TABLE ~~5705.3.4(2)~~5706.2.10(2) REFERENCE TABLE FOR USE WITH TABLE ~~5705.3.4(1)~~5706.2.10(1)

TANK CAPACITY (gallons)	MINIMUM DISTANCE FROM LOT LINE OF A LOT THAT IS OR CAN BE BUILT ON, INCLUDING THE OPPOSITE SIDE OF A PUBLIC WAY (feet)	MINIMUM DISTANCE FROM NEAREST SIDE OF ANY PUBLIC WAY OR FROM NEAREST IMPORTANT BUILDING ON THE SAME PROPERTY (feet)
275 or less	5	5
276 to 750	10	5
751 to 12,000	15	5
12,001 to 30,000	20	5
30,001 to 50,000	30	10
50,001 to 100,000	50	15
100,001 to 500,000	80	25
500,001 to 1,000,000	100	35
1,000,001 to 2,000,000	135	45
2,000,001 to 3,000,000	165	55
3,000,001 or more	175	60

For SI: 1 foot = 304.8 mm, 1 gallon = 3.785 L.

~~5705.3.6~~5706.2.11 **Cleaning with flammable and combustible liquids.**
Cleaning with Class I, II and IIIA liquids shall be in accordance with Sections ~~5705.3.6.1~~5706.2.11.1 through ~~5705.3.6.2.7~~5706.2.11.2.7.

Exceptions:

1. Dry cleaning shall be in accordance with Chapter 21.
2. Spray-nozzle cleaning shall be in accordance with Section 2403.3.5.

~~5705.3.6.1~~5706.2.11.1 Cleaning operations.
Class IA liquids shall not be used for cleaning. Cleaning with Class IB, IC or II liquids shall be conducted in accordance with one of the following:

1. In a room or building, Section ~~5705.3.7~~5706.4.
2. In a parts cleaner *listed*, *labeled* and *approved* for the purpose, Section ~~5705.3.6.2~~5706.2.11.2.

Exception: Materials used in commercial and industrial process-related cleaning operations in accordance with other provisions of this code and not involving facilities maintenance cleaning operations.

~~5705.3.6.2~~5706.2.11.2 Listed and approved machines.
Parts cleaning and degreasing conducted in *listed* and *approved* machines in accordance with Section ~~5705.3.6.1~~5706.2.11.1 shall be in accordance with Sections ~~5705.3.6.2.1~~5706.2.11.2.1 through ~~5705.3.6.2.7~~5706.2.11.2.7.

~~5705.3.6.2.1~~5706.2.11.2.1 Solvents. Solvents shall be classified and shall be compatible with the machines within which they are used.

~~5705.3.6.2.2~~5706.2.11.2.2 Machine capacities. The quantity of solvent shall not exceed the *listed* design capacity of the machine for the solvent being used with the machine.

~~5705.3.6.2.3~~5706.2.11.2.3 Solvent quantity limits.
Solvent quantities shall be limited as follows:

1. Machines without remote solvent reservoirs shall be limited to quantities set forth in Section ~~5705.3.5~~5706.3.
2. Machines with remote solvent reservoirs using Class I liquids shall be limited to quantities set forth in Section ~~5705.3.5~~5706.3.
3. Machines with remote solvent reservoirs using Class II liquids shall be limited to 35 gallons (132 L) per machine. The total quantities shall not exceed an aggregate of 240 gallons (908 L) per *control area* in buildings not equipped throughout with an *approved automatic sprinkler system* and an aggregate of 480 gallons (1817 L) per *control area* in buildings equipped throughout with an *approved automatic sprinkler system* in accordance with Section 903.3.1.1.
4. Machines with remote solvent reservoirs using Class IIIA liquids shall be limited to 80 gallons (303 L) per machine.

~~5705.3.6.2.4~~5706.2.11.2.4 Immersion soaking of parts. Work areas of machines with remote solvent reservoirs shall not be used for immersion soaking of parts.

~~5705.3.6.2.5~~5706.2.11.2.5 Separation. Multiple machines shall be separated from each other by a distance of not less than 30 feet (9144 mm) or by a *fire barrier* with a minimum 1-hour *fire-resistance rating*.

~~5705.3.6.2.6~~5706.2.11.2.6 Ventilation. Machines shall be located in areas adequately ventilated to prevent accumulation of vapors.

~~5705.3.6.2.7~~5706.2.11.2.7 Installation. Machines shall be installed in accordance with their listings.

~~5705.5~~5706.2.12 Alcohol-based hand rubs classified as Class I or II liquids.
The use of dispensers containing alcohol-based hand rubs classified as Class I or II liquids shall be in accordance with all of the following:

1. The maximum capacity of each dispenser shall be 68 ounces (2 L).
2. The minimum separation between dispensers shall be 48 inches (1219 mm).

3. Dispensers shall not be located above, below or closer than 1 inch (25 mm) to an electrical receptacle, switch, appliance, device or other ignition source. The wall space between the dispenser and the floor or intervening counter top shall be free of electrical receptacles, switches, appliances, devices or other ignition sources.
4. Dispensers shall be located so that the bottom of the dispenser is not less than 42 inches (1067 mm) and not more than 48 inches (1219 mm) above the finished floor.
5. Dispensers shall not obstruct required means of egress or be placed within 3 feet (914 mm) of an open flame, heating device or other ignition source.
6. Dispensers shall not release their contents except when the dispenser is manually activated. Facilities shall be permitted to install and use automatically activated “touch free” alcohol-based hand-rub dispensing devices with the following requirements:
   6.1. The facility or persons responsible for the dispensers shall test the dispensers each time a new refill is installed in accordance with the manufacturer’s care and use instructions.
   6.2. Dispensers shall be designed and must operate in a manner that ensures accidental or malicious activations of the dispensing device are minimized. At a minimum, all devices subject to or used in accordance with this section shall have the following safety features:
      6.2.1. Any activations of the dispenser shall only occur when an object is placed within 4 inches (98 mm) of the sensing device.
      6.2.2. The dispenser shall not dispense more than the amount required for hand hygiene consistent with label instructions as regulated by the United States Food and Drug Administration (USFDA).
      6.2.3. An object placed within the activation zone and left in place will cause only one activation.
7. Storage and use of alcohol-based hand rubs shall be in accordance with the applicable provisions of Sections 5704 and ~~5705~~ 5706.
8. Dispensers located in occupancies with carpeted floors shall only be allowed in *smoke compartments* or *fire areas* equipped throughout with an *approved automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2.

~~5705.5.1~~5706.2.12.1 Corridor installations.
In addition to the provisions of Section ~~5705.5~~5706.2.12, where dispensers containing alcohol-based hand rubs are located in *corridors* or rooms and areas open to the *corridor*, they shall be in accordance with all of the following:
1. Level 2 and 3 aerosol containers shall not be allowed in *corridors*.
2. The maximum capacity of each Class I or II liquid dispenser shall be 41 ounces (1.21 L) and the maximum capacity of each Level 1 aerosol dispenser shall be 18 ounces (0.51 kg).
3. The maximum quantity allowed in a *corridor* within a *control area* shall be 10 gallons (37.85 L) of Class I or II liquids or 1135 ounces (32.2 kg) of Level 1 aerosols, or a combination of Class I or II liquids and Level 1 aerosols not to exceed, in total, the equivalent of 10 gallons (37.85 L) or 1,135 ounces (32.2 kg) such that the sum of the ratios of the liquid and aerosol quantities divided by the allowable quantity of liquids and aerosols, respectively, shall not exceed one.
4. Projections into a *corridor* shall be in accordance with Section 1003.3.3.

~~5705.4~~5706.2.13 Solvent distillation units.
Solvent distillation units shall comply with Sections ~~5705.4.1~~5706.2.13.1 through ~~5705.4.9~~5706.2.13.9.

~~5705.4.1~~5706.2.13.1 Unit with a capacity of 60 gallons or less.
Solvent distillation units used to recycle Class I, II or IIIA liquids having a distillation chamber capacity of 60 gallons (227 L) or less shall be *listed*, *labeled* and installed in accordance with Section ~~5705.4~~5706.2.13 and UL 2208.

Exceptions:
1. Solvent distillation units used in continuous through-put industrial processes where the source of heat is remotely supplied using steam, hot water, oil or other heat transfer fluids, the temperature of which is below the auto-ignition point of the solvent.

2. *Approved* research, testing and experimental processes.

~~5705.4.2~~5706.2.13.2 Units with a capacity exceeding 60 gallons.
Solvent distillation units used to recycle Class I, II or IIIA liquids, having a distillation chamber capacity exceeding 60 gallons (227 L) shall be used in locations that comply with the use and mixing requirements of Section ~~5705~~5706.2 and other applicable provisions in this chapter.

~~5705.4.3~~5706.2.13.3 Prohibited processing. Class I, II and IIIA liquids that are classified as unstable (reactive) shall not be processed in solvent distillation units.

Exception: Appliances *listed* for the distillation of unstable (reactive) solvents.

~~5705.4.4~~5706.2.13.4 Labeling. A permanent label shall be affixed to the unit by the manufacturer. The label shall indicate the capacity of the distillation chamber, and the distance the unit shall be placed away from sources of ignition. The label shall indicate the products for which the unit has been *listed* for use or refer to the instruction manual for a list of the products.

~~5705.4.5~~5706.2.13.5 Manufacturer's instruction manual. An instruction manual shall be provided. The manual shall be readily available for the user and the *fire code official*. The manual shall include installation, use and servicing instructions. It shall identify the liquids for which the unit has been *listed* for distillation purposes along with each liquid's *flash point* and auto-ignition temperature. For units with adjustable controls, the manual shall include directions for setting the heater temperature for each liquid to be instilled.

~~5705.4.6~~5706.2.13.6 Location. Solvent distillation units shall be used in locations in accordance with the listing. Solvent distillation units shall not be used in *basements*.

~~5705.4.7~~5706.2.13.7 Storage of liquids.
Distilled liquids and liquids awaiting distillation shall be stored in accordance with the applicable Sections of 5704 and 5705.

~~5705.4.8~~5706.2.13.8 Storage of residues.
Hazardous residue from the distillation process shall be stored in accordance with the applicable Sections of 5704, 5705 and Chapter 50.

~~5705.4.9~~5706.2.13.9 Portable fire extinguishers.
Approved portable fire extinguishers shall be provided in accordance with Section 906. Not less than one portable fire extinguisher having a rating of not less than 40-B shall be located not less than 10 feet (3048 mm) or more than 30 feet (9144 mm) from any solvent distillation unit.

~~5705.3.5~~5706.3 ~~Quantity limits for use~~ Quantities not exceeding the maximum allowable quantity per control area.
Quantities not exceeding the maximum allowable quantity per control area for indoor dispensing, use, mixing and handling~~Liquid use quantity limitations~~ shall comply with Sections ~~5705.3.5.1~~5706.3.1 through ~~5705.3.5.3~~5706.3.2.

~~5705.3.5.1~~5706.3.1 Maximum allowable quantity per control area.
Indoor use, dispensing and mixing of *flammable* and *combustible liquids* shall not exceed the *maximum allowable quantity per control area* indicated in Table 5003.1.1(1) and shall not exceed the additional limitations set forth in Section ~~5705.3.5~~5706.3.2.
Use of hazardous production material *flammable* and *combustible liquids* in Group H-5 occupancies shall be in accordance with Chapter 27.

Exception: Cleaning with Class I, II and IIIA liquids shall be in accordance with Section ~~5705.3.6~~5706.2.11.

~~5705.3.5.2~~5706.3.2 Occupancy quantity limits.
The following limits for quantities of *flammable* and *combustible liquids* used, dispensed or mixed based on occupancy classification shall not be exceeded:

1. Group A occupancies: Quantities in Group A occupancies shall not exceed that necessary for demonstration, treatment, laboratory work, maintenance purposes and operation of equipment, and shall not exceed quantities set forth in Table 5003.1.1(1).

2. Group B occupancies: Quantities in drinking, dining, office and school uses within Group B occupancies shall not exceed that necessary for demonstration, treatment, laboratory work, maintenance purposes and operation of equipment, and shall not exceed quantities set forth in Table 5003.1.1(1).
3. Group E occupancies: Quantities in Group E occupancies shall not exceed that necessary for demonstration, treatment, laboratory work, maintenance purposes and operation of equipment and shall not exceed quantities set forth in Table 5003.1.1(1).
4. Group F occupancies: Quantities in dining, office and school uses within Group F occupancies shall not exceed that necessary for demonstration, laboratory work, maintenance purposes and operation of equipment, and shall not exceed quantities set forth in Table 5003.1.1(1).
5. Group I occupancies: Quantities in Group I occupancies shall not exceed that necessary for demonstration, laboratory work, maintenance purposes and operation of equipment, and shall not exceed quantities set forth in Table 5003.1.1(1).
6. Group M occupancies: Quantities in dining, office and school uses within Group M occupancies shall not exceed that necessary for demonstration, laboratory work, maintenance purposes and operation of equipment, and shall not exceed quantities set forth in Table 5003.1.1(1).
7. Group R occupancies: Quantities in Group R occupancies shall not exceed that necessary for maintenance purposes and operation of equipment, and shall not exceed quantities set forth in Table 5003.1.1(1).
8. Group S occupancies: Quantities in dining and office uses within Group S occupancies shall not exceed that necessary for demonstration, laboratory work, maintenance purposes and operation of equipment and shall not exceed quantities set forth in Table 5003.1.1(1).

Exception: Cleaning with Class I, II, or IIIA liquids shall be in accordance with Section ~~5705.3.6~~5706.2.11.

~~5705.3.5.3~~5706.4 Quantities exceeding ~~limits for~~the maximum allowable quantity per control ~~areas~~area.
Quantities exceeding the *maximum allowable quantity per control area* indicated in Sections ~~5705.3.5.1~~5706.3.1 and ~~5705.3.5.2~~ 5706.3.2, or when required by Section 5706.2.11.1, shall be in accordance with the following:

1. For *open systems*, indoor use, dispensing and mixing of *flammable* and *combustible liquids* shall be within a room or building complying with the *International Building Code* and Sections ~~5705.3.7.1~~5706.4.1 through ~~5705.3.7.5.3~~5706.4.2.3.
2. For *closed systems*, indoor use, dispensing and mixing of *flammable* and *combustible liquids* shall be within a room or building complying with the *International Building Code* and Sections ~~5705.3.7~~5706.4.1 through ~~5705.3.7.4~~5706.4.1.4 and Section ~~5705.3.7.6~~5706.4.3.

~~5705.3.7~~5706.4.1 Rooms or buildings for quantities exceeding the maximum allowable quantity per control area.
Where required by Section ~~5705.3.5.3~~5706.4 or ~~5705.3.6.1~~5706.2.11.1, rooms or buildings used for the use, dispensing or mixing of *flammable* and *combustible liquids* in quantities exceeding the *maximum allowable quantity per control area* shall be in accordance with Sections ~~5705.3.7.1~~5706.4.1.1 through ~~5705.3.7.6.3~~5706.4.2.3.

~~5705.3.7.1~~5706.4.1.1 Construction, location and fire protection.
Rooms or buildings classified in accordance with the *International Building Code* as Group H-2 or H-3 occupancies based on use, dispensing or mixing of *flammable* or *combustible liquids* shall be constructed in accordance with the *International Building Code*.

~~5705.3.7.2~~5706.4.1.2 Basements.
In rooms or buildings classified in accordance with the *International Building Code* as Group H-2 or H-3, dispensing or mixing of *flammable* or *combustible liquids* shall not be conducted in *basements*.

~~5705.3.7.3~~5706.4.1.3 Fire protection.

Rooms or buildings classified in accordance with the *International Building Code* as Group H-2 or H-3 occupancies shall be equipped with an *approved automatic fire-extinguishing system* in accordance with Chapter 9.

~~5705.3.7.4~~5706.4.1.4 Doors.
Interior doors to rooms or portions of such buildings shall be self-closing fire doors in accordance with the *International Building Code*.

~~5705.3.7.5~~5706.4.2 Open systems.
Use, dispensing and mixing of *flammable* and *combustible liquids* in *open systems* shall be in accordance with Sections ~~5705.3.7.5.1~~ 5706.4.2.1 through ~~5705.3.7.5.3~~5706.4.2.3.

~~5705.3.7.5.1~~5706.4.2.1 Ventilation.
Continuous mechanical ventilation shall be provided at a rate of not less than 1 cfm per square foot [0.00508 $m^3/(s \times m^2)$] of floor area over the design area. Provisions shall be made for introduction of makeup air in such a manner to include all floor areas or pits where vapors can collect. Local or spot ventilation shall be provided where needed to prevent the accumulation of hazardous vapors. Ventilation system design shall comply with the *International Building Code* and *International Mechanical Code*.

Exception: Where natural ventilation can be shown to be effective for the materials used, dispensed or mixed.

~~5705.3.7.5.2~~5706.4.2.2 Explosion control.
Explosion control shall be provided in accordance with Section 911.

~~5705.3.7.5.3~~5706.4.2.3 Spill control and secondary containment.
Spill control shall be provided in accordance with Section ~~5703.4~~5004.2 where Class I, II or IIIA liquids are dispensed into containers exceeding a 1.3-gallon (5 L) capacity or mixed or used in open containers or systems exceeding a 5.3-gallon (20 L) capacity. Spill control and secondary containment shall be provided in accordance with Section ~~5703.4~~5004.2 where the capacity of an individual container exceeds 55 gallons (208 L) or the aggregate capacity of multiple containers or tanks exceeds 100 gallons (378.5 L).

~~5705.3.7.6~~5706.4.3 Closed systems.
Use or mixing of *flammable* or *combustible liquids* in *closed systems* shall be in accordance with Sections ~~5705.3.7.6.1~~5706.4.3.1 through ~~5705.3.7.6.3~~5706.4.3.3.

~~5705.3.7.6.1~~5706.4.3.1 Ventilation.
Closed systems designed to be opened as part of normal operations shall be provided with ventilation in accordance with Section ~~5705.3.7.5.1~~5706.4.2.1.

~~5705.3.7.6.2~~5706.4.3.2 Explosion control.
Explosion control shall be provided where an explosive environment can occur as a result of the mixing or use process. Explosion control shall be designed in accordance with Section 911.

Exception: Where process vessels are designed to contain fully the worst-case explosion anticipated within the vessel under process conditions considering the most likely failure.

~~5705.3.7.6.3~~5706.4.3.3 Spill control and secondary containment.
Spill control shall be provided in accordance with Section ~~5703.4~~5004.2.1 where *flammable* or *combustible liquids* are dispensed into containers exceeding a 1.3-gallon (5 L) capacity or mixed or used in open containers or systems exceeding a 5.3-gallon (20 L) capacity. ~~Spill control and secondary~~Secondary containment shall be provided in accordance with Section ~~5703.4~~5004.2 where the capacity of an individual container exceeds 55 gallons (208 L) or the aggregate capacity of multiple containers or tanks exceeds 1,000 gallons (3785 L).

~~5705.3.8~~5706.5 Use, dispensing and handling outside of buildings.
Outside use, dispensing and handling shall be in accordance with Sections ~~5705.3.8.1~~5706.5 through ~~5705.3.8.4~~5706.5.3. Dispensing of liquids into motor vehicle fuel tanks at motor fuel-dispensing facilities shall be in accordance with Chapter 23.

~~5705.3.8.1~~5706.5.1 Spill control.

Outside use, dispensing and handling areas shall be provided with spill control as set forth in Section ~~5703.4~~5004.2.

~~5705.3.8.2~~5706.5.2 Location on property.

Dispensing activities that exceed the quantities set forth in Table ~~5705.3.8.2~~5706.5.2 shall not be conducted within 15 feet (4572 mm) of buildings or combustible materials or within 25 feet (7620 mm) of building openings, *lot lines*, public streets, public alleys or *public ways*. Dispensing activities that exceed the quantities set forth in Table ~~5705.3.8.2~~5706.5.2 shall not be conducted within 15 feet (4572 mm) of storage of Class I, II or III liquids unless such liquids are stored in tanks that are *listed* and *labeled* as 2-hour protected tank assemblies in accordance with UL 2085.

Exceptions:

1. The requirements shall not apply to areas where only the following are dispensed: Class III liquids; liquids that are heavier than water; water-miscible liquids; and liquids with viscosities greater than 10,000 centipoise (cp) (10 Pa × s).
2. *Flammable* and *combustible liquid* dispensing in refineries, chemical plants, process facilities, gas and crude oil production facilities and oil-blending and packaging facilities, terminals and bulk plants.

TABLE ~~5705.3.8.2~~5706.5.2 MAXIMUM ALLOWABLE QUANTITIES FOR DISPENSING FLAMMABLE AND COMBUSTIBLE LIQUIDS IN OUTDOOR CONTROL AREAS[a, b]

CLASS OF LIQUID	QUANTITY (gallons)
Flammable	
Class IA	10
Class IB	15
Class IC	20
Combination Class IA, IB and IC	30[c]
Combustible	
Class II	30
Class IIIA	80
Class IIIB	3,300

For SI: 1 gallon = 3.785 L.

a. For definition of "Outdoor Control Area," see Section 202.

b. The fire code official is authorized to impose special conditions regarding locations, types of containers, dispensing units, fire control measures and other factors involving fire safety.

c. Containing not more than the maximum allowable quantity per control area of each individual class.

~~5705.3.8.3~~5706.5.2.1 Location of processing vessels.

Processing vessels shall be located with respect to distances to *lot lines* that can be built on in accordance with Table ~~5705.3.4(1)~~ 5706.2.10(1).

Exception: In refineries and distilleries.

~~5705.3.8.4~~5706.5.3 Weather protection.

Weather protection for outdoor use shall be in accordance with Section 5005.3.9.

SECTION ~~5706~~ 5707
SPECIAL OPERATIONS

~~5706.1~~ 5707.1 General.

This section shall cover the provisions for special operations that include, but are not limited to, storage, use, dispensing, mixing or handling of *flammable* and *combustible liquids*. The following special operations shall be in accordance with Sections 5701, 5703, 5704, ~~and~~ 5705 and 5706, except as ~~provided in Section 5706:~~modified by the following:

1. Storage and dispensing of *flammable* and *combustible liquids* on farms and construction sites shall comply with Section 5707.2.

2. Well drilling and operating shall comply with Section 5707.3.
3. Bulk plants or terminals shall comply with Section 5707.4.
4. Bulk transfer and process transfer operations utilizing tank vehicles and tank cars shall comply with Section 5707.5.
5. Tank vehicles and tank vehicle operation shall comply with Section 5707.6.
6. Refineries shall comply with Section 5707.7.
7. Vapor recovery and vapor-processing systems shall comply with Section 5707.8.

~~5706.2~~ 5707.2 Storage and dispensing of flammable and combustible liquids on farms and construction sites.
Permanent and temporary storage and dispensing of Class I and II liquids for private use on farms and rural areas and at construction sites, earth-moving projects, gravel pits or borrow pits shall be in accordance with Sections ~~5706.2.1~~5707.2.1 through ~~5706.2.8.1~~ 5707.2.8.1.

Exception: Storage and use of fuel oil and containers connected with oil-burning equipment regulated by Section 605 and the *International Mechanical Code*.

~~5706.2.1~~ 5707.2.1 Combustibles and open flames near tanks. Storage areas shall be kept free from weeds and extraneous combustible material. Open flames and smoking are prohibited in *flammable* or *combustible liquid* storage areas.

~~5706.2.2~~ 5707.2.2 Marking of tanks and containers. Tanks and containers for the storage of liquids above ground shall be conspicuously marked with the name of the product that they contain and the words: "FLAMMABLE—KEEP FIRE AND FLAME AWAY." Tanks shall bear the additional marking: "KEEP 50 FEET FROM BUILDINGS."

~~5706.2.3~~ 5707.2.3 Containers for storage and use.
Metal containers used for storage of Class I or II liquids shall be in accordance with DOTn requirements or shall be of an *approved* design.
Discharge devices shall be of a type that do not develop an internal pressure on the container. Pumping devices or *approved* self-closing faucets used for dispensing liquids shall not leak and shall be well-maintained. Individual containers shall not be interconnected and shall be kept closed when not in use.

Containers stored outside of buildings shall be in accordance with Section 5704 and the *International Building Code*.

~~5706.2.4~~ 5707.2.4 Permanent and temporary tanks.
The capacity of permanent above-ground tanks containing Class I or II liquids shall not exceed 1,100 gallons (4164 L). The capacity of temporary above-ground tanks containing Class I or II liquids shall not exceed 10,000 gallons (37 854 L). Tanks shall be of the single-compartment design.

Exception: Permanent above-ground tanks of greater capacity that meet the requirements of Section ~~5704.2~~5705.

~~5706.2.4.1~~ 5707.2.4.1 Fill-opening security. Fill openings shall be equipped with a locking closure device. Fill openings shall be separate from vent openings.

~~5706.2.4.2~~ 5707.2.4.2 Vents.
Tanks shall be provided with a method of normal and emergency venting. Normal vents shall be in accordance with Section ~~5704.2.7.3~~ 5705.2.1.3.
Emergency vents shall be in accordance with Section ~~5704.2.7.4~~5705.2.1.4. Emergency vents shall be arranged to discharge in a manner that prevents localized overheating or flame impingement on any part of the tank in the event that vapors from such vents are ignited.

~~5706.2.4.3~~ 5707.2.4.3 Location. Tanks containing Class I or II liquids shall be kept outside and not less than 50 feet (15 240 mm) from buildings and combustible storage. Additional distance shall be provided where necessary to ensure that vehicles, equipment and containers being filled directly from such tanks will not be less than 50 feet (15 240 mm) from structures, haystacks or other combustible storage.

~~5706.2.4.4~~ 5707.2.4.4 Locations where above-ground tanks are prohibited. The storage of Class I and II liquids in above-ground tanks is prohibited within the limits established by law as set forth in the fire code adoption ordinance or other regulation adopted by the jurisdiction .

~~5706.2.5~~ 5707.2.5 Type of tank. Tanks shall be provided with top openings only or shall be elevated for gravity discharge.

~~5706.2.5.1~~ 5707.2.5.1 Tanks with top openings only. Tanks with top openings shall be mounted in accordance with either of the following:

1. On well-constructed metal legs connected to shoes or runners designed so that the tank is stabilized and the entire tank and its supports can be moved as a unit.
2. For stationary tanks, on a stable base of timbers or blocks approximately 6 inches (152 mm) in height that prevents the tank from contacting the ground.

~~5706.2.5.1.1~~ 5707.2.5.1.1 Pumps and fittings. Tanks with top openings only shall be equipped with a tightly and permanently attached, *approved* pumping device having an *approved* hose of sufficient length for filling vehicles, equipment or containers to be served from the tank. Either the pump or the hose shall be equipped with a padlock to its hanger to prevent tampering. An effective antisiphoning device shall be included in the pump discharge unless a self-closing nozzle is provided. Siphons or internal pressure discharge devices shall not be used.

~~5706.2.5.2~~ 5707.2.5.2 Tanks for gravity discharge. Tanks with a connection in the bottom or the end for gravity-dispensing liquids shall be mounted and equipped as follows:

1. Supports to elevate the tank for gravity discharge shall be designed to carry all required loads and provide stability.
2. Bottom or end openings for gravity discharge shall be equipped with a valve located adjacent to the tank shell that will close automatically in the event of fire through the operation of an effective heat-activated releasing device. Where this valve cannot be operated manually, it shall be supplemented by a second, manually operated valve.

The gravity discharge outlet shall be provided with an *approved* hose equipped with a self-closing valve at the discharge end of a type that can be padlocked to its hanger.

~~5706.2.6~~ 5707.2.6 Spill control drainage control and diking.
Indoor storage and dispensing areas where the maximum allowable quantities per control area are exceeded and where required by Section 5004.2 shall be provided with spill control and drainage control as set forth in Section ~~5703.4~~5004.2. Outdoor storage areas shall be provided with drainage control or diking as set forth in Section ~~5704.2.10~~5705.2.1.11.

~~5706.2.7~~ 5707.2.7 Portable fire extinguishers.
Portable fire extinguishers with a minimum rating of 20-B:C and complying with Section 906 shall be provided where required by the *fire code official*.

~~5706.2.8~~ 5707.2.8 Dispensing from tank vehicles.
Where *approved*, liquids used as fuels are allowed to be transferred from tank vehicles into the tanks of motor vehicles or special equipment, provided that:

1. The tank vehicle's specific function is that of supplying fuel to motor vehicle fuel tanks.
2. The dispensing hose does not exceed 100 feet (30 480 mm) in length.
3. The dispensing nozzle is an *approved* type.
4. The dispensing hose is properly placed on an *approved* reel or in a compartment provided before the tank vehicle is moved.
5. Signs prohibiting smoking or open flames within 25 feet (7620 mm) of the vehicle or the point of refueling are prominently posted on the tank vehicle.
6. Electrical devices and wiring in areas where fuel dispensing is conducted are in accordance with NFPA 70.

7. Tank vehicle-dispensing equipment is operated only by designated personnel who are trained to handle and dispense motor fuels.
8. Provisions are made for controlling and mitigating unauthorized discharges.

~~5706.2.8.1~~ 5707.2.8.1 Location. Dispensing from tank vehicles shall be conducted not less than 50 feet (15 240 mm) from structures or combustible storage.

~~5706.3~~ 5707.3 Well drilling and operating.
Wells for oil and natural gas shall be drilled and operated in accordance with Sections ~~5706.3.1~~5707.3.1 through ~~5706.3.8~~5707.3.8.

~~5706.3.1~~ 5707.3.1 Location.
The location of wells shall comply with Sections ~~5706.3.1.1~~5707.3.1.1 through ~~5706.3.1.3.2~~5707.3.1.3.2.

~~5706.3.1.1~~ 5707.3.1.1 Storage tanks and sources of ignition. Storage tanks or boilers, fired heaters, open-flame devices or other sources of ignition shall not be located within 25 feet (7620 mm) of well heads. Smoking is prohibited at wells or tank locations except as designated and in *approved* posted areas.

Exception: Engines used in the drilling, production and serving of wells.

~~5706.3.1.2~~ 5707.3.1.2 Streets and railways. Wells shall not be drilled within 75 feet (22 860 mm) of any dedicated public street, highway or nearest rail of an operating railway.

~~5706.3.1.3~~ 5707.3.1.3 Buildings. Wells shall not be drilled within 100 feet (30 480 mm) of buildings not necessary to the operation of the well.

~~5706.3.1.3.1~~ 5707.3.1.3.1 Group A, E or I buildings. Wells shall not be drilled within 300 feet (91 440 mm) of buildings with an occupancy in Group A, E or I.

~~5706.3.1.3.2~~ 5707.3.1.3.2 Existing wells.
Where wells are existing, buildings shall not be constructed within the distances set forth in Section ~~5706.3.1~~5707.3.1 for separation of wells or buildings.

~~5706.3.2~~ 5707.3.2 Waste control. Control of waste materials associated with wells shall comply with Sections ~~5706.3.2.1~~5707.3.2.1 and ~~5706.3.2.2~~5707.3.2.2.

~~5706.3.2.1~~ 5707.3.2.1 Discharge on a street or water channel. Liquids containing crude petroleum or its products shall not be discharged into or on streets, highways, drainage canals or ditches, storm drains or flood control channels.

~~5706.3.2.2~~ 5707.3.2.2 Discharge and combustible materials on ground. The surface of the ground under, around or near wells, pumps, boilers, oil storage tanks or buildings shall be kept free from oil, waste oil, refuse or waste material.

~~5706.3.3~~ 5707.3.3 Sumps.
Sumps associated with wells shall comply with Sections ~~5706.3.3.1~~5707.3.3.1 through ~~5706.3.3.3~~5707.3.3.3.

~~5706.3.3.1~~ 5707.3.3.1 Maximum width. Sumps or other basins for the retention of oil or petroleum products shall not exceed 12 feet (3658 mm) in width.

~~5706.3.3.2~~ 5707.3.3.2 Backfilling. Sumps or other basins for the retention of oil or petroleum products larger than 6 feet by 6 feet by 6 feet (1829 mm by 1829 mm by 1829 mm) shall not be maintained longer than 60 days after the cessation of drilling operations.

~~5706.3.3.3~~ 5707.3.3.3 Security. Sumps, diversion ditches and depressions used as sumps shall be securely fenced or covered.

~~5706.3.4~~ <u>5707.3.4</u> **Prevention of blowouts.** Protection shall be provided to control and prevent the blowout of a well. Protection equipment shall meet federal, state and other applicable jurisdiction requirements.

~~5706.3.5~~ <u>5707.3.5</u> **Storage tanks.**
Storage of *flammable* or *combustible liquids* in tanks shall be in accordance with Section<u>s</u> 5704<u>and 5705</u>. Oil storage tanks or groups of tanks shall have posted in a conspicuous place, on or near such tank or tanks, an *approved* sign with the name of the *owner* or operator, or the lease number and the telephone number where a responsible person can be reached at any time.

~~5706.3.6~~ <u>5707.3.6</u> **Soundproofing.** Where soundproofing material is required during oil field operations, such material shall be noncombustible.

~~5706.3.7~~ <u>5707.3.7</u> **Signs.** Well locations shall have posted in a conspicuous place on or near such tank or tanks an *approved* sign with the name of the *owner* or operator, name of the leasee or the lease number, the well number and the telephone number where a responsible person can be reached at any time. Such signs shall be maintained on the premises from the time materials are delivered for drilling purposes until the well is abandoned.

~~5706.3.8~~ <u>5707.3.8</u> **Field-loading racks.**
Field-loading racks shall be in accordance with Section ~~5706.5~~<u>5707.5</u>.

~~5706.4~~ <u>5707.4</u> **Bulk plants or terminals.**
Portions of properties where *flammable* and *combustible liquids* are received by tank vessels, pipelines, tank cars or tank vehicles and stored or blended in bulk for the purpose of distribution by tank vessels, pipelines, tanks cars, tank vehicles or containers shall be in accordance with Sections ~~5706.4.1~~<u>5707.4.1</u> through ~~5706.4.10.4~~<u>5707.4.10.2</u>.

~~5706.4.1~~ <u>5707.4.1</u> **Building construction.**
Buildings shall be constructed in accordance with the *International Building Code*.

~~5706.4.2~~ <u>5707.4.2</u> **Means of egress.** Rooms in which liquids are stored, used or transferred by pumps shall have *means of egress* arranged to prevent occupants from being trapped in the event of fire.

~~5706.4.3~~ <u>5707.4.3</u> **Heating.** Rooms in which Class I liquids are stored or used shall be heated only by means not constituting a source of ignition, such as steam or hot water. Rooms containing heating appliances involving sources of ignition shall be located and arranged to prevent entry of flammable vapors.

~~5706.4.4~~ <u>5707.4.4</u> **Ventilation.**
Ventilation shall be provided for rooms, buildings and enclosures in which Class I liquids are pumped, used or transferred. Design of ventilation systems shall consider the relatively high specific gravity of the vapors. Where natural ventilation is used, adequate openings in outside walls at floor level, unobstructed except by louvers or coarse screens, shall be provided. Where natural ventilation is inadequate, mechanical ventilation shall be provided in accordance with the *International Mechanical Code*.

~~5706.4.4.1~~ <u>5707.4.4.1</u> **Basements and pits.** Class I liquids shall not be stored or used within a building having a *basement* or pit into which flammable vapors can travel, unless such area is provided with ventilation designed to prevent the accumulation of flammable vapors therein.

~~5706.4.4.2~~ <u>5707.4.4.2</u> **Dispensing of Class I liquids.** Containers of Class I liquids shall not be drawn from or filled within buildings unless a provision is made to prevent the accumulation of flammable vapors in hazardous concentrations. Where mechanical ventilation is required, it shall be kept in operation while flammable vapors could be present.

~~5706.4.5~~ <u>5707.4.5</u> **Storage.**
Storage of Class I, II and IIIA liquids in bulk plants shall be in accordance with the applicable provisions of Section<u>s</u> 5704 <u>and 5705</u>.

~~5706.4.6~~ <u>5707.4.6</u> **Overfill protection of Class I and II liquids.**

Manual and automatic systems shall be provided to prevent overfill during the transfer of Class I and II liquids from mainline pipelines and marine vessels in accordance with API 2350.

~~5706.4.7~~ 5707.4.7 Wharves.
This section shall apply to all wharves, piers, bulkheads and other structures over or contiguous to navigable water having a primary function of transferring liquid cargo in bulk between shore installations and tank vessels, ships, barges, lighter boats or other mobile floating craft.

Exception: Marine motor fuel-dispensing facilities in accordance with Chapter 23.

~~5706.4.7.1~~ 5707.4.7.1 Transferring approvals. Handling packaged cargo of liquids, including full and empty drums, bulk fuel and stores, over a wharf during cargo transfer shall be subject to the approval of the wharf supervisor and the senior deck officer on duty.

~~5706.4.7.2~~ 5707.4.7.2 Transferring location. Wharves at which liquid cargoes are to be transferred in bulk quantities to or from tank vessels shall be not less than 100 feet (30 480 mm) from any bridge over a navigable waterway; or from an entrance to, or superstructure of, any vehicular or railroad tunnel under a waterway. The termination of the fixed piping used for loading or unloading at a wharf shall be not less than 200 feet (60 960 mm) from a bridge or from an entrance to, or superstructures of, a tunnel.

~~5706.4.7.3~~ 5707.4.7.3 Superstructure and decking material. Superstructure and decking shall be designed for the intended use. Decking shall be constructed of materials that will afford the desired combination of flexibility, resistance to shock, durability, strength and *fire resistance*.

~~5706.4.7.4~~ 5707.4.7.4 Tanks allowed. Tanks used exclusively for ballast water or Class II or III liquids are allowed to be installed on suitably designed wharves.

~~5706.4.7.5~~ 5707.4.7.5 Transferring equipment. Loading pumps capable of building up pressures in excess of the safe working pressure of cargo hose or loading arms shall be provided with bypasses, relief valves or other arrangements to protect the loading facilities against excessive pressure. Relief devices shall be tested not less than annually to determine that they function satisfactorily at their set pressure.

~~5706.4.7.6~~ 5707.4.7.6 Piping, valves and fittings. Piping valves and fittings shall be in accordance with Section ~~5703.6~~5703.5 except as modified by the following:

1. Flexibility of piping shall be ensured by appropriate layout and arrangement of piping supports so that motion of the wharf structure resulting from wave action, currents, tides or the mooring of vessels will not subject the pipe to repeated excessive strain.
2. Pipe joints that depend on the friction characteristics of combustible materials or on the grooving of pipe ends for mechanical continuity of piping shall not be used.
3. Swivel joints are allowed in piping to which hoses are connected and for articulated, swivel-joint transfer systems, provided that the design is such that the mechanical strength of the joint will not be impaired if the packing materials fail such as by exposure to fire.
4. Each line conveying Class I or II liquids leading to a wharf shall be provided with a block valve that has *ready access* and that is on shore, near the approach to the wharf and outside of any diked area. Where more than one line is involved, the valves shall be grouped in one location.
5. Means shall be provided for easy access to cargo line valves located below the wharf deck.
6. Piping systems shall contain a sufficient number of valves to operate the system properly and to control the flow of liquid in normal operation and in the event of physical damage.
7. Piping on wharves shall be bonded and grounded where Class I and II liquids are transported. Where excessive stray currents are encountered, insulating joints shall be installed. Bonding and grounding connections on piping shall be located on the wharf side of hose riser insulating flanges, where used, and shall be in a location provided with *ready access* for inspection.

8. Hose or articulated swivel-joint pipe connections used for cargo transfer shall be capable of accommodating the combined effects of change in draft and maximum tidal range, and mooring lines shall be kept adjusted to prevent surge of the vessel from placing stress on the cargo transfer system.
9. Hoses shall be supported to avoid kinking and damage from chafing.

~~5706.4.7.7~~ 5707.4.7.7 Loading and unloading. Loading or discharging shall not commence until the wharf superintendent and officer in charge of the tank vessel agree that the tank vessel is properly moored and connections are properly made.

~~5706.4.7.8~~ 5707.4.7.8 Mechanical work. Mechanical work shall not be performed on the wharf during cargo transfer, except under special authorization by the *fire code official* based on a review of the area involved, methods to be employed and precautions necessary.

~~5706.4.10.3~~ 5707.4.7.9 Obstruction of equipment.
Material shall not be placed on wharves in such a manner that would obstruct access to firefighting equipment or important pipeline control valves.

~~5706.4.10.4~~ 5707.4.7.10 Fire apparatus access.
Where the wharf is designed for vehicular traffic, an unobstructed fire apparatus access road to the shore end of the wharf shall be maintained in accordance with Chapter 5.

~~5706.4.8~~ 5707.4.8 Sources of ignition.
Class I, II or IIIA liquids shall not be used, drawn or dispensed where flammable vapors can reach a source of ignition. Smoking shall be prohibited except in designated locations. “No Smoking” signs complying with Section 310 shall be conspicuously posted where a hazard from flammable vapors is normally present.

~~5706.4.9~~ 5707.4.9 Drainage control.
Loading and unloading areas shall be provided with drainage control in accordance with Section ~~5704.2.10~~5705.2.1.11.

~~5706.4.10~~ 5707.4.10 Fire protection.
Fire protection shall be in accordance with Chapter 9 and Sections ~~5706.4.10.1~~5707.4.10.1 through ~~5706.4.10.4~~5707.4.10.2.

~~5706.4.10.1~~ 5707.4.10.1 Portable fire extinguishers.
Portable fire extinguishers with a rating of not less than 20-B and complying with Section 906 shall be located within 75 feet (22 860 mm) of hose connections, pumps and separator tanks.

~~5706.4.10.2~~ 5707.4.10.2 Fire hoses.
Where piped water is available, ready-connected fire hose in a size appropriate for the water supply shall be provided in accordance with Section 905 so that manifolds where connections are made and broken can be reached by not less than one hose stream.

~~5706.5~~ 5707.5 Bulk transfer and process transfer operations.
Bulk transfer and process transfer operations shall be *approved* and be in accordance with Sections ~~5706.5.1~~5707.5.1 through ~~5706.5.3.3~~5707.5.3.3. Motor fuel-dispensing facilities shall comply with Chapter 23.

~~5706.5.1~~ 5707.5.1 General.
~~The provisions of Sections 5706.5.1.1 through 5706.5.1.18 shall apply to bulk transfer and process transfer operations; Sections 5706.5.2 and 5706.5.2.1 shall apply to bulk transfer operations; Sections 5706.5.3 through 5706.5.3.3 shall apply to process transfer operations and Sections 5706.5.4 through 5706.5.4.5 shall apply to dispensing from tank vehicles and tank cars.~~The provisions of this section apply to bulk transfer and process transfer as follows:

1. Sections 5707.5.1.1 through 5707.5.1.18 apply to bulk transfer and process transfer.
2. Sections 5707.5.2 through 5707.5.2.1 apply to bulk transfer.

3. <u>Sections 5707.5.3 through 5707.5.3.3 apply to process transfer.</u>

<u>See Section 5708.7 for dispensing from tank vehicles and tank cars into motor vehicles.</u>

~~5706.5.1.1~~ <u>5707.5.1.1</u> Location. Bulk transfer and process transfer operations shall be conducted in *approved* locations. Tank cars shall be unloaded only on private sidings or railroad-siding facilities equipped for transferring *flammable* or *combustible liquids*. Tank vehicles and tank cars engaged in bulk transfer or process transfer operations shall be separated from buildings, above-ground tanks, combustible materials, *lot lines*, public streets, public alleys or *public ways* by a distance of 25 feet (7620 mm) for Class I liquids and 15 feet (4572 mm) for Class II and IIIA liquids measured from the nearest loading or unloading valve on the tank vehicle or tank car.

Exception: Buildings for pumps and shelters for personnel supporting transfer operations shall not be required to be separated from tank vehicles and tank cars engaged in bulk transfer or process transfer operations.

~~5706.5.1.2~~ <u>5707.5.1.2</u> Weather protection canopies.
Where weather protection canopies are provided, they shall be constructed in accordance with Section 5004.13. Weather protection canopies shall not be located within 15 feet (4572 mm) of a building or combustible material or within 25 feet (7620 mm) of building openings, *lot lines*, public streets, public alleys or *public ways*.

~~5706.5.1.3~~ <u>5707.5.1.3</u> Ventilation.
Ventilation shall be provided to prevent accumulation of vapors in accordance with Section ~~5705.3.7.5.1~~<u>5706.4.2.1</u>.

~~5706.5.1.4~~ <u>5707.5.1.4</u> Sources of ignition.
Sources of ignition shall be controlled or eliminated in accordance with Section 5003.7.

~~5706.5.1.5~~ <u>5707.5.1.5</u> Spill control and secondary containment.
Areas where transfer operations are located shall be provided with spill control and secondary containment in accordance with Section ~~5703.4~~<u>5004.2</u>. The spill control and secondary containment system shall have a design capacity capable of containing the capacity of the largest tank compartment located in the area where transfer operations are conducted. Containment of the rainfall volume specified in Section 5004.2.2.6 is not required.

~~5706.5.1.6~~ <u>5707.5.1.6</u> Fire protection.
Fire protection shall be in accordance with Section 5703.2.

~~5706.5.1.7~~ <u>5707.5.1.7</u> Static protection. Static protection shall be provided to prevent the accumulation of static charges during transfer operations. Bonding facilities shall be provided during the transfer through open domes where Class I liquids are transferred, or where Class II and III liquids are transferred into tank vehicles or tank cars that could contain vapors from previous cargoes of Class I liquids. Protection shall consist of a metallic bond wire permanently electrically connected to the fill stem. The fill pipe assembly shall form a continuous electrically conductive path downstream from the point of bonding. The free end of such bond wire shall be provided with a clamp or equivalent device for convenient attachment to a metallic part in electrical contact with the cargo tank of the tank vehicle or tank car. For tank vehicles, protection shall consist of a flexible bond wire of adequate strength for the intended service and the electrical resistance shall not exceed 1 megohm. For tank cars, bonding shall be provided where the resistance of a tank car to ground through the rails is 25 ohms or greater.

Such bonding connection shall be fastened to the vehicle, car or tank before dome covers are raised and shall remain in place until filling is complete and all dome covers have been closed and secured.

Exceptions:

1. Where vehicles and cars are loaded exclusively with products not having a static-accumulating tendency, such as asphalt, cutback asphalt, most crude oils, residual oils and water-miscible liquids.
2. Where Class I liquids are not handled at the transfer facility and the tank vehicles are used exclusively for Class II and III liquids.
3. Where vehicles and cars are loaded or unloaded through closed top or bottom connections whether the hose is conductive or nonconductive.

Filling through open domes into the tanks of tank vehicles or tank cars that contain vapor-air mixtures within the flammable range, or where the liquid being filled can form such a mixture, shall be by means of a downspout that extends to near the bottom of the tank.

~~5706.5.1.8~~ 5707.5.1.8 Stray current protection. Tank car loading facilities where Class I, II or IIIA liquids are transferred through open domes shall be protected against stray currents by permanently bonding the pipe to not less than one rail and to the transfer apparatus. Multiple pipes entering the transfer areas shall be permanently electrically bonded together. In areas where excessive stray currents are known to exist, all pipes entering the transfer area shall be provided with insulating sections to isolate electrically the transfer apparatus from the pipelines.

~~5706.5.1.9~~ 5707.5.1.9 Top loading.
When top loading a tank vehicle with Class I and II liquids without vapor control, valves used for the final control of flow shall be of the self-closing type and shall be manually held open except where automatic means are provided for shutting off the flow when the tank is full. Where used, automatic shutoff systems shall be provided with a manual shutoff valve located at a safe distance from the loading nozzle to stop the flow if the automatic system fails.
When top loading a tank vehicle with vapor control, flow control shall be in accordance with Section ~~5706.5.1.10~~5707.5.1.10. Self-closing valves shall not be tied or locked in the open position.

~~5706.5.1.10~~ 5707.5.1.10 Bottom loading. When bottom loading a tank vehicle or tank car with or without vapor control, a positive means shall be provided for loading a predetermined quantity of liquid, together with an automatic secondary shutoff control to prevent overfill. The connecting components between the transfer equipment and the tank vehicle or tank car required to operate the secondary control shall be functionally compatible.

~~5706.5.1.10.1~~ 5707.5.1.10.1 Dry disconnect coupling. When bottom loading a tank vehicle, the coupling between the liquid loading hose or pipe and the truck piping shall be a dry disconnect coupling.

~~5706.5.1.10.2~~ 5707.5.1.10.2 Venting. When bottom loading a tank vehicle or tank car that is equipped for vapor control and vapor control is not used, the tank shall be vented to the atmosphere to prevent pressurization of the tank. Such venting shall be at a height equal to or greater than the top of the cargo tank.

~~5706.5.1.10.3~~ 5707.5.1.10.3 Vapor-tight connection. Connections to the plant vapor control system shall be designed to prevent the escape of vapor to the atmosphere when not connected to a tank vehicle or tank car.

~~5706.5.1.10.4~~ 5707.5.1.10.4 Vapor-processing equipment. Vapor-processing equipment shall be separated from above-ground tanks, warehouses, other plant buildings, transfer facilities or nearest *lot line* of adjoining property that can be built on by a distance of not less than 25 feet (7620 mm). Vapor-processing equipment shall be protected from physical damage by remote location, guard rails, curbs or fencing.

~~5706.5.1.11~~ 5707.5.1.11 Switch loading. Tank vehicles or tank cars that have previously contained Class I liquids shall not be loaded with Class II or III liquids until such vehicles and all piping, pumps, hoses and meters connected thereto have been completely drained and flushed.

~~5706.5.1.12~~ 5707.5.1.12 Loading racks.
Where provided, loading racks, *stairways* or platforms shall be constructed of noncombustible materials. Buildings for pumps or for shelter of loading personnel are allowed to be part of the loading rack. Wiring and electrical equipment located within 25 feet (7620 mm) of any portion of the loading rack shall be in accordance with Section 5703.1.1.

~~5706.5.1.13~~ 5707.5.1.13 Transfer apparatus. Bulk and process transfer apparatus shall be of an *approved* type.

~~5706.5.1.14~~ 5707.5.1.14 Inside buildings. Tank vehicles and tank cars shall not be located inside a building while transferring Class I, II or IIIA liquids, unless *approved* by the *fire code official*.

> **Exception:** Tank vehicles are allowed under weather protection canopies and canopies of automobile motor vehicle fuel-dispensing stations.

~~5706.5.1.15~~ 5707.5.1.15 Tank vehicle and tank car certification.
Certification shall be maintained for tank vehicles and tank cars in accordance with DOTn 49 CFR Parts 100–185.

~~5706.5.1.16~~ 5707.5.1.16 Tank vehicle and tank car stability.
Tank vehicles and tank cars shall be stabilized against movement during loading and unloading in accordance with Sections ~~5706.5.1.16.1~~5707.5.1.16.1 through ~~5706.5.1.16.3~~5707.5.1.16.3.

~~5706.5.1.16.1~~ 5707.5.1.16.1 Tank vehicles. When the vehicle is parked for loading or unloading, the cargo trailer portion of the tank vehicle shall be secured in a manner that will prevent unintentional movement.

~~5706.5.1.16.2~~ 5707.5.1.16.2 Chock blocks. Not less than two chock blocks not less than 5 inches by 5 inches by 12 inches (127 mm by 127 mm by 305 mm) in size and dished to fit the contour of the tires shall be used during transfer operations of tank vehicles.

~~5706.5.1.16.3~~ 5707.5.1.16.3 Tank cars. Brakes shall be set and the wheels shall be blocked to prevent rolling.

~~5706.5.1.17~~ 5707.5.1.17 Monitoring. Transfer operations shall be monitored by an *approved* monitoring system or by an attendant. Where monitoring is by an attendant, the operator or other competent person shall be present at all times.

~~5706.5.1.18~~ 5707.5.1.18 Security.
Transfer operations shall be surrounded by a noncombustible fence not less than 5 feet (1524 mm) in height. Tank vehicles and tank cars shall not be loaded or unloaded unless such vehicles are entirely within the fenced area.

Exceptions:

1. Motor fuel-dispensing facilities complying with Chapter 23.
2. Installations where adequate public safety exists because of isolation, natural barriers or other factors as determined appropriate by the *fire code official*.
3. Facilities or properties that are entirely enclosed or protected from entry.

~~5706.5.2~~ 5707.5.2 Bulk transfer.
Bulk transfer shall be in accordance with Sections ~~5706.5.1~~5707.5.1 and ~~5706.5.2.1~~5707.5.2.1.

~~5706.5.2.1~~ 5707.5.2.1 Vehicle motor. Motors of tank vehicles or tank cars shall be shut off during the making and breaking of hose connections and during the unloading operation.

Exception: Where unloading is performed with a pump deriving its power from the tank vehicle motor.

~~5706.5.3~~ 5707.5.3 Process transfer.
Process transfer shall be in accordance with Section ~~5706.5.1~~5707.5.1 and Sections ~~5706.5.3.1~~5707.5.3 through ~~5706.5.3.3~~5707.5.3.3.

~~5706.5.3.1~~ 5707.5.3.1 Piping, valves, hoses and fittings.
Piping, valves, hoses and fittings that are not a part of the tank vehicle or tank car shall be in accordance with Section ~~5703.6~~5703.5. Caps or plugs that prevent leakage or spillage shall be provided at all points of connection to transfer piping.

~~5706.5.3.1.1~~ 5707.5.3.1.1 Shutoff valves. *Approved* automatically or manually activated shutoff valves shall be provided where the transfer hose connects to the process piping, and on both sides of any exterior *fire-resistance-rated* wall through which the piping passes. Manual shutoff valves shall be arranged so that they are able to be accessed from grade. Valves shall not be locked in the open position.

~~5706.5.3.1.2~~ 5707.5.3.1.2 Hydrostatic relief. Hydrostatic pressure-limiting or relief devices shall be provided where pressure buildup in trapped sections of the system could exceed the design pressure of the components of the system.
Devices shall relieve to other portions of the system or to another *approved* location.

~~5706.5.3.1.3~~ **5707.5.3.1.3 Antisiphon valves.** Antisiphon valves shall be provided where the system design would allow siphonage.

~~5706.5.3.2~~ **5707.5.3.2 Vents.** Normal and emergency vents shall be maintained operable at all times.

~~5706.5.3.3~~ **5707.5.3.3 Motive power.** Motors of tank vehicles or tank cars shall be shut off during the making and breaking of hose connections and during the unloading operation.

Exception: When unloading is performed with a pump deriving its power from the tank vehicle motor.

~~5706.6~~ **5707.6 Tank vehicles and vehicle operation.**
Tank vehicles shall be designed, constructed, equipped and maintained in accordance with NFPA 385 and Sections ~~5706.6.1~~5707.6.1 through ~~5706.6.4~~5707.6.4.

~~5706.6.1~~ **5707.6.1 Operation of tank vehicles.**
Tank vehicles shall be utilized and operated in accordance with NFPA 385 and Sections ~~5706.6.1.1~~5707.6.1.1 through ~~5706.6.1.11~~ 5707.6.1.11.

~~5706.6.1.1~~ **5707.6.1.1 Vehicle maintenance.** Tank vehicles shall not be operated unless they are in proper state of repair and free from accumulation of grease, oil or other flammable substance, and leaks.

~~5706.6.1.2~~ **5707.6.1.2 Leaving vehicle unattended.** The driver, operator or attendant of a tank vehicle shall not remain in the vehicle cab and shall not leave the vehicle while it is being filled or discharged. The delivery hose, when attached to a tank vehicle, shall be considered to be a part of the tank vehicle.

~~5706.6.1.3~~ **5707.6.1.3 Vehicle motor shutdown.** Motors of tank vehicles or tractors shall be shut down during the making or breaking of hose connections. If loading or unloading is performed without the use of a power pump, the tank vehicle or tractor motor shall be shut down throughout such operations.

~~5706.6.1.4~~ **5707.6.1.4 Outage.** A cargo tank or compartment thereof used for the transportation of *flammable* or *combustible liquids* shall not be loaded to absolute capacity. The vacant space in a cargo tank or compartment thereof used in the transportation of *flammable* or *combustible liquids* shall be not less than 1 percent. Sufficient space shall be left vacant to prevent leakage from or distortion of such tank or compartment by expansion of the contents caused by rise in temperature in transit.

~~5706.6.1.5~~ **5707.6.1.5 Overfill protection.** The driver, operator or attendant of a tank vehicle shall, before making delivery to a tank, determine the unfilled capacity of such tank by a suitable gauging device. To prevent overfilling, the driver, operator or attendant shall not deliver in excess of that amount.

~~5706.6.1.6~~ **5707.6.1.6 Securing hatches.** During loading, hatch covers shall be secured on all but the receiving compartment.

~~5706.6.1.7~~ **5707.6.1.7 Liquid temperature.** Materials shall not be loaded into or transported in a tank vehicle at a temperature above the material's ignition temperature unless safeguarded in an *approved* manner.

~~5706.6.1.8~~ **5707.6.1.8 Bonding to underground tanks.** An external bond-wire connection or bond-wire integral with a hose shall be provided for the transferring of *flammable liquids* through open connections into underground tanks.

~~5706.6.1.9~~ **5707.6.1.9 Smoking.** Smoking by tank vehicle drivers, helpers or other personnel is prohibited while they are driving, making deliveries, filling or making repairs to tank vehicles.

~~5706.6.1.10~~ **5707.6.1.10 Hose connections.** Delivery of *flammable liquids* to underground tanks with a capacity of more than 1,000 gallons (3785 L) shall be made by means of *approved* liquid and vapor-tight connections between the delivery hose and tank fill pipe. Where underground tanks are equipped with any type of vapor recovery system, all connections required to be made for the safe and proper functioning of the particular vapor recovery process shall be made. Such connections shall be made liquid and vapor tight and remain connected throughout the unloading process. Vapors shall not be discharged at grade level during delivery.

~~**5706.6.1.10.1**~~ **5707.6.1.10.1 Simultaneous delivery.** Simultaneous delivery to underground tanks of any capacity from two or more discharge hoses shall be made by means of mechanically tight connections between the hose and fill pipe.

~~**5706.6.1.11**~~ **5707.6.1.11 Hose protection.** Upon arrival at a point of delivery and prior to discharging any *flammable* or *combustible liquids* into underground tanks, the driver, operator or attendant of the tank vehicle shall ensure that all hoses utilized for liquid delivery and vapor recovery, where required, will be protected from physical damage by motor vehicles. Such protection shall be provided by positioning the tank vehicle to prevent motor vehicles from passing through the area or areas occupied by hoses, or by other *approved* equivalent means.

~~**5706.6.2**~~ **5707.6.2 Parking.**

Parking of tank vehicles shall be in accordance with Sections ~~5706.6.2.1~~5707.6.2.1 through ~~5706.6.2.3~~5707.6.2.3.

Exception: In cases of accident, breakdown or other emergencies, tank vehicles are allowed to be parked and left unattended at any location while the operator is obtaining assistance.

~~**5706.6.2.1**~~ **5707.6.2.1 Parking near residential, educational and institutional occupancies and other high-risk areas.** Tank vehicles shall not be left unattended at any time on residential streets, or within 500 feet (152 m) of a residential area, apartment or hotel complex, educational facility, hospital or care facility. Tank vehicles shall not be left unattended at any other place that would, in the opinion of the *fire chief*, pose an extreme life hazard.

~~**5706.6.2.2**~~ **5707.6.2.2 Parking on thoroughfares.**

Tank vehicles shall not be left unattended on a public street, highway, public avenue or public alley.

Exceptions:

1. The necessary absence in connection with loading or unloading the vehicle. During actual fuel transfer, Section ~~5706.6.1.2~~ 5707.6.1.2 shall apply. The vehicle location shall be in accordance with Section ~~5706.6.2.1~~5707.6.2.1.
2. Stops for meals during the day or night, where the street is well lighted at the point of parking. The vehicle location shall be in accordance with Section ~~5706.6.2.1~~5707.6.2.1.

~~**5706.6.2.3**~~ **5707.6.2.3 Duration exceeding 1 hour.** Tank vehicles parked at one point for longer than 1 hour shall be located off of public streets, highways, public avenues or alleys, and in accordance with either of the following:

1. Inside of a bulk plant and either 25 feet (7620 mm) or more from the nearest *lot line* or within a building *approved* for such use.
2. At other *approved* locations not less than 50 feet (15 240 mm) from the buildings other than those *approved* for the storage or servicing of such vehicles.

~~**5706.6.3**~~ **5707.6.3 Garaging.** Tank vehicles shall not be parked or garaged in buildings other than those specifically *approved* for such use by the *fire code official*.

~~**5706.6.4**~~ **5707.6.4 Portable fire extinguisher.** Tank vehicles shall be equipped with a portable fire extinguisher complying with Section 906 and having a minimum rating of 2-A:20-B:C.

During unloading of the tank vehicle, the portable fire extinguisher shall be out of the carrying device on the vehicle and shall be 15 feet (4572 mm) or more from the unloading valves.

~~**5706.7**~~ **5707.7 Refineries.**

Plants and portions of plants in which *flammable liquids* are produced on a scale from crude petroleum, natural gasoline or other hydrocarbon sources shall be in accordance with Sections ~~5706.7.1~~5707.7.1 through ~~5706.7.3~~5707.7.3. Petroleum-processing plants and facilities or portions of plants or facilities in which *flammable* or *combustible liquids* are handled, treated or produced on a commercial scale from crude petroleum, natural gasoline, or other hydrocarbon sources shall also be in accordance with API 651, API 653, API 752, API 1615, API 2001, API 2003, API 2009, API 2015, API 2023, API 2201 and API 2350.

~~**5706.7.1**~~ **5707.7.1 Corrosion protection.**

Above-ground tanks and piping systems shall be protected against corrosion in accordance with API 651.

~~5706.7.2~~ 5707.7.2 Cleaning of tanks.
The safe entry and cleaning of petroleum storage tanks shall be conducted in accordance with API 2015.

~~5706.7.3~~ 5707.7.3 Storage of heated petroleum products.
Where petroleum-derived asphalts and residues are stored in heated tanks at refineries and bulk storage facilities or in tank vehicles, such products shall be in accordance with API 2023.

~~5706.8~~ 5707.8 Vapor recovery and vapor-processing systems.
Vapor-processing systems in which the vapor source operates at pressures from vacuum, up to and including 1 psig (6.9 kPa) or in which a potential exists for vapor mixtures in the flammable range, shall comply with Sections ~~5706.8.1~~5707.8.1 through ~~5706.8.5~~5707.8.5.

Exceptions:

1. Marine systems complying with federal transportation waterway regulations such as DOTn 33 CFR Parts 154 through 156, and CGR 46 CFR Parts 30, 32, 35 and 39.
2. Motor fuel-dispensing facility systems complying with Chapter 23.

~~5706.8.1~~ 5707.8.1 Over-pressure/vacuum protection.
Tanks and equipment shall have independent venting for over-pressure or vacuum conditions that might occur from malfunction of the vapor recovery or processing system.

Exception: For tanks, venting shall comply with Section ~~5704.2.7.3~~5705.2.1.3.

~~5706.8.2~~ 5707.8.2 Vent location. Vents on vapor-processing equipment shall be not less than 12 feet (3658 mm) from adjacent ground level, with outlets located and directed so that flammable vapors will disperse to below the lower flammable limit (LFL) before reaching locations containing potential ignition sources.

~~5706.8.3~~ 5707.8.3 Vapor collection systems and overfill protection.
The design and operation of the vapor collection system and overfill protection shall be in accordance with this section and Section 19.5 of NFPA 30.

~~5706.8.4~~ 5707.8.4 Liquid-level monitoring. A liquid knock-out vessel used in the vapor collection system shall have means to verify the liquid level and a high-liquid-level sensor that activates an alarm. For unpopulated facilities, the high-liquid-level sensor shall initiate the shutdown of liquid transfer into the vessel and shutdown of vapor recovery or vapor-processing systems.

~~5706.8.5~~ 5707.8.5 Overfill protection.
Storage tanks served by vapor recovery or processing systems shall be equipped with overfill protection in accordance with Section ~~5704.2.7.5.8~~5705.2.1.5.8.

SECTION ~~5707~~ 5708
~~ON-DEMAND~~ MOBILE FUELING OPERATIONS

Add new text as follows:

5708.1 General. Mobile fueling operations dispensing Class I, II or III liquids into the fuel tanks of motor vehicles shall comply with this section.
Exception: Transfer of liquid from tank vehicles to motor vehicles for private use on farms and rural areas and at construction sites, earth-moving projects, gravel pits and borrow pits is allowed when in accordance with Section 5707.2.8.

Revise as follows:

~~5707.1~~ 5708.2 ~~General~~ On-demand mobile fueling.

On-demand *mobile fueling* operations that dispense Class I, II and III liquids into the fuel tanks of motor vehicles shall comply with Sections ~~5707.1~~ 5708.2.1 through ~~5707.6.6~~ 5708.2.7.6.

Exception: Fueling from an approved portable container in cases of an emergency or for personal use.

~~5707.1.1~~ 5708.2.1 Approval required.

Mobile fueling operations shall not be conducted without first obtaining an operational permit in accordance with Section 105.5.18.

~~5707.1.2~~ 5708.2.2 Location.

Mobile fueling operations shall occur only at *approved* locations. The *fire code official* is authorized to approve individual locations or geographic areas where *mobile fueling* is allowed.

~~5707.2~~ 5708.2.3 Mobile fueling vehicle.

An on-demand *mobile fueling* vehicle shall be that which is utilized in on-demand fueling operations for the dispensing of Class I, II or III liquids into the fuel tanks of motor vehicles.

~~5707.2.1~~ 5708.2.3.1 Mobile fueling vehicle classifications.

An on-demand *mobile fueling* vehicle shall be characterized as one of the following:

1. **Tier 1 *mobile fueling* vehicle.** A tank vehicle that complies with NFPA 385 and that has chassis-mounted tanks where the aggregate capacity does not exceed 1,600 gallons (6057 L).
2. **Tier 2 *mobile fueling* vehicle.** A vehicle with one or more chassis-mounted tanks or containers that do not exceed 110 gallons (416 L) in capacity with an aggregate capacity that does not exceed 800 gallons (3028 L) or the weight capacity of the vehicle in accordance with DOTn.
3. **Tier 3 *mobile fueling* vehicle.** A vehicle that carries a maximum aggregate capacity of 60 gallons (227 L) of motor fuel in metal safety cans *listed* in accordance with UL 30 or other *approved* metal containers, each not to exceed 5 gallons (19 L) in capacity.

~~5707.2.2~~ 5708.2.3.2 Mobile fueling vehicle requirements.

Each *mobile fueling* vehicle shall comply with all local, state and federal requirements, as well as the following:

1. *Mobile fueling* vehicles with a chassis-mounted tank in excess of 110 gallons (416 L) shall also comply with the requirements of Section ~~5706.6~~5707.6 and NFPA 385.
2. The *mobile fueling* vehicle and its equipment shall be maintained in good repair.
3. Safety cans and *approved* metal containers shall be secured to the *mobile fueling* vehicle except when in use.
4. Fueling a motor vehicle from tanks or containers mounted in a trailer connected to a *mobile fueling* vehicle shall be prohibited.

~~5707.3~~ 5708.2.4 Required documents.

Documents developed to comply with Sections ~~5707.3.1~~5708.2.4.1 through ~~5707.3.3~~5708.2.4.3 shall be updated as necessary by the *owner* of the *mobile fueling* operation and shall be maintained in compliance with Section 110.3.

~~5707.3.1~~ 5708.2.4.1 Safety and emergency response plan. *Mobile fueling* operators shall have an *approved* written safety and emergency response plan that establishes policies and procedures for fire safety, spill prevention and control, personnel training and compliance with other applicable requirements of this code.

~~5707.3.2~~ 5708.2.4.2 Training records. *Mobile fueling* vehicles shall be operated only by designated personnel who are trained on proper fueling procedures and the safety and emergency response plan. Training records of operators shall be maintained.

~~5707.3.3~~ 5708.2.4.3 Site plan.

Where required by the *fire code official*, a site plan shall be developed for each location or area at which *mobile fueling* occurs. The site plan shall be in sufficient detail to indicate the following:

1. All buildings and structures.

2. *Lot lines* or property lines.
3. Electric car chargers.
4. Solar photovoltaic parking lot canopies.
5. Appurtenances on-site and their use or function.
6. All uses adjacent to the *lot lines* of the site.
7. Fueling locations.
8. Locations of all storm drain openings and adjacent waterways or wetlands.
9. Information regarding slope, natural drainage, curbing and impounding.
10. How a spill will be kept on the site property.
11. Scale of the site plan.

~~5707.4~~ 5708.2.5 Mobile fueling areas. During fueling, the *mobile fueling* vehicle and point of connection to the vehicle shall not be located on public streets, *public ways* or inside *buildings*. Fueling on the roof level of parking structures or other *buildings* is prohibited.

~~5707.4.1~~ 5708.2.5.1 Separation.
During fueling, the point of connection to the vehicle being fueled shall not take place within 25 feet (7620 mm) of buildings, *lot lines*, property lines or combustible storage. *Mobile fueling* vehicles shall not park within 10 feet (3048 mm) of buildings, *lot lines*, property lines or combustible storage.

Exceptions:

1. The *fire code official* shall be authorized to decrease the separation distance for dispensing from metal safety cans or other *approved* metal containers in accordance with Section ~~5707.2~~5708.2.3.1.
2. The point of fueling shall not take place within 10 feet (3048 mm) of buildings, *lot lines*, property lines or combustible storage where the *mobile fueling* vehicle has an *approved* vapor recovery system or is servicing vehicles with onboard refueling vapor recovery.

Where dispensing operations occur within 15 feet (4572 mm) of a storm drain, an *approved* storm drain cover or an *approved* equivalent method that will prevent any fuel from reaching the drain shall be used.

~~5707.4.2~~ 5708.2.5.2 Sources of ignition. Smoking, open flames and other sources of ignition shall be prohibited within 25 feet (7620 mm) of fuel dispensing activities. Signs prohibiting smoking or open flames within 25 feet (7620 mm) of the vehicle or the point of fueling shall be prominently posted on the *mobile fueling* vehicle. The engines of vehicles being fueled shall be shut off during fueling.

~~5707.4.3~~ 5708.2.5.3 Electrical equipment.
Mobile fueling shall not occur within 20 feet (6096 mm) of electrical equipment located within 18 inches (457 mm) of the ground unless such electrical equipment is rated for Class I, Division 2, hazardous locations in accordance with NFPA 70.

~~5707.5~~ 5708.2.6 Equipment.
Mobile fueling equipment shall comply with Sections ~~5707.5.1~~5708.2.6.1 through ~~5707.5.5~~5708.2.6.5.

~~5707.5.1~~ 5708.2.6.1 Dispensing hoses and nozzles. Where equipped, the dispensing hose shall not exceed 50 feet (15 240 mm) in length. The dispensing nozzles and hoses shall be of an *approved* and *listed* type. Where metal-to-metal contact cannot be made between the nozzle and the fuel fill opening, a means for bonding the *mobile fueling* vehicle to the motor vehicle shall be provided and employed during fueling operations.

~~5707.5.2~~ 5708.2.6.2 Breakaway device.
A *listed* breakaway device shall be provided at the nozzle.

Exception: *Mobile fueling* vehicles equipped with an *approved* brake interlock tied to the nozzle holder that prohibits movement of the *mobile fueling* vehicle when the nozzle is removed from its holder or tied to the delivery of fuel that prevents activation of the pumping system.

~~5707.5.3~~ 5708.2.6.3 **Shutoff valve and fuel limit.** *Mobile fueling* vehicles shall be equipped with a *listed* shutoff valve assembly and a fuel limit switch set to a maximum of 30 gallons (116 L).

~~5707.5.4~~ 5708.2.6.4 **Fire extinguisher.**
An *approved* portable fire extinguisher complying with Section 906 with a minimum rating of4-A:80-B:C shall be provided on the *mobile fueling* vehicle with signage clearly indicating its location.

~~5707.5.5~~ 5708.2.6.5 **Spill kit.** *Mobile fueling* vehicles shall contain a minimum 5-gallon (19 L) spill kit of an *approved* type.

~~5707.6~~ 5708.2.7 **Operations.** *Mobile fueling* vehicles shall be constantly attended during fueling operations with brakes set and warning lights in operation. *Mobile fueling* vehicles shall not obstruct emergency vehicle access roads.

~~5707.6.1~~ 5708.2.7.1 **Dispensing hose.** Where equipped, *mobile fueling* vehicles shall be positioned in a manner to preclude traffic from driving over the dispensing hose. The dispensing hose shall be properly placed on an *approved* reel or in an *approved* compartment prior to moving the *mobile fueling* vehicle.

~~5707.6.2~~ 5708.2.7.2 **Drip control.** Operators shall place a drip pan or an absorbent pillow under the nozzle and each fuel fill opening prior to and during dispensing operations to catch drips.

~~5707.6.3~~ 5708.2.7.3 **Safety cones.** Safety cones or other visual barriers shall be employed as warning devices to highlight the vehicle fueling area.

~~5707.6.4~~ 5708.2.7.4 **Vehicle lights.** The *mobile fueling* vehicle flasher lights shall be in operation while dispensing operations are in progress.

~~5707.6.5~~ 5708.2.7.5 **Nighttime deliveries.** Nighttime deliveries shall be made only in areas deemed adequately lighted by the *fire code official.*

~~5707.6.6~~ 5708.2.7.6 **Spill reporting.**
Spills shall be reported in accordance with Section 5003.3.1.

~~5706.5.4~~ 5708.3 **Dispensing from tank vehicles and tank cars.**
Dispensing from tank cars into the fuel tanks of motor vehicles shall be prohibited. Dispensing from tank vehicles into the fuel tanks of motor vehicles shall be prohibited unless allowed by and conducted in accordance with Sections ~~5706.5.4.1~~5708.3.1 through ~~5706.5.4.5~~ 5708.3.4 or where permitted and approved in accordance with Sections 5708.2.1 through 5708.2.7.6..

~~5706.5.4.1~~ 5708.3.1 **Marine craft and special equipment.** Liquids intended for use as motor fuels are allowed to be transferred from tank vehicles into the fuel tanks of marine craft and special equipment where *approved* by the *fire code official*, and where:

1. The tank vehicle's specific function is that of supplying fuel to fuel tanks.
2. The operation is not performed where the public has access or where there is unusual exposure to life and property.
3. The dispensing line does not exceed 50 feet (15 240 mm) in length.
4. The dispensing nozzle is *approved*.
5. The operation shall be in accordance with Sections 2310.4.1 and 2310.4.2.

~~5706.5.4.2~~ 5708.3.2 **Emergency refueling.**
Where *approved* by the *fire code official*, dispensing of motor vehicle fuel from tank vehicles into the fuel tanks of motor vehicles is allowed during emergencies. Dispensing from tank vehicles shall be in accordance with Sections ~~5706.2.8~~5708.7.2.8 and 5706.6.

~~5706.5.4.3~~ 5708.3.3 Aircraft fueling.
Transfer of liquids from tank vehicles to the fuel tanks of aircraft shall be in accordance with Chapter 20.

~~5706.5.4.4 Fueling of vehicles at farms, construction sites and similar areas.~~
~~Transfer of liquid from tank vehicles to motor vehicles for private use on farms and rural areas and at construction sites, earth-moving projects, gravel pits and borrow pits is allowed in accordance with Section 5706.2.8.~~

~~5706.5.4.5~~ 5708.3.4 Commercial, industrial, governmental or manufacturing.
Dispensing of Class I, II and III motor vehicle fuel from tank vehicles into the fuel tanks of motor vehicles located at commercial, industrial, governmental or manufacturing establishments is allowed where *approved*, provided that such dispensing operations are conducted in accordance with the following:

1. Dispensing shall occur only at sites that have been issued a permit to conduct *mobile fueling*.
2. The *owner* of a *mobile fueling* operation shall provide to the jurisdiction a written response plan that demonstrates readiness to respond to a fuel spill and carry out appropriate mitigation measures, and describes the process to dispose properly of contaminated materials.
3. A detailed site plan shall be submitted with each application for a permit. The site plan shall indicate: all buildings, structures and appurtenances on site and their use or function; all uses adjacent to the *lot lines* of the site; the locations of all storm drain openings, adjacent waterways or wetlands; information regarding slope, natural drainage, curbing, impounding and how a spill will be retained on the site property; and the scale of the site plan.
   Provisions shall be made to prevent liquids spilled during dispensing operations from flowing into buildings or off-site. Acceptable methods include, but shall not be limited to, grading driveways, raising doorsills or other *approved* means.
4. The *fire code official* is allowed to impose limits on the times and days during which *mobile fueling* operations is allowed to take place, and specific locations on a site where fueling is permitted.
5. *Mobile fueling* operations shall be conducted in areas not open to the public or shall be limited to times when the public is not present.
6. *Mobile fueling* shall not take place within 15 feet (4572 mm) of buildings, property lines, combustible storage or storm drains.
   Exceptions:
   1. The distance to storm drains shall not apply where an *approved* storm drain cover or an *approved* equivalent that will prevent any fuel from reaching the drain is in place prior to fueling or a fueling hose being placed within 15 feet (4572 mm) of the drain. Where placement of a storm drain cover will cause the accumulation of excessive water or difficulty in conducting the fueling, such cover shall not be used and the fueling shall not take place within 15 feet (4572 mm) of a drain.
   2. The distance to storm drains shall not apply for drains that direct influent to *approved* oil interceptors.
7. The tank vehicle shall comply with the requirements of NFPA 385 and local, state and federal requirements. The tank vehicle’s specific functions shall include that of supplying fuel to motor vehicle fuel tanks. The vehicle and all its equipment shall be maintained in good repair.
8. Signs prohibiting smoking or open flames within 25 feet (7620 mm) of the tank vehicle or the point of fueling shall be prominently posted on three sides of the vehicle including the back and both sides.
9. A portable fire extinguisher with a minimum rating of 40:BC shall be provided on the vehicle with signage clearly indicating its location.
10. The dispensing nozzles and hoses shall be of an *approved* and *listed* type.
11. The dispensing hose shall not be extended from the reel more than 100 feet (30 480 mm) in length.
12. Absorbent materials, nonwater-absorbent pads, a 10-foot-long (3048 mm) containment boom, an *approved* container with lid and a nonmetallic shovel shall be provided to mitigate a minimum 5-gallon (19 L) fuel spill.

13. Tank vehicles shall be equipped with a “fuel limit” switch such as a count-back switch, to limit the amount of a single fueling operation to not more than 500 gallons (1893 L) before resetting the limit switch.

    Exception: Tank vehicles where the operator carries and can utilize a remote emergency shutoff device that, when activated, immediately causes flow of fuel from the tank vehicle to cease.

14. Persons responsible for dispensing operations shall be trained in the appropriate mitigating actions in the event of a fire, leak or spill. Training records shall be maintained by the dispensing company.
15. Operators of tank vehicles used for *mobile fueling* operations shall have in their possession at all times an emergency communications device to notify the proper authorities in the event of an emergency.
16. The tank vehicle dispensing equipment shall be constantly attended and operated only by designated personnel who are trained to handle and dispense motor fuels.
17. Fuel dispensing shall be prohibited within 25 feet (7620 mm) of any source of ignition.
18. The engines of vehicles being fueled shall be shut off during dispensing operations.
19. Nighttime fueling operations shall only take place in adequately lighted areas.
20. The tank vehicle shall be positioned with respect to vehicles being fueled to prevent traffic from driving over the delivery hose.
21. During fueling operations, tank vehicle brakes shall be set, chock blocks shall be in place and warning lights shall be in operation.
22. Motor vehicle fuel tanks shall not be topped off.
23. The dispensing hose shall be properly placed on an *approved* reel or in an *approved* compartment prior to moving the tank vehicle.
24. The *fire code official* and other appropriate authorities shall be notified when a reportable spill or unauthorized discharge occurs.
25. Operators shall place a drip pan or an absorbent pillow under each fuel fill opening prior to and during dispensing operations. Drip pans shall be liquid-tight. The pan or absorbent pillow shall have a capacity of not less than 3 gallons (11.36 L). Spills retained in the drip pan or absorbent pillow need not be reported. Operators, when fueling, shall have on their person an absorbent pad capable of capturing diesel fuel overfills. Except during fueling, the nozzle shall face upward and an absorbent pad shall be kept under the nozzle to catch drips. Contaminated absorbent pads or pillows shall be disposed of regularly in accordance with local, state and federal requirements.

Reason: This proposal is a comprehensive reorganization of Chapter 57. The goals are to make the chapter easier to navigate, improve clarity for the user, and correlate the requirements with the provisions in Chapter 50. There are no changes in requirements or application. All of these revisions are entirely editorial and the majority of the changes are simply renumbering the sections to fit the reorganization of the chapter

The chapter is reorganized into the following main sections:

- 5701 General (only 5701.3 is shown in the proposal because there are no revisions to the remaining sections)
- 5702 Definitions (this section is not shown in the proposal because there are no revisions)
- 5703 General Requirements
- 5704 Storage in Containers and Portable Tanks
- 5705 Storage in Stationary Tanks (new section, requirements previously found in 5704)
- 5706 Dispensing, Use, Mixing and Handling (previously 5705)
- 5707 Special Operations (previously 5706)
- 5708 Mobile Fueling Operations (previously 5707)

Reformatting the chapter into these main sections achieves the following results:

- Storage is separated into "Containers and Portable Tanks" or "Stationary Tanks" to assist in clarifying the different requirements for each configuration (5704 and 5705)
- Tank design, fabrication and construction provisions now reside in a separate section (5705.2)

- Sections dealing with quantities above or below the MAQ are grouped
  - Indoor storage below MAQs and Indoor storage above MAQs have been separated (5704.2 and 5704.3). This provides clarity and correlates with the format in Chapter 50.
  - Indoor use/handling in quantities above or below MAQs have been separated into two sections (5706.3 and 5706.4)
  - Relocated alcohol-based hand rubs because requirements now apply both above and below MAQ (5706.2.12)
- Section 5703.4 is deleted, simply because it is repeated in several locations. This location is redundant and not needed. Spill control and secondary containment are still required.
- Section 5704.1 was reformatted to clarify is application. Section 5704 covers several methods of storage and the user is directed to the appropriate sections for each storage method.
- Application of spill control and secondary containment have been relocated and reformatted to clarify their application and correlate with secondary containment requirements in Chapter 50 (5704.3.7.3).
- Dispensing from tank vehicles is relocated from Special Operations to Mobile Fueling (5708.7) NOTE: a separate proposal has been submitted this cycle to relocate all Fueling Operations to Chapter 23. If that proposal is successful, Section 5708 should be deleted.
- The header is revised in Tables 5704.2.3.5.3(5) and 5704.2.3.5.3(6). The maximum spacing of 80 SF/head applies to the ceiling sprinkler system, not the in-rack sprinklers.
- Section 5705.2.4.4 is editorially revised to include the provisions from the subsequent three sections.
- Section 5706.1 was reformatted to clarify is application. Section 5704 covers several methods of use configurations and the user is directed to the appropriate sections for each method.
- Section 5706.4.3.3 has been revised to clarify when spill control is required vs. secondary containment
- Section 5707.5 is editorially revised and reformatted to clarify the difference between bulk transfer/process transfer and fueling operations.

A cross reference spreadsheet has been uploaded as an attachment. The spreadsheet identifies the 2024 section number and the proposed new section number for the 2027 edition.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

As extensive as this proposal is, it is entirely editorial. The reformatting and editorial clarifications make no changes to the requirements or their application.

F250-24

F251-24

IFC: 5701.6 (New)

Proponents: Adam Henson, U.S. Chemical Safety and Hazard Investigation Board (adam.henson@csb.gov)

2024 International Fire Code

Add new text as follows:

5701.6 Process Hazard Analysis. Where flammable and combustible liquids are stored or used in excess of the maximum allowable quantity per control area specified in Table 5003.1.1(1) process hazard analyses shall be conducted to ensure reasonable protection of people and property from dangerous conditions involving flammable and combustible liquids. The process hazard analysis shall be conducted utilizing a methodology suitable for the complexity of the process and shall consider factors internal and external to the organization. Recommendations from such analyses shall be addressed in a timely manner.

Reason: On May 1, 2002, there was a fire at the Third Coast Industries petroleum products facility in Friendswood, TX. The fire began as a relatively small one of unknown origin that eventually spread all through the facilities operations for blending and packaging motor oils, hydraulic oils, and engine and other lubricants.

The fire began overnight while the facility was unattended. It was discovered in progress by the facility's security guard who determined it was too severe to fight. Firefighters arrived on scene within minutes, but had insufficient means to fight the fire. The fire burned for more than 24 hours and consumed 1.2 million gallons of combustible and flammable liquids destroying the site. One hundred nearby residents were evacuated, a school was temporarily closed, and significant environmental cleanup was necessary due to fumes and runoff.

Approximately 98 percent of the materials at Third Coast were Class IIIB combustible liquids meaning they had a flash point of 200 Deg F or greater. They also had 4,400 gallons of methanol (Class IB), 3,500 gallons of mineral spirits (Class II), and 9,500 gallons of petroleum distillate (Class IIIA) in storage tanks intermingled with their Class IIIB products and raw materials. Based on the high flash points of most of their raw materials and products, Third Coast may have underestimated the fire hazard present at their facility.

During its investigation the CSB concluded that Third Coast had not analyzed the hazards of their facility. If they had, the deficiencies in onsite water supply, fire detection and alarm equipment, and drainage and containment for combustible liquids could have been identified and addressed prior to the fire preventing the loss of the facility, the evacuation of the community, and the damage done to the environment.

As part of its investigation into this incident, the CSB reviewed the requirements of the International Fire Code chapters on Hazardous Materials – General Provisions and Flammable and Combustible Liquids both then and again now. Nothing in the code requires process hazard analysis unless someone wants to exercise the Performance-Based Design Alternative described at 5001.3 of the IFC.

As the result of the investigation, the CSB issued the following recommendation to the International Code Council:

CSB Recommendation No. 2002-03-I-TX-R3Revise the International Fire Code to address the following issues: For facilities that are not staffed around the clock, specify circumstances where automatic fire detection is needed. Narrow exemptions for Class IIIB liquids. Expand fire protection analysis requirements to include all areas of a facility where there may be flammable or combustible fire risks.

The language proposed is intended to satisfactorily implement the objectives of this recommendation.

Bibliography: U.S. Chemical Safety and Hazard Investigation Board (CSB), "Petroleum Products Facility Incident (Destruction of Facility)," 06 March 2003. [Online]. Available: https://www.csb.gov/file.aspx?DocumentId=5611. [Accessed 30 November 2023].

Cost Impact: Increase

Estimated Immediate Cost Impact:

$5,000

Estimated Immediate Cost Impact Justification (methodology and variables):

There are no material costs associated with this code change. The labor cost is based on 8 hours of work by an outside consultant at $500 an hour, 8 hours of work by plant management at $56 an hour, 8 hours of work by plant engineering at $48 an hour, and 4 hours of work by a plant employee at $20 an hour.

The cost can be reduced if plant personnel can conduct a PHA without the help of a consultant. The cost of conducting a PHA is directly proportional to the complexity of the process being analyzed. The process in this example represents a storage process or a simple manufacturing process.

Consultant (8 Hours x $500) + Plant Management (8 Hours x $56) + Plant Engineering (8 Hours x $48) + Plant Employee (4 Hours x $20) = $4,912 (Rounded to $5,000)

Labor Cost Source:

- Consultant – Anecdotal Based on Experience and Quote
- Plant Management – https://www.ziprecruiter.com/Salaries/Plant-Manager-Salary
- Plant Engineering – https://www.ziprecruiter.com/Salaries/Plant-Engineer-Salary
- Plant Employee - https://www.ziprecruiter.com/Salaries/Chemical-Operator-Salary

Estimated Life Cycle Cost Impact:

N/A

Estimated Life Cycle Cost Impact Justification (methodology and variables):

N/A

F251-24

F252-24

IFC: 5704.2.13.1.4, 5704.2.14.1

Proponents: Chad Sievers, NYS, NYS DOS (chad.sievers@dos.ny.gov); Jeanne Rice, NYSDOS (jeanne.rice@dos.ny.gov); China Clarke, New York State Dept of State, Manager Technical Support Unit (china.clarke@dos.ny.gov); Kevin Duerr-Clark, NYS DOS, NYS DOS (kevin.duerr-clark@dos.ny.gov); Brian Tollisen, NYS Department of State, NYS Department of State (brian.tollisen@dos.ny.gov); Daniel Carroll, New York State Department of State, Department of State (daniel.carroll@dos.ny.gov); John R Addario - NYS Department of State, NEW YORK STATE CODES DIVISION, New York State Department of State Division of Building Standards and Codes (john.addario@dos.ny.gov)

2024 International Fire Code

Revise as follows:

5704.2.13.1.4 Tanks abandoned in place . ~~Tanks abandoned in place shall be as follows:~~ The abandoning of underground tanks in place shall comply with all of the following:

1. *Flammable* and *combustible liquids* shall be removed from the tank and connected piping.
2. The suction, inlet, gauge, vapor return and vapor lines shall be disconnected.
3. The tank shall be filled completely with an *approved* inert solid material.
4. Remaining underground piping shall be capped or plugged.
5. A record of tank size, location and date of abandonment shall be retained.
6. All exterior above-grade fill piping shall be permanently removed when tanks are abandoned or removed.
7. The owner of tanks with automatic delivery shall notify the supplier or suppliers in writing a minimum of 24 hours prior to the abandonment, instructing them to discontinue deliveries.

5704.2.14.1 Removal. Removal of above-ground and underground tanks shall comply ~~be in accordance~~ with all of the following:

1. *Flammable* and *combustible liquids* shall be removed from the tank and connected piping.
2. Piping at tank openings that is not to be used further shall be disconnected.
3. Piping shall be removed from the ground.

   Exception: Piping is allowed to be abandoned in place where the *fire code official* determines that removal is not practical. Abandoned piping shall be capped and safeguarded as required by the *fire code official*.
4. Tank openings shall be capped or plugged, leaving a $^1/_8$-inch to $^1/_4$-inch-diameter (3.2 mm to 6.4 mm) opening for pressure equalization.
5. Tanks shall be purged of vapor and inerted prior to removal.
6. All exterior above-grade fill and vent piping shall be permanently removed.

   Exception: Piping associated with bulk plants, terminal facilities and refineries.
7. The *owner* of tanks with automatic delivery shall notify the supplier or suppliers in writing a minimum of 24 hours prior to the removal, instructing the supplier to discontinue deliveries.

Reason: This was done to help minimize the chances of a supplier attempting to fill a tank that has been abandoned or removed, resulting in a spill and costly remediation.

Cost Impact: Increase

Estimated Immediate Cost Impact:

The notification required by this proposed change will have a slight additional cost of $11.50 at the end of the tank's life. This cost is due to office staff emailing the supplier, notifying them that service must cease as the tank is out of service.

Estimated Immediate Cost Impact Justification (methodology and variables):

This will be a one-time fee at the end of the tank's life.

Office staff $18-23 /hr

https://www.salary.com/research/salary/listing/office-worker-hourly-wages

Estimated time to write an email to discontinue service: 30 minutes max.

0.5 hr x $23= **$11.50**

F252-24

F253-24

IFC: 5704.2.13.1.4, 5704.2.14, 5704.2.14.1, 5704.2.14.2

Proponents: Daniel Carroll, NYS, NYS DOS (daniel.carroll@dos.ny.gov); Chad Sievers, NYS, NYS DOS (chad.sievers@dos.ny.gov); Kevin Duerr-Clark, NYS DOS, NYS DOS (kevin.duerr-clark@dos.ny.gov); John R Addario - NYS Department of State, NEW YORK STATE CODES DIVISION, New York State Department of State Division of Building Standards and Codes (john.addario@dos.ny.gov); Jeanne Rice, NYS DOS, NYS DOS (jeanne.rice@dos.ny.gov); China Clarke, New York State Dept of State, Manager Technical Support Unit (china.clarke@dos.ny.gov); Brian Tollisen, NYS Department of State, NYS Department of State (brian.tollisen@dos.ny.gov)

2024 International Fire Code

Revise as follows:

5704.2.13.1.4 Tanks abandoned in place. Tanks abandoned in place shall be as follows:

1. ~~*Flammable* and *combustible liquids* shall be removed from the tank and connected piping.~~The entire contents of the tank and related piping shall be emptied, and the tank purged of all vapor. The contents of the storage tank and related piping shall be removed from the premises or property and disposed of in accordance with applicable local, state, or federal rules and regulations.
2. The suction, inlet, gauge, vapor return and vapor lines shall be disconnected and either be permanently removed, capped, plugged, or filled completely with an *approved* inert solid material.
3. ~~The tank~~ Tanks shall be filled completely with an *approved* inert solid material.
4. Remaining underground piping shall be capped or plugged.
5. A record of tank size, location and date of abandonment shall be retained.
6. All exterior above-grade fill piping shall be permanently removed when tanks are abandoned or removed, or the fill pipe shall be filled completely with an *approved* inert solid material.

5704.2.14 Removal and disposal of tanks.
Removal and disposal of tanks shall comply with Sections 5704.2.14.1 and 5704.2.14.2.

Revise as follows:

5704.2.14.1 Removal. Removal of above-ground and underground tanks shall be in accordance with all of the following:

1. ~~*Flammable* and *combustible liquids* shall be removed from the tank and connected piping.~~The entire contents of the tank and related piping shall be emptied, purged of all vapor, and inerted.
2. Piping at tank openings that is not to be used further shall be disconnected.
3. Piping shall be removed from the ground.

   ~~Exception~~Exceptions:

   1. Piping is allowed to be abandoned in place where the *fire code official* determines that removal is not practical. Abandoned piping shall be capped and safeguarded as required by the *fire code official*.
   2. Piping that is reused for the installation of a new tank and meets the applicable requirements for the new installation shall be allowed to remain where *approved* by the *fire code official*.

4. Tank openings shall be capped or plugged, leaving a $^1/_8$-inch to $^1/_4$-inch-diameter (3.2 mm to 6.4 mm) opening for pressure equalization.
5. Tanks shall be purged of vapor and inerted prior to removal.

6. All exterior above-grade fill and vent piping shall <u>either</u> be permanently removed <u>or filled completely with an *approved* inert solid material.</u>

   .

   Exception: Piping associated with bulk plants, terminal facilities and refineries.

5704.2.14.2 Disposal. ~~Tanks shall be disposed of in accordance with federal, state and local regulations.~~
<u>The tank and related piping, and the contents of the tank and related piping shall be removed from the premises and disposed of in accordance with applicable local, state, or federal rules and regulations</u>

Reason: This change provides some additional clarity on the proper removal and disposal of the materials within tanks that are abandoned in place and those removed and disposed of. It also attempts to clarify scenarios where either reuse of existing piping is necessary for replacement tank installations, or for when removal of all piping would be unnecessarily onerous.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

These changes provide some more flexibility in the abandonment and removal of tanks while clarifying what would already be required by local, state, and federal laws.

F253-24

F254-24

IFC: 5704.3.6, 5704.3.7.5.1, 5704.3.8.4

Proponents: Kevin Scott, KH Scott & Associates LLC, KH Scott & Associates LLC (khscottassoc@gmail.com)

2024 International Fire Code

Revise as follows:

5704.3.6 Wholesale and retail sales uses.
Flammable and *combustible liquids* in Group M occupancy wholesale and retail sales uses shall be in accordance with Sections 5704.3.6.1 through 5704.3.6.5, or Sections 10.10.2, 12.3.6, 16.4.1 through 16.4.3, 16.5.1 through ~~16.5.2.12~~ 16.5.3.18, Figures 16.4.1(a) through 16.4.1(c) and Tables ~~16.5.2.1~~16.5.3.1 through ~~16.5.2.12,~~16.5.3.1.18 of NFPA 30.

5704.3.7.5.1 Fire-protection systems.
Liquid storage rooms shall be protected by *automatic sprinkler systems* installed in accordance with Chapter 9 and Tables 5704.3.6.3(4) through 5704.3.6.3(7) and Table 5704.3.7.5.1, or Sections 16.4.1 through 16.4.3, 16.5.1 through 16.5.3.18, and Figures 16.4.1(a) through 16.4.1(c) and Tables 16.5.3.1 through 16.5.3.18 of NFPA 30. In-rack sprinklers shall also comply with NFPA 13.Automatic foam-water systems and automatic aqueous film-forming foam (AFFF) water sprinkler systems shall not be used except where *approved*.
Protection criteria developed from fire modeling or full-scale fire testing conducted at an *approved* testing laboratory are allowed in lieu of the protection as shown in Tables 5704.3.6.3(2) through 5704.3.6.3(7) and Table 5704.3.7.5.1 where *approved*.

5704.3.8.4 Automatic sprinkler systems. Liquid storage warehouses shall be protected by *automatic sprinkler systems* installed in accordance with Chapter 9 and Tables 5704.3.6.3(4) through 5704.3.6.3(7) and Table 5704.3.7.5.1, or Sections 16.4.1 through 16.4.3, 16.5.1 through ~~16.5.3.12~~ 16.5.3.18, and Figures 16.4.1(a) through 16.4.1(c) and Tables 16.5.3.1 through ~~16.5.3.12~~ 16.5.3.18 of NFPA 30. In-rack sprinklers shall also comply with NFPA 13.Automatic foam-water systems and automatic AFFF water sprinkler systems shall not be used except where *approved*.
Protection criteria developed from fire modeling or full-scale fire testing conducted at an *approved* testing laboratory are allowed in lieu of the protection as shown in Tables 5704.3.6.3(2) through 5704.3.6.3(7) and Table 5704.3.7.5.1 where *approved*.

Reason: This proposal is intended to correct several inconsistencies between requirements for Flammable Liquid Storage Rooms, Flammable Liquid Storage Warehouses, and Flammable Liquids in Retail.

This proposal corrects the NFPA 30 references, and adds an the same NFPA 30 reference to the Flammable Liquid Storage Rooms.

The requirements for fire sprinkler design in Retail facilities and Flammable Liquid Storage Warehouses reference specific criteria in NFPA 30 as an acceptable alternative. The format and section numbers in NFPA 30 are slightly different in the 2024 NFPA 30 document, so the revisions to Sections 5704.3.8.4 and 5704.3.6 have been revised to correct the references.

The more significant change is for Flammable Liquid Storage Rooms. Section 5704.3.7.5.1 does not contain similar language to reference NFPA 30. The criteria in NFPA 30 contains sprinkler design for additional storage configurations, beyond what is contained in the Chapter 57, and the NFPA 30 referenced sections are also applicable to Flammable Liquid Storage Rooms. Therefore, the reference to criteria in NFPA 30 is added to the provisions for Flammable Liquid Storage Rooms.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal does not provide any new requirements. It allows the use of NFPA 30 sprinkler design criteria as an option to the sprinkler design criteria in Chapter 57.

F254-24

F255-24

IFC: TABLE 5704.3.6.3(7), TABLE 5704.3.6.3(8), 5704.3.6.3, TABLE 5704.3.6.3(1), 5704.3.7.5.1, TABLE 5704.3.7.5.1, TABLE 5704.3.4.1, 5704.3.8.4

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Fire Code

Delete without substitution:

~~TABLE 5704.3.6.3(7) AUTOMATIC AFFF WATER PROTECTION REQUIREMENTS FOR RACK STORAGE OF LIQUIDS IN METAL CONTAINERS GREATER THAN 5-GALLON CAPACITY~~[~~a, b~~]

CLASS LIQUID	CEILING SPRINKLER DESIGN AND DEMAND			IN-RACK SPRINKLER ARRANGEMENT AND DEMAND[c]				DURATION AFFF SUPPLY (minimum)	DURATION WATER SUPPLY (hours)
	Density (gpm/ft^2)	Area (square feet) High-temperature sprinklers	Area (square feet) Ordinary temperature sprinklers	On-end storage of drumson pallets, up to 25 feet	Minimum nozzle pressure (psi)	Number of sprinklers operating	Hose stream demand[d] (gpm)		
IA, IB, IC and II	0.30	1,500	2,500	~~1. Ordinary temperature sprinkler up to 10 feet apart horizontally~~ ~~2. One line sprinklers above each level of storage~~ ~~3. Locate in longitudinal flue space, staggered vertically~~ ~~4. Shields required for multiple-level~~	30	Three sprinklers per level	500	15	2

~~For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 square foot = 0.0929 m², 1 pound per square inch = 6.895 kPa, 1 gallon = 3.785 L, 1 gallon per minute = 3.785 L/m, 1 gallon per minute per square foot = 40.75 L/min/m².~~

a. ~~System shall be a closed-head wet system with approved devices for proportioning aqueous film-forming foam.~~

b. ~~Except as modified herein, in-rack sprinklers shall be installed in accordance with NFPA 13.~~

c. ~~The height of storage shall not exceed 25 feet.~~

d. ~~Hose stream demand includes 1$^1/_2$-inch inside hose connections, where required.~~

Revise as follows:

TABLE ~~5704.3.6.3(8)~~ 5704.3.6.3(7) AUTOMATIC SPRINKLER PROTECTION REQUIREMENTS FOR CLASS I LIQUID STORAGE IN METAL CONTAINERS OF 1-GALLON CAPACITY OR LESS WITH UNCARTONED OR CASE-CUT SHELF DISPLAY UP TO 6.5 FEET, AND PALLETIZED STORAGE ABOVE IN A DOUBLE-ROW RACK ARRAY[a]

STORAGE HEIGHT	CEILING SPRINKLER DESIGN AND DEMAND				IN-RACK SPRINKLER ARRANGEMENT AND DEMAND				MINIMUM HOSE STREAM DEMAND (gpm)	MINIMUM DURATION SPRINKLERS AND HOSE STREAM (hours)
	Density (gpm/ft^2)	Area (square feet) High temperature	Area (square feet) Ordinary temperature	Maximum spacing	Racks up to 9 feet deep	Racks 9 to 12 feet	Minimum nozzle pressure	Number of sprinklers operating		

STORAGE HEIGHT	CEILING SPRINKLER DESIGN AND DEMAND: Density (gpm/ft)	Area (square feet): High temperature	Area (square feet): Ordinary temperature	Maximum spacing	IN-RACK SPRINKLER ARRANGEMENT AND DEMAND: Racks up to 9 feet deep	Racks 9 to 12 feet	Minimum nozzle pressure	Number of sprinklers operating	MINIMUM HOSE STREAM DEMAND (gpm)	MINIMUM DURATION SPRINKLERS AND HOSE STREAM (hours)
Maximum 20-foot storage height	0.60	2,000[b]	Not Applicable	100 ft^2/head	1. Ordinary temperature, quick-response sprinklers, maximum 8 feet 3 inches horizontal spacing 2. One line of sprinklers at the 6-foot level and the 11.5-foot level of storage 3. Locate in longitudinal flue space, staggered vertical 4. Shields required where multiple-level	Not Applicable	30 psi (standard orifice) or 14 psi (large orifice)	1. Six sprinklers each on two levels 2. Hydraulically most remote 12 sprinklers	500	2

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 square foot = 0.0929 m^2, 1 pound per square inch = 6.895 kPa, 1 gallon = 3.785 L, 1 gallon per minute = 3.785 L/m, 1 gallon per minute per square foot = 40.75 L/min/m^2.

a. This table shall not apply to racks with solid shelves.

b. Using extra-large orifice sprinklers under a ceiling 30 feet or less in height. Minimum aisle width is 7.5 feet.

5704.3.6.3 Fire protection and storage arrangements.

Fire protection and container storage arrangements shall be in accordance with Table 5704.3.6.3(1) or the following:

1. Storage on shelves shall not exceed 6 feet (1829 mm) in height, and shelving shall be metal.
2. Storage on pallets or in piles greater than 4 feet 6 inches (1372 mm) in height, or where the ceiling exceeds 18 feet (5486 mm) in height, shall be protected in accordance with Table 5704.3.6.3(4), and the storage heights and arrangements shall be limited to those specified in Table 5704.3.6.3(2).
3. Storage on racks greater than 4 feet 6 inches (1372 mm) in height, or where the ceiling exceeds 18 feet (5486 mm) in height shall be protected in accordance with ~~Tables~~Table 5704.3.6.3(5)~~,~~ or 5704.3.6.3(6), ~~and 5704.3.6.3(7)~~or NFPA 30, as appropriate, and the storage heights and arrangements shall be limited to those specified in Table 5704.3.6.3(3).

Combustible commodities shall not be stored above *flammable* and *combustible liquids*.

TABLE 5704.3.6.3(1) MAXIMUM STORAGE HEIGHT IN CONTROL AREA

TYPE OF LIQUID	NONSPRINKLERED AREA (feet)	SPRINKLERED AREA[a] (feet)	SPRINKLERED WITH IN-RACK PROTECTION[a, b] (feet)
Flammable liquids:			
Class IA	4	4	4
Class IB	4	8	12
Class IC	4	8	12
Combustible liquids:			
Class II	6	8	12
Class IIIA	8	12	16
Class IIIB	8	12	20

For SI: 1 foot = 304.8 mm.

a In buildings protected by an automatic sprinkler system, the storage height for containers and portable tanks shall not exceed the maximum storage height permitted for the fire protection scheme set forth in NFPA 30 or the maximum storage height demonstrated in a full-scale fire test, whichever is greater. NFPA 30 criteria and fire test results for metallic containers and portable tanks shall not be applied to nonmetallic containers and portable tanks.

b. In-rack protection shall be in accordance with Table 5704.3.6.3(5)~~,~~ or 5704.3.6.3(6), or ~~5704.3.6.3(7)~~NFPA 30.

5704.3.7.5.1 Fire-protection systems.

Liquid storage rooms shall be protected by *automatic sprinkler systems* installed in accordance with Chapter 9 and Tables 5704.3.6.3(4) through 5704.3.6.3(~~7~~6) ~~and Table 5704.3.7.5.1~~, or NFPA 30. In-rack sprinklers shall also comply with NFPA 13.
Automatic foam-water systems ~~and automatic aqueous film-forming foam (AFFF) water sprinkler systems~~ shall not be used except where *approved*.

~~Protection criteria developed from fire modeling or full-scale fire testing conducted at an *approved* testing laboratory are allowed in lieu of the protection as shown in Tables 5704.3.6.3(2) through 5704.3.6.3(7) and Table 5704.3.7.5.1 where *approved*.~~

Delete without substitution:

~~TABLE 5704.3.7.5.1 AUTOMATIC AFFF-WATER PROTECTION REQUIREMENTS FOR SOLID-PILE AND PALLETIZED STORAGE OF LIQUIDS IN METAL CONTAINERS OF 5-GALLON CAPACITY OR LESS[a, b]~~

PACKAGE TYPE	CLASS LIQUID	CEILING SPRINKLER DESIGN AND DEMAND					STORAGE HEIGHT (feet)	HOSE DEMAND (gpm)[c]	DURATION AFFF SUPPLY (minimum)	DURATION WATER SUPPLY (hours)
		Density (gpm/ft^2)	Area (square feet)	Temperature rating	Maximum spacing	Orifice size (inch)				
Cartoned	IB, IC, II and III	0.40	2,000	286° F	100 ft^2/head	0.531	11	500	15	2
Uncartoned	IB, IC, II and III	0.30	2,000	286° F	100 ft^2/head	0.5 or 0.531	12	500	15	2

~~For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 square foot = 0.0929 m^2, 1 gallon per minute = 3.785 L/m, 1 gallon per minute per square foot = 40.75 L/min/m^2, °C = (°F – 32)/1.8.~~

a. ~~System shall be a closed-head wet system with *approved* devices for proportioning aqueous film-forming foam.~~

b. ~~Maximum ceiling height of 30 feet.~~

c. ~~Hose stream demand includes 1$^1/_2$-inch inside hose connections, where required.~~

Revise as follows:

TABLE 5704.3.4.1 MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF FLAMMABLE AND COMBUSTIBLE LIQUIDS IN WHOLESALE AND RETAIL SALES OCCUPANCIES[a]

TYPE OF LIQUID	MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA (gallons)		
	Sprinklered[b] in accordance with footnote densities and arrangements	Sprinklered in accordance with Tables 5704.3.6.3(4) through 5704.3.6.3(~~8~~7) ~~and Table 5704.3.7.5.1~~, or NFPA 30	Nonsprinklered
Class IA	60	60	30
Class IB, IC, II and IIIA	7,500[c]	15,000[c]	1,600
Class IIIB	Unlimited	Unlimited	13,200

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m^2, 1 gallon = 3.785 L, 1 gallon per minute per square foot = 40.75 L/min/m^2.

a. Control areas shall be separated from each other by not less than a 1-hour fire barrier.

b. To be considered as sprinklered, a building shall be equipped throughout with an *approved* automatic sprinkler system with a design providing minimum densities as follows:

   1. For uncartoned commodities on shelves 6 feet or less in height where the ceiling height does not exceed 18 feet, quantities are those allowed with a minimum sprinkler design density of Ordinary Hazard Group 2.

   2. For cartoned, palletized or racked commodities where storage is 4 feet 6 inches or less in height and where the ceiling height does not exceed 18 feet, quantities are those allowed with a minimum sprinkler design density of 0.21 gallon per minute per square foot over the most remote 1,500-square-foot area.

c. Where wholesale and retail sales or storage areas exceed 50,000 square feet in area, the maximum allowable quantities are allowed to be increased by 2 percent for each 1,000 square feet of area in excess of 50,000 square feet, up to not more than 100 percent of the table amounts. A control area separation is not required. The cumulative amounts, including amounts attained by having an additional control area, shall not exceed 30,000 gallons.

5704.3.8.4 Automatic sprinkler systems.

Liquid storage warehouses shall be protected by *automatic sprinkler systems* installed in accordance with Chapter 9 and Tables 5704.3.6.3(4) through 5704.3.6.3(~~7~~6) ~~and Table 5704.3.7.5.1~~, or ~~Sections 16.4.1 through 16.4.3, 16.5.1 through 16.5.3.12, and Figures 16.4.1(a) through 16.4.1(c) and Tables 16.5.3.1 through 16.5.3.12 of~~ NFPA 30. In-rack sprinklers shall also comply with NFPA 13. Automatic foam-water systems ~~and automatic AFFF water sprinkler systems~~ shall not be used except where *approved*.

~~Protection criteria developed from fire modeling or full-scale fire testing conducted at an *approved* testing laboratory are allowed in lieu of the protection as shown in Tables 5704.3.6.3(2) through 5704.3.6.3(7) and Table 5704.3.7.5.1 where *approved*.~~

Reason: This proposal is designed to eliminate the reference to AFFF (aqueous film forming foam) from the IFC. AFFF contains PFAS (polyfluoroalkyl substances or perfluoroalkyl substances). PFAS is referred to as a “forever chemical”, and U.S. EPA has determined that exposure to PFAS can have detrimental health effects. EPA and some states have taken actions to reduce PFAS exposure, and the continued requirement for AFFF foam systems needs to be removed from the code.

Industry is developing other foam agents known as NFF (nonfluorinated foam), or SFFF (synthetic fluorine free foam), which does not contain PFAS. Several foam manufacturers have developed NFF foam concentrates which have been tested and several are now listed under UL 162 Foam Equipment and Liquid Concentrates.

This proposal will retain the reference to foam fire-extinguishing systems or foam-water sprinkler systems in the code, but remove the criteria specifying AFFF. The IFC will continue to require foam systems and specify they comply with NFPA 30 and NFPA 11. NFPA 30 establishes density and application rates for foam-water sprinkler systems and NFPA 11 provides criteria on the foam equipment and acceptable foam concentrates.

The application rates and design criteria for NFF will be different than those in the IFC for AFFF so specific design criteria and references to AFFF are revised or deleted as follows:

1. Table 5704.3.6.3(7) is deleted because this table only addresses AFFF systems. The NFPA 30 criteria is more current than the table in the IFC; is more restrictive than the IFC; and offers more storage configurations than the IFC. The 2022 NFPA 30 provides criteria for this specific storage arrangement. Table 16.5.3.3 from NFPA 30 is below, and the criteria in the table for the rack storage of flammable and combustible liquids is highlighted:

2022 NFPA 30

Table 16.5.3.3 – Design Criteria for Foam-Water Sprinkler Protection of Single- or Double-Row Rack Storage of Class IB, IC, Class II, Class IIIA, and Class IIIB Liquids [Any FP, BP ≥100°F] in Metal Containers, Portable Tanks, and IBCs

Liquid Type / Flash Point	Container Capacity gallons	Container Type	Maximum Ceiling Height feet	Maximum Storage Height ft	Ceiling Sprinkler Protection				In-Rack Sprinkler Protection				Notes	Fire Test Reference
					Sprinkler Type		Design		Sprinkler Type		Design			
					K-Factor	Response / Temp / Orientation	Density (gpm/ft²)	Area (sq ft)	K-Factor	Response / Temp / Orientation	Minimum Discharge Flow (gpm)	Layout		
Class IB, IC, II and IIIA	≤6.5	Non Relieving	30	25	≥8.0	SR or QR / High / Any	0.30	2,000	≥5.6	SR or QR / Ord / Any	30	3	1, 2, 4, 5	1
		Relieving	30	25	≥8.0	SR or QR / High / Any	0.30	2,000	≥5.6	SR or QR / Ord / Any	30	4	1, 2, 4, 5	4
	>6.5 and ≤60	Non Relieving	30	25	≥8.0	SR / High / Any	0.30	3,000	≥5.6	SR or QR / Ord / Any	30	3	1, 3, 4, 5	2
		Relieving	30	25	≥8.0	SR / High / Any	0.30	3,000	≥5.6	SR or QR / Ord / Any	30	4	1, 3, 4, 5	5
	Portable tanks and IBCs	Relieving	30	25	≥8.0	SR / High / Any	0.30	3,000	≥5.6	SR or QR / Ord / Any	30	4	1, 3, 4, 5	5
Class IIIB	≤60	Non Relieving	50	40	≥8.0	SR / High / Any	0.30	2,000	≥5.6	SR or QR / Ord / Any	30	4	1, 5	3
		Relieving	50	40	≥8.0	SR / High / Any	0.30	2,000	≥5.6	SR or QR / Ord / Any	30	4	1, 5	6

For SI units, 1 gal = 3.8 L, 1 ft = 0.3 m, 1 ft² = 0.09 m², 1 gpm/ft² = 40.7 L/min/m² = 40.7 mm/min.
For definitions of abbreviations used in the Response column, see 16.5.1.9(4). See also 16.5.1.9(5).
Notes:
(1) In-rack sprinkler design based on the six most hydraulically remote sprinkler in each of the upper three levels.
(2) Design area can be reduced to 1500 ft² when using a preprimed foam-water system installed in accordance with NFPA 11 and maintained according to NFPA 25.
(3) Design area can be reduced to 2000 ft² when using a preprimed foam-water system installed in accordance with NFPA 11 and maintained according to NFPA 25.
(4) In-rack sprinkler hydraulic design can be reduced to three sprinklers operating per level, with three levels operating simultaneously, when using a preprimed foam-water system installed in accordance with NFPA 11 and maintained according to NFPA 25.
(5) See 16.5.3.3.1 for additional criteria.

2. Table 5704.3.6.3(8) is renumbered to Table 5704.3.6.3(7) which was deleted in Item 1 above.
3. Section 5704.3.6.3 is revised to replace the reference to Table 5704.3.6.3(7) which was deleted in Item 1 above. This is replaced with a reference to NFPA 30.
4. Table 5704.3.6.3(1) is revised to remove the reference to Table 5704.3.6.3(7), which was deleted in Item 1 above. A reference to NFPA 30 is added to send the user to the foam-water system criteria in NFPA 30.
5. Section 5704.3.7.5.1 is revised to remove the reference to Table 5704.3.6.3(7), which was deleted in Item 1 above. This is replaced with a reference to NFPA 30. The reference to AFFF is removed in the 2nd paragraph. The section simply requires foam systems. The 3rd paragraph is deleted. This paragraph essentially states that Alternative Methods of Compliance are acceptable. The provisions for Alternative Methods were significantly revised in the 2024 IFC, so this paragraph just states what is already in Chapter 1. The 3rd paragraph is redundant, so no code requirements are lost by removing this paragraph and Chapter 1 provisions will govern.
6. Table 5704.3.7.5.1 is deleted because this table only addresses AFFF systems. The 2022 NFPA 30 provides criteria for this specific storage arrangement. Table 16.5.3.4 from NFPA 30 is below, and the criteria in the table for storage of flammable and combustible liquids in small containers is highlighted:

2022 NFPA 30

Table 16.5.3.4 – Design Criteria for Foam-Water Sprinkler Protection of Palletized and Stacked Storage of Class IB, IC, Class II, and Class IIIA Liquids [FP <200oF, BP ≥100oF] Liquids in Metal Containers, Portable Tanks, and IBCs

Liquid Type / Flash Point	Container Capacity gallons	Container Type	Packaging	Maximum Ceiling Height feet	Maximum Storage Height ft	Ceiling Sprinkler Protection				Notes	Fire Test Reference
						Sprinkler Type		Design			
						K-Factor	Response / Temp / Orientation	Density (gpm/ft²)	Area (sq ft)		
Class IB, IC, II and IIIA	≤6.5	Non Relieving	Cartoned	30	11	≥11.2	SR or QR / High / Any	0.40	3,000	1, 2, 4, 5	1
		Non Relieving	Uncartoned	30	12	≥8.0	SR or QR / High / Any	0.30	3,000	1, 2, 4, 5	4
	>6.5 and ≤60	Non Relieving	Cartoned or Uncartoned	30	5 1 high	≥8.0	SR / High / Any	0.30	3,000	1, 3, 4, 5	2
		Relieving	Cartoned or Uncartoned	30	6.5 2 high	≥8.0	SR / High / Any	0.30	3,000	1, 3, 4, 5	5
			Cartoned or Uncartoned	33	10 3 high	≥11.2	SR / High / Any	0.45	3,000	1, 3, 4, 5	5
		Relieving	Cartoned or Uncartoned	33	13.75 4 high	≥11.2	SR / High / Any	0.60	3,000	1, 3, 4, 5	5
	Portable tanks and IBCs	Relieving	—	30	1 or 2 high	≥8.0	SR / High / Any	0.30	3,000	1, 3, 4, 5	5

For SI units, 1 gal = 3.8 L, 1 ft = 0.3 m, 1 ft² = 0.09 m², 1 gp13.75m/ft² = 40.7 L/min/m² = 40.7 mm/min.

For definitions of abbreviations used in the Response column, see 16.5.1.9(4). See also 16.5.1.9(5).

Notes:

(1) Design area can be reduced to 2000 ft2 when using a preprimed foam-water system installed in accordance with NFPA 11 and maintained according to NFPA 25.

(2) Both ¾ in. (20 mm) and 2 in. (50 mm) listed pressure-relieving mechanisms are required on containers greater than 6.5 gal (23 L) capacity. See Section 16.3.6.

(3) Drums placed on open slatted pallet, not nested, to allow pressure relief from drums on lower levels.

7. Table 5704.3.4.1 is revised to remove the reference to Tables 5704.3.6.3(7) and 5704.3.7.5.1 which were deleted in Items 1 and 6 above. This is replaced with a reference to NFPA 30.
8. Section 5704.3.8.4 is revised to remove the reference to Tables 5704.3.6.3(7) and 5704.3.7.5.1, which were deleted in Items 1 and 6 above. Additionally, the specific sections in NFPA 30 are removed leaving a simple reference to NFPA 30 for the design of the fire sprinkler system. The reference to AFFF is removed in the 2nd paragraph. The section simply requires foam systems. The 3rd paragraph is deleted. This paragraph essentially states that Alternative Methods of Compliance are acceptable. The provisions for Alternative Methods were significantly revised in the 2024 IFC, so this paragraph just states what is already in Chapter 1. The 3rd paragraph is redundant, so no code requirements are lost by removing this paragraph and Chapter 1 provisions will govern.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Bibliography: NFPA 30, 2022 Edition. National Fire Protection Association, 1 Battery March Park, Quincy, Massachusetts 02169, Tables 15.5.3.3 and 16.5.3.4.

Cost Impact: Increase

Estimated Immediate Cost Impact:

$0.00. It is only assumed that the cost for construction will increase however compliance with state regulations will likely prohibit the use of AFFF. In addition, the use of AFFF foam is not mandated by the code, it is an optional method of protection. Since AFFF is banned from use, its replacement synthetic foam, will also be an option for use as a protection scheme.

Estimated Immediate Cost Impact Justification (methodology and variables):

The increase is based on a percentage of gallon to gallon cost increase from AFFF to SFF.

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IFC: 5704.3.8.5, TABLE 5704.3.6.3(5), TABLE 5704.3.6.3(6)

Proponents: Kevin Scott, KH Scott & Associates LLC, self (khscottassoc@gmail.com)

2024 International Fire Code

Delete without substitution:

~~**5704.3.8.5 Warehouse hose lines.**~~
~~In liquid storage warehouses, either $1^1/_2$-inch (38 mm) lined or 1-inch (25 mm) hard rubber hose lines shall be provided in sufficient number to reach all liquid storage areas and shall be in accordance with Section 903 or 905.~~

Revise as follows:

TABLE 5704.3.6.3(5) AUTOMATIC SPRINKLER PROTECTION REQUIREMENTS FOR RACK STORAGE OF LIQUIDS IN METAL CONTAINERS OF 5-GALLON CAPACITY OR LESS WITH OR WITHOUT CARTONS ON CONVENTIONAL WOOD PALLETS[a]

CLASS LIQUID	CEILING SPRINKLER DESIGN AND DEMAND			IN-RACK SPRINKLER ARRANGEMENT AND DEMAND					MINIMUM HOSE STREAM DEMAND (gpm)	MINIMUM DURATION SPRINKLER AND HOSE STREAM (hours)
	Density (gpm/ft^2)	Area (square feet) High-temperature sprinklers	Area (square feet) Ordinary temperature sprinklers	Maximum spacing	Racks up to 9 feet deep	Racks more than 9 feet to 12 feet deep	30 psi (standard orifice) 14 psi (large orifice)	Number of sprinklers operating		
I (maximum 25-foot height) Option 1	0.40	3,000	5,000	80 ft^2/head	1. Ordinary temperature, quick-response sprinklers, maximum 8 feet 3 inches horizontal spacing 2. One line sprinklers above each level of storage 3. Locate in longitudinal flue space, staggered vertical 4. Shields required where multiple-level	1. Ordinary temperature, quick-response sprinklers, maximum 8 feet 3 inches horizontal spacing 2. One line sprinklers above each level of storage 3. Locate in transverse flue spaces, staggered vertical and within 20 inches of aisle 4. Shields required where multiple-level	30 psi (0.5-inch orifice)	1. Eight sprinklers if only one level 2. Six sprinklers each on two levels if only two levels 3. Six sprinklers each on top three levels, if three or more levels 4. Hydraulically most remote	750	2
I (maximum 25-foot height) Option 2	0.55	2,000[b]	Not Applicable	100 ft^2/head	1. Ordinary temperature, quick-response sprinklers, maximum 8 feet 3 inches horizontal spacing 2. See 2 above 3. See 3 above 4. See 4 above	1. Ordinary temperature, quick-response sprinklers, maximum 8 feet 3 inches horizontal spacing 2. See 2 above 3. See 3 above 4. See 4 above	14 psi (0.53-inch orifice)	See 1 through 4 above	500	2
I and II (maximum 14-foot storage height) (maximum three tiers)	0.55[c]	2,000[d]	Not Applicable	100 ft^2/head	Not Applicable None for maximum 6-foot-deep racks	Not Applicable	Not Applicable	Not Applicable	500	2
II (maximum 25-foot height)	0.30	3,000	5,000	100 ft^2/head	1. Ordinary temperature sprinklers 8 feet apart horizontally 2. One line sprinklers between levels at nearest 10-foot vertical intervals 3. Locate in longitudinal flue space, staggered vertical 4. Shields required where multiple-level	1. Ordinary temperature sprinklers 8 feet apart horizontally 2. Two lines between levels at nearest 10-foot vertical intervals 3. Locate in transverse flue spaces, staggered vertical and within 20 inches of aisle 4. Shields required where multiple-level	30 psi	Hydraulically most remote—six sprinklers at each level, up to a maximum of three levels	750	2

CLASS LIQUID	CEILING SPRINKLER DESIGN AND DEMAND			IN-RACK SPRINKLER ARRANGEMENT AND DEMAND					MINIMUM HOSE STREAM DEMAND (gpm)	MINIMUM DURATION SPRINKLER AND HOSE STREAM (hours)
	Density (gpm/ft)	Area (square feet) High-temperature sprinklers	Area (square feet) Ordinary temperature sprinklers	Maximum spacing	Racks up to 9 feet deep	Racks more than 9 feet to 12 feet deep	30 psi (standard orifice) 14 psi (large orifice)	Number of sprinklers operating		
III (40-foot height)	0.25	3,000	5,000	120 ft²/head	Same as for Class II liquids	Same as for Class II liquids	30 psi	Same as for Class II liquids	500	2

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 square foot = 0.0929 m², 1 pound per square inch = 6.895 kPa, 1 gallon = 3.785 L, 1 gallon per minute = 3.785 L/m, 1 gallon per minute per square foot = 40.75 L/min/m².

a. The ~~design area contemplates~~ sprinkler designs in this table require the installation of a standpipe system and assume the use of Class II standpipe systems. Where Class I standpipe systems are used, the area of application shall be increased by 30 percent without revising density.

b. Using listed or approved extra-large orifices, high-temperature quick-response or standard element sprinklers under a maximum 30-foot ceiling with minimum 7.5-foot aisles.

c. For friction lid cans and other metal containers equipped with plastic nozzles or caps, the density shall be increased to 0.65 gpm per square foot using listed or approved extra-large orifice, high-temperature quick-response sprinklers.

d. Using listed or approved extra-large orifice, high-temperature quick-response or standard element sprinklers under a maximum 18-foot ceiling with minimum 7.5-foot aisles and metal containers.

TABLE 5704.3.6.3(6) AUTOMATIC SPRINKLER PROTECTION REQUIREMENTS FOR RACK STORAGE OF LIQUIDS IN METAL CONTAINERS GREATER THAN 5-GALLON CAPACITY[a]

CLASS LIQUID	CEILING SPRINKLER DESIGN AND DEMAND			IN-RACK SPRINKLER ARRANGEMENT AND DEMAND					MINIMUM HOSE STREAM DEMAND (gpm)	MINIMUM DURATION SPRINKLER AND HOSE STREAM (hours)
	Density (gpm/ft²)	Area (square feet) High-temperature sprinklers	Area (square feet) Ordinary temperature sprinklers	Maximum spacing	On-side storage racks up to 9-foot-deep racks	On-end storage (on pallets) up to 9-foot-deep racks	Minimum nozzle pressure	Number of sprinklers operating		
IA (maximum 25-foot height)	0.60	3,000	5,000	80 ft²/head	1. Ordinary temperature sprinklers 8 feet apart horizontally 2. One line sprinklers above each tier of storage 3. Locate in longitudinal flue space, staggered vertical 4. Shields required where multiple-level	1. Ordinary temperature sprinklers 8 feet apart horizontally 2. One line sprinklers above each tier of storage 3. Locate in longitudinal flue space, staggered vertical 4. Shields required where multiple-level	30 psi	Hydraulically most remote—six sprinklers at each level	1,000	2
IB, IC and II (maximum 25-foot height)	0.60	3,000	5,000	100 ft²/head	1. See 1 above 2. One line sprinklers every three tiers of storage 3. See 3 above 4. See 4 above	1. See 1 above 2. See 2 above 3. See 3 above 4. See 4 above	30 psi	Hydraulically most remote—six sprinklers at each level	750	2
III (maximum 40-foot height)	0.25	3,000	5,000	120 ft²/head	1. See 1 above 2. One line sprinklers every sixth level (maximum) 3. See 3 above 4. See 4 above	1. See 1 above 2. One line sprinklers every third level (maximum) 3. See 3 above 4. See 4 above	15 psi	Hydraulically most remote—six sprinklers at each level	500	1

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m², 1 pound per square inch = 6.895 kPa, 1 gallon = 3.785 L, 1 gallon per minute =

3.785 L/m, 1 gallon per minute per square foot = 40.75 L/min/m^2.

a. The ~~design assumes~~ sprinkler designs in this table require the installation of a standpipe system and assume the use of Class II standpipe systems. Where a Class I standpipe system is used, the area of application shall be increased by 30 percent without revising density.

Reason: This proposal removes the requirement for hoselines in liquid storage warehouses. Liquid storage warehouses are a Group H occupancy and are allowed to store an unlimited amount of flammable and combustible liquids. A 1” rubber hose line in warehouse filled with 55-gallon drums of flammable and combustible liquids will have little practical effect. Liquid storage warehouses are required to be protected with a complete fire sprinkler system. The fire sprinkler system will provide better protection for the hazard in the warehouse than a 1” hose line. In many cases, a single fire sprinkler will discharge as much water as the 1” hoseline.

Hoselines and Class II standpipes at one time provided the best fire protection available. Fire sprinkler systems have improved in their effectiveness and water application capabilities over the past couple decades. It is time to remove this hoseline requirement from the code.

Tables 5704.3.6.3(5) and (6) are both based on the inclusion of a standpipe system. However, in Footnote a both tables include the option of using a Class I standpipe system. Those two footnotes are revised to specify that a standpipe system is required in order to utilize these tables.

Class II standpipes are not required in the NFPA 30 standard for these facilities. But when the IFC requires a Class II standpipe, the code requirement supersedes the standard language, even though designer uses the sprinkler design tables in NFPA 30.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0.00 but may be a larger reduction.

Estimated Immediate Cost Impact Justification (methodology and variables):

This proposal will reduce the cost of installing fire hose and fire hose connections in liquid storage warehouses.

F256-24

F257-24

IFC: 5705.3.9 (New), 5705.3.9.1 (New), 5705.3.9.2 (New), 5705.3.9.3 (New), 5705.3.9.4 (New)

Proponents: Adam Henson, U.S. Chemical Safety and Hazard Investigation Board (adam.henson@csb.gov)

2024 International Fire Code

Add new text as follows:

5705.3.9 Heating Flammable and Combustible Liquids Above Their Flashpoints Indoors. Heating flammable and combustible liquids indoors shall be done in accordance with Section 5705.3.9.1 through 5705.3.9.4.

5705.3.9.1 Venting Vapors. Process vessels used to heat flammable and combustible liquids shall be sealed from the room they are located in and the vapors vented to a safe location.

5705.3.9.2 Opening the Vessel. If the vessel needs to be opened, the room ventilation shall meet the requirements of 5705.3.7.5.1 and the process heating controls shall be interlocked with the ventilation to shut down process heat if the ventilation fails or is turned off.

5705.3.9.3 Excess Temperature Control. The process vessel shall be equipped with an excess temperature control. This control shall automatically shut down heating and initiate cooling if necessary. Redundant controls shall be provided where determined necessary by risk assessment.

5705.3.9.4 Explosion Control. Explosion control shall be provided in accordance with Section 911.

Reason: On November 22, 2006, there was an explosion at the CAI/Arnel manufacturing facility in Danvers, MA. The explosion was caused by flammable liquid vapors released from a 2000-gallon tank used in the production of ink. A steam valve on the tank heater was unintentionally left open causing the flammable liquid to vaporize after which it accumulated in the building's production area where it found an ignition source and ignited. This occurred overnight after all the workers had left for the day.

At least 10 members of the public required hospital treatment for cuts and bruises. More than 300 residents were evacuated from within a half-mile radius from the facility. The explosion and subsequent fire destroyed the facility, damaged dozens of nearby homes, businesses, and boats, and shattered windows as far away as two miles. Twenty-four homes and six businesses were damaged beyond repair. During the fire, thousands of gallons of flammable liquids stored inside the building and approximately 51,000 pounds of nitrocellulose material burned. The fire lasted for more than 17 hours.

The facility had ventilation in accordance with NFPA/OSHA requirements, but the ventilation had been shut down by the employees before they left as was common. This was done to avoid neighbor complaints and reduce heat loss despite the open top mix tanks that were known to contain flammable liquids, operated in conjunction with heaters supplied by a continuously operated steam system, and which were sometimes, including this night, operated overnight. Earlier in the day, CAI employees began mixing an ink batch in Mix Tank 3. The batch was comprised of a more than 2,000-gallon flammable liquid mixture of heptane, isopropyl alcohol, and propyl alcohol. After the tank was charged with raw materials the production manager opened the steam valve around 3:00 PM to begin heating the mixture. Around 5:30 PM the production manager returned to the work platform to check the mixture temperature which he recalled was about 90 Deg F. The production manager believes they shut the steam valve at this time prior to leaving for the day.

During its investigation the CSB concluded that the production supervisor most likely forgot to perform the critical step of shutting the steam valve prior to leaving for the day due to a combination of distraction and a lack of formal work procedures. The CSB concluded further that the boiling point for the batch of ink in Mix Tank 3 was 165.6 Deg F, that between 232 to 239 Deg F. steam was supplied to the mixing tank, and that a temperature limit control could have prevented overheating the batch. Finally, the CSB concluded that had Mix Tank 3 been sealed and vented, or the ventilation system left on, flammable liquid vapor from Mix Tank 3 would likely have been exhausted out of the building preventing the buildup of the vapors within the building.

As part of its investigation into this incident, the CSB reviewed the requirements of the International Fire Code chapters on Hazardous Materials – General Provisions and Flammable and Combustible Liquids both then and again now. Nothing in the code requires temperature limit controls and/or sealed and vented process vessels when heating flammable and combustible limits above their flash points.

As the result of the investigation, the CSB issued the following recommendation to the International Code Council:

CSB Recommendation No. 2007-03-I-MA-R11

Revise the International Fire Code: Chapter 20: - Specifically include "printing inks" in the definition of "organic coating." - Define equipment specifically discussed in the standard, such as open and closed kettles. - Require heated tanks and vessels containing flammable and combustible liquids to have equipment to prevent overheating, such as: devices to stop the heating process if the temperature exceeds the safe operating limits; devices to stop the heating process if the flammable vapor control equipment malfunctions (e.g., building ventilation system or heated tank vent); and a heating medium that is unable to heat the tank above safe operating temperatures. Chapters 20, 27, and 34: -Define "open", "closed", and "sealed and vented" process tanks. -Define "non-listed" process tanks. -Prohibit heating flammable and combustible liquids above their flashpoints in tanks inside buildings unless the tanks are sealed and vented to the building exterior.

The language proposed is intended to satisfactorily implement the objectives of this recommendation.

Bibliography: U.S. Chemical Safety and Hazard Investigation Board (CSB), "Confined Vapor Cloud Explosion", 13 May 2008. [Online]. Available: https://www.csb.gov/assets/1/20/CSBFinalReportCAIExplosion.pdf?13735. [Accessed 30 November 2023].

Cost Impact: Increase

Estimated Immediate Cost Impact:

$8,240 for Venting and $21,555 for Temperature Limit Control

Estimated Immediate Cost Impact Justification (methodology and variables):

The simplest means of venting the vapors from a heated process vessel is to create an opening in the top of the vessel, install piping through the roof to the outside, and install an end of the line flame arrestor. The flame arrestor is not technically necessary to accomplish the purpose sought by the code change proposal, but is necessary for safe operation. The cost to accomplish this is $480 for piping, $2,000 for a flame arrestor, and $5,760 for labor according to the information contained within “Appendix D: Capital Cost Guidelines” of *Rules of Thumb in Engineering Practice*.

$480 (Piping) + $2,000 (Flame Arrestor) + $5,760 (Labor (All)) = $8,240

The cost of installing a temperature limit control is $21,555. $16,300 for materials and $5,255 for labor. This is according to the information contained within “Appendix D: Capital Cost Guidelines” of *Rules of Thumb in Engineering Practice*.

Temperature Sensor ($6,000 (Materials) + $1,200 (Labor) = $7,200

Hi-Lo Shutoff ($5,500 (Materials) + $3,575 (Labor) = $9,075

Control Valve ($4,800 (Materials) + $480 (Labor) = $5,280

Total: **=** $21,555

Cost Source: Woods, P. D. (2007). *Rules of Thumb in Engineering Practice.* Weinheim, Germany: Wiley-VCH.

Estimated Life Cycle Cost Impact:

N/A

Estimated Life Cycle Cost Impact Justification (methodology and variables):

N/A

F257-24

F258-24

IFC: 5705.5, 5705.5.1

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Jeff O'Neil, Chair, Committee on Healthcare (ahc@iccsafe.org); Jonathan Flannery, Pandemic Task Force Code Development Working Group, PTF CDWG (jflannery@aha.org)

2024 International Fire Code

Revise as follows:

5705.5 Alcohol-based hand rubs classified as Class I or II liquids.
The use of dispensers containing alcohol-based hand rubs classified as Class I or II liquids shall be in accordance with all of the following:

1. The maximum capacity of each dispenser shall be 68 ounces (2 L).
2. The minimum separation between dispensers shall be 48 inches (1219 mm).
3. Dispensers shall not be located above, below or closer than 1 inch (25 mm) to an electrical receptacle, switch, appliance, device or other ignition source. The wall space between the dispenser and the floor or intervening counter top shall be free of electrical receptacles, switches, appliances, devices or other ignition sources.
4. Wall mounted ~~Dispensers~~ dispensers and dispensers on stands shall be located so that the bottom of the dispenser is not less than 42 inches (1067 mm) and not more than 48 inches (1219 mm) above the finished floor.
5. Dispensers shall not obstruct required means of egress or be placed within 3 feet (914 mm) of an open flame, heating device or other ignition source.
6. Dispensers shall not release their contents except when the dispenser is manually activated. Facilities shall be permitted to install and use automatically activated “touch free” alcohol-based hand-rub dispensing devices with the following requirements:
    6.1. The facility or persons responsible for the dispensers shall test the dispensers each time a new refill is installed in accordance with the manufacturer’s care and use instructions.

    6.2. Dispensers shall be designed and must operate in a manner that ensures accidental or malicious activations of the dispensing device are minimized. At a minimum, all devices subject to or used in accordance with this section shall have the following safety features:

        6.2.1. Any activations of the dispenser shall only occur when an object is placed within 4 inches (98 mm) of the sensing device.

        6.2.2. The dispenser shall not dispense more than the amount required for hand hygiene consistent with label instructions as regulated by the United States Food and Drug Administration (USFDA).

        6.2.3. An object placed within the activation zone and left in place will cause only one activation.
7. Storage and use of alcohol-based hand rubs shall be in accordance with the applicable provisions of Sections 5704 and 5705.
8. Dispensers located in occupancies with carpeted floors shall only be allowed in *smoke compartments* or *fire areas* equipped throughout with an *approved automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2.

5705.5.1 Corridor installations. In addition to the provisions of Section 5705.5, where dispensers containing alcohol-based hand rubs are located in *corridors* or rooms and areas open to the *corridor*, they shall be in accordance with all of the following:

1. Where located in a corridor, dispensers shall be wall mounted

~~1~~2. Level 2 and 3 aerosol ~~containers~~ dispensers shall not be ~~allowed~~ permitted in *corridors*.

~~2~~3. The maximum capacity of each ~~Class I or II~~ liquid dispenser shall be 41 ounces (1.21 L) and the maximum capacity of each Level 1 aerosol dispenser shall be 18 ounces (0.51 kg).

~~3~~4. The maximum quantity <u>of alcohol-based hand rub solution in dispensers </u>allowed in a *corridor* within a *control area* shall be 10 gallons (37.85 L) of Class I or II liquids or 1135 ounces (32.2 kg) of Level 1 aerosols, or a combination of Class I or II liquids and Level 1 aerosols not to exceed, in total, the equivalent of 10 gallons (37.85 L) or 1,135 ounces (32.2 kg) such that the sum of the ratios of the liquid and aerosol quantities divided by the allowable quantity of liquids and aerosols, respectively, shall not exceed one.

~~4~~5. Projections into a *corridor* shall be in accordance with Section 1003.3.3.

Reason: This is a simple clean-up to the changes approved last cycle.

1. Provides a clarification of requirements to differentiate permanent wall-mounted dispenser requirements which have been in the IFC for many cycles from other types of dispensers such as floor-supported, desktop or counter located that are currently being used.

2. ABHR dispensers are often located on countertops or desktops in areas other than corridors that would not comply with the height minimum and maximum requirement. Provides correlation for the allowance for these types of free-standing dispensers permitted by this section.

3. The new Item #1 clarifies that ABHR dispensers in corridors must be wall mounted to reduce the risk of movable dispensers and dispensers on stands being tipped-over creating an obstruction to the required corridor width. Dispensers in “rooms or areas open to the corridor” can be free-standing or placed on a countertop or desktop as these would not create corridor obstructions.

4. The moved Items #2, #3 and #4 are editorial only to provide better clarity of the existing requirements.
5. Exception #4 in 5705.5 provides minor editorial changes for consistency in terminology usage with other sections of section 5705.5.*Just for easy reference*: [BE] CORRIDOR. An enclosed exit access component that defines and provides a path of egress travel.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC), ICC Committee for Healthcare (CHC) and the Pandemic Task Force Code Development Work Group (PTF CDWG).

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

The Committee on Healthcare (CHC) was established by the ICC Board of Directors in 2011 to pursue opportunities to study and develop effective and efficient provisions for Hospital, Nursing Homes, Assisted Living and Ambulatory Care Facilities. This committee was formed in cooperation with the American Society for Healthcare Engineering (ASHE). In July of 2017, the ICC Board made CHC a standing committee. In 2023 the CHC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the CHC website at CHC webpage.

The ICC/NEHA Pandemic Task Force (PTF) was organized and tasked with researching the effects of the COVID-19 pandemic on the built environment and developing a roadmap and proposing needed resources – including guidelines, recommended practices, publications and updates to the International Codes® (I-Codes®) – that are necessary to overcome the numerous challenges that may be faced during future pandemics and to construct and manage safe, sustainable and affordable occupancy of the built environment. The ICC Pandemic Task Force Code Development Work Group (PTF CDWG) has conducted a comprehensive review of current code requirements as they relate to the prevention of the transmission of diseases and other serious health concerns and suggested revisions to current code requirements based on this assessment.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is simply clarifying the intended application of the ABHR requirements as revised for the 2024 IFC.

F258-24

F259-24

IFC: 5705.5

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Jeff O'Neil, Chair, Committee on Healthcare (ahc@iccsafe.org); Jonathan Flannery, Pandemic Task Force Code Development Working Group, PTF CDWG (jflannery@aha.org)

2024 International Fire Code

Revise as follows:

5705.5 Alcohol-based hand rubs classified as Class I or II liquids.
The use of dispensers containing alcohol-based hand rubs classified as Class I or II liquids shall be in accordance with all of the following:

1. In health care facilities, the maximum capacity of each dispenser shall be 41 ounces (1.21 L) in rooms, corridors and areas open to corridors and 68 ounces (2.0 L) in care suites. In all other facilities, the maximum capacity of each wall-mounted dispenser shall be 68 ounces (2 L) and any other dispenser shall be 1 gallon (4 L).

2. The aggregate quantity within a control area, or smoke compartment in health care facilities, shall not exceed 30 gallons (37.85 L) of liquids or 1135 ounces (32.2 kg) of Level 1 aerosols, or a combination of liquids and aerosols not to exceed, in total, the equivalent of 30 gallons (37.85 L) or 1,135 ounces (32.2 kg) such that the sum of the ratios of the liquid and aerosol quantities divided by the allowable quantity of liquids and aerosols, respectively, shall not exceed one.
Exception: In a single story building with only one control area, the aggregate quantity limit shall be based on 1 gal per 900 sq. ft. (84 sq. m)

~~2~~3. The minimum separation between dispensers shall be 48 inches (1219 mm).

~~3~~4. Dispensers shall not be located above, below or closer than 1 inch (25 mm) to an electrical receptacle, switch, appliance, device or other ignition source. The wall space between the dispenser and the floor or intervening counter top shall be free of electrical receptacles, switches, appliances, devices or other ignition sources.

~~4~~5. Dispensers shall be located so that the bottom of the dispenser is not less than 42 inches (1067 mm) and not more than 48 inches (1219 mm) above the finished floor.

~~5~~6. Dispensers shall not obstruct required means of egress or be placed within 3 feet (914 mm) of an open flame, heating device or other ignition source.

~~6~~7. Dispensers shall not release their contents except when the dispenser is manually activated. Facilities shall be permitted to install and use automatically activated "touch free" alcohol-based hand-rub dispensing devices with the following requirements:
   - ~~6~~7.1. The facility or persons responsible for the dispensers shall test the dispensers each time a new refill is installed in accordance with the manufacturer's care and use instructions.
   - ~~6~~7.2. Dispensers shall be designed and must operate in a manner that ensures accidental or malicious activations of the dispensing device are minimized. At a minimum, all devices subject to or used in accordance with this section shall have the following safety features:
     - ~~6.2.1.~~ 7.2.1 Any activations of the dispenser shall only occur when an object is placed within 4 inches (98 mm) of the sensing device.
     - ~~6.2.2.~~ 7.2.2 The dispenser shall not dispense more than the amount required for hand hygiene consistent with label instructions as regulated by the United States Food and Drug Administration (USFDA).
     - ~~6.2.3.~~ 7.2.3 An object placed within the activation zone and left in place will cause only one activation.

~~7~~8. Storage and use of alcohol-based hand rubs shall be in accordance with the applicable provisions of Sections 5704 and 5705.

Reason: This proposal adds two new reasonable requirements for maximum quantity limitations of alcohol-based hand rub dispensers in use throughout buildings in control areas, smoke compartments, rooms, corridors and rooms that open to corridors. These MAQ limitations are based on experience over the past 4 years of the pandemic by both health care facilities and other occupancy types. The higher quantity of allowable alcohol-based hand rub solution in dispensers is increased from 10 Gallons to 30 Gallons per control area. This is a reasonable increase in MAQ and is supported by the increased quantities that have been safely utilized in all public buildings during the pandemic.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC), ICC Committee for Healthcare (CHC) and the Pandemic Task Force Code Development Work Group (PTF CDWG)

This proposal is submitted by the ICC Fire Code Action Committee (FCAC) and ICC Committee for Healthcare (CHC). FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

The Committee on Healthcare (CHC) was established by the ICC Board of Directors in 2011 to pursue opportunities to study and develop effective and efficient provisions for Hospital, Nursing Homes, Assisted Living and Ambulatory Care Facilities. This committee was formed in cooperation with the American Society for Healthcare Engineering (ASHE). In July of 2017, the ICC Board made CHC a standing committee. In 2023 the CHC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the CHC website at CHC webpage.

The ICC/NEHA Pandemic Task Force (PTF) was organized and tasked with researching the effects of the COVID-19 pandemic on the built environment and developing a roadmap and proposing needed resources – including guidelines, recommended practices, publications and updates to the International Codes® (I-Codes®) – that are necessary to overcome the numerous challenges that may be faced during future pandemics and to construct and manage safe, sustainable and affordable occupancy of the built environment. The ICC Pandemic Task Force Code Development Work Group (PTF CDWG) has conducted a comprehensive review of current code requirements as they relate to the prevention of the transmission of diseases and other serious health concerns and suggested revisions to current code requirements based on this assessment.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0.00

Estimated Immediate Cost Impact Justification (methodology and variables):

This proposal does not impose any requirements that would increase construction cost. There is no requirement for the installation of alcohol-based hand rub dispensers imposed by this proposal. Installation of dispensers is a choice and where installed, reasonable MAQ limitation for a Class I or Class II liquid is an appropriate safety measure.

F259-24

F260-24

IFC: 5705.5, 5705.5.2 (New), TABLE 5003.1.1(5); IBC: TABLE 307.1.1

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Jeff O'Neil, Chair, Committee on Healthcare (ahc@iccsafe.org)

2024 International Fire Code

Revise as follows:

5705.5 Alcohol-based hand rubs classified as Class I or II liquids.
The use of dispensers containing alcohol-based hand rubs classified as Class I or II liquids shall be in accordance with all of the following:

1. The maximum capacity of each dispenser shall be 68 ounces (2 L).
2. The minimum separation between dispensers shall be 48 inches (1219 mm).
3. Dispensers shall not be located above, below or closer than 1 inch (25 mm) to an electrical receptacle, switch, appliance, device or other ignition source. The wall space between the dispenser and the floor or intervening counter top shall be free of electrical receptacles, switches, appliances, devices or other ignition sources.
4. Dispensers shall be located so that the bottom of the dispenser is not less than 42 inches (1067 mm) and not more than 48 inches (1219 mm) above the finished floor.
5. Dispensers shall not obstruct required means of egress or be placed within 3 feet (914 mm) of an open flame, heating device or other ignition source.
6. Dispensers shall not release their contents except when the dispenser is manually activated. Facilities shall be permitted to install and use automatically activated “touch free” alcohol-based hand-rub dispensing devices with the following requirements:
   6.1. The facility or persons responsible for the dispensers shall test the dispensers each time a new refill is installed in accordance with the manufacturer’s care and use instructions.

   6.2. Dispensers shall be designed and must operate in a manner that ensures accidental or malicious activations of the dispensing device are minimized. At a minimum, all devices subject to or used in accordance with this section shall have the following safety features:
      6.2.1. Any activations of the dispenser shall only occur when an object is placed within 4 inches (98 mm) of the sensing device.

      6.2.2. The dispenser shall not dispense more than the amount required for hand hygiene consistent with label instructions as regulated by the United States Food and Drug Administration (USFDA).

      6.2.3. An object placed within the activation zone and left in place will cause only one activation.

7. Storage ~~and use~~ of alcohol-based hand rub ~~rubs~~ solution not in use shall be in accordance with Section 5705.5.2 ~~the applicable provisions of Sections 5704 and 5705~~.
8. Dispensers located in occupancies with carpeted floors shall only be allowed in *smoke compartments* or *fire areas* equipped throughout with an *approved automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2.

Add new text as follows:

5705.5.2 Storage of alcohol-based hand rub solutions classified as Class I or II liquids.. The indoor storage of alcohol-based hand rub solution, classified as Class I or II liquids flammable or combustible, shall be in accordance with all of the following:

Exception: Alcohol-based hand rub dispensers for personal use with an aggregate of not more than 16 oz (474 ml) at a workstation shall not be included in determining the MAQ.

1. The maximum capacity of individual alcohol-based hand rub solution storage containers shall be 1 gallon (4 L) and the container shall be constructed of a material compatible with the alcohol-based solution.

2. Storage of alcohol-based hand rub solutions in basements or below grade shall be protected throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

5705.5.2 TABLE MAXIMUM ALLOWABLE QUANTITY OF ALCOHOL-BASED HAND RUB SOLUTION IN STORAGEe

STORAGE LOCATION	SPRINKLERED	NONSPRINKLERED
Open storage areas[c]	60 Gal	30 Gal
Non-dedicated storage room[a]	120 Gal	60 Gal
Non-dedicated storage room; 1-HR fire separation[a,d]	240 Gal	120 Gal
Non-dedicated storage room; 2-HR fire separation[a,d]	360 Gal	240 Gal
Dedicated storage room[b]	360 Gal	240 Gal
Dedicated storage room; 1-HR fire separation[b,d]	600 Gal	240 Gal
Dedicated storage room; 2-HR fire separation[b,d]	720 Gal	240 Gal

a. Non-dedicated storage room is an enclosed storage room complying with the applicable storage requirements of this code.

b. Dedicated storage room is an enclosed storage room used only for the storage of alcohol-based hand rub solution.

c. The number of open storage areas is limited to 1 per story or fire area with a maximum, of 4 per building

d. Fire separation shall be fire resistance-rated construction separating the dedicated storage room from the remainder of the building.

e. The maximum allowable quantity is for per control area, or smoke compartment in health care facilities.

Revise as follows:

TABLE 5003.1.1(5) HAZARDOUS MATERIALS EXEMPTIONS[a]

MATERIAL CLASSIFICATION	OCCUPANCY OR APPLICATION	EXEMPTION
Combustible fiber	Baled cotton	Densely packed baled cotton shall not be classified as combustible fiber, provided that the bales comply with the packing requirements of ISO 8115.
Corrosive	Building materials	The quantity of commonly used building materials that are classified as corrosive materials is not limited.
	Personal and household products	The quantity of personal and household products that are classified as corrosive materials is not limited in retail displays, provided that the products are in original packaging.
	Retail and wholesale sales occupancies	The quantity of medicines, foodstuffs or consumer products, and cosmetics containing not more than 50 percent by volume of water-miscible liquids, with the remainder of the solutions not being flammable, is not limited. To qualify for this allowance, such materials shall be packaged in individual containers not exceeding 1.3 gallons.
Explosives	Groups B, F, M and S	Storage of special industrial explosive devices is not limited.
	Groups M and R-3	Storage of black powder, smokeless propellant, and small arms primers is not limited.
Flammable and combustible liquids and gases	Aerosols	Buildings and structures occupied for the storage of aerosol products, aerosol cooking spray products, or plastic aerosol 3 products shall be classified as Group S-1.
	Alcoholic beverages	The quantity of alcoholic beverages in liquor stores and distributors without bulk storage is not limited.
		The quantity of alcoholic beverages in distilling or brewing of beverages is not limited.
		The storage quantity of beer, distilled spirits and wines in barrels and casks is not limited.

		The quantity of alcoholic beverages in retail and wholesale sales occupancies is not limited. To qualify for this allowance, beverages shall be packaged in individual containers not exceeding 1.3 gallons.
	Cleaning establishments with combustible liquid solvents	The quantity of combustible liquid solvents used in closed systems and having a flash point at or above 140°F is not limited. To qualify for this allowance, equipment shall be listed by an approved testing agency and the occupancy shall be separated from all other areas of the building by 1-hour fire barriers or 1-hour horizontal assemblies, or both, constructed in accordance with the *International Building Code*.
		The quantity of combustible liquid solvents having a flash point at or above 200°F is not limited.
	Closed piping systems	The quantity of flammable and combustible liquids and gases utilized for the operation of machinery or equipment is not limited.
	Flammable finishing operations using flammable and combustible liquids	Buildings and structures occupied for the application of flammable finishes shall comply with Section 416.
	Fuel	The quantity of liquid or gaseous fuel in fuel tanks on vehicles or motorized equipment is not limited.
		The quantity of gaseous fuels in piping systems and fixed appliances regulated by the *International Fuel Gas Code* is not limited.
		The quantity of liquid fuels in piping systems and fixed appliances regulated by the *International Mechanical Code* is not limited.
	Fuel oil	The quantity of fuel oil storage complying with Section 605.4.2 is not limited.
	Hand sanitizer	The quantity of alcohol-based hand rubs (ABHR) classified as Class I or II liquids in dispensers installed in accordance with Sections 5705.5 and 5705.5.1 is not limited. The location of the ABHR shall be provided in the construction documents. The quantity of alcohol-based hand rubs classified as Class I or II liquids in storage in accordance with Section 5705.5.2.
	Retail and wholesale sales occupancies with flammable and combustible liquids	The quantity of medicines, foodstuffs or consumer products, and cosmetics containing not more than 50 percent by volume of water-miscible liquids, with the remainder of the solutions not being flammable, is not limited. To qualify for this allowance, such materials shall be packaged in individual containers not exceeding 1.3 gallons.
Highly toxic and toxic materials	Retail and wholesale sales occupancies	The quantity of medicines, foodstuffs or consumer products, and cosmetics containing not more than 50 percent by volume of water-miscible liquids, with the remainder of the solutions not being flammable, is not limited. To qualify for this allowance, such materials shall be packaged in individual containers not exceeding 1.3 gallons.
Any	Agricultural materials	The quantity of agricultural materials stored or utilized for agricultural purposes on the premises is not limited.
	Energy storage	The quantity of hazardous materials in stationary storage battery systems is not limited.
		The quantity of hazardous materials in stationary fuel cell power systems is not limited.
		The quantity of hazardous materials in capacitor energy storage systems is not limited.
	Refrigeration systems	The quantity of refrigerants in refrigeration systems is not limited.

For SI: 1 gallon = 3.785 L, °C = (°F – 32)/1.8.

a. Exempted materials and conditions listed in this table are required to comply with provisions of this code that are not based on exceeding maximum allowable quantities in Section 5003.

2024 International Building Code

Revise as follows:

TABLE 307.1.1 HAZARDOUS MATERIALS EXEMPTIONS[a]

MATERIAL CLASSIFICATION	OCCUPANCY OR APPLICATION	EXEMPTION
Combustible fiber	Baled cotton	Densely packed baled cotton shall not be classified as combustible fiber, provided that the bales comply with the packing requirements of ISO 8115.
Corrosive	Building materials	The quantity of commonly used building materials that are classified as corrosive materials is not limited.
	Personal and household products	The quantity of personal and household products that are classified as corrosive materials is not limited in retail displays, provided that the products are in original packaging.

	Retail and wholesale sales occupancies	The quantity of medicines, foodstuffs or consumer products, and cosmetics containing not more than 50 percent by volume of water-miscible liquids, with the remainder of the solutions not being flammable, is not limited. To qualify for this allowance, such materials shall be packaged in individual containers not exceeding 1.3 gallons.
Explosives	Groups B, F, M and S	Storage of special industrial explosive devices is not limited.
	Groups M and R-3	Storage of black powder, smokeless propellant and small arms primers is not limited.
Flammable and combustible liquids and gases	Aerosols	Buildings and structures occupied for the storage of aerosol products, aerosol cooking spray products, or plastic aerosol 3 products shall be classified as Group S-1.
	Alcoholic beverages	The quantity of alcoholic beverages in liquor stores and distributors without bulk storage is not limited.
		The quantity of alcoholic beverages in distilling or brewing of beverages is not limited.
		The storage quantity of beer, distilled spirits and wines in barrels and casks is not limited.
		The quantity of alcoholic beverages in retail and wholesale sales occupancies is not limited. To qualify for this allowance, beverages shall be packaged in individual containers not exceeding 1.3 gallons.
	Cleaning establishments with combustible liquid solvents	The quantity of combustible liquid solvents used in closed systems and having a flash point at or above 140ºF is not limited. To qualify for this allowance, equipment shall be listed by an approved testing agency and the occupancy shall be separated from all other areas of the building by 1-hour fire barriers constructed in accordance with Section 707 or 1-hour horizontal assemblies constructed in accordance with Section 711, or both
		The quantity of combustible liquid solvents having a flash point at or above 200ºF is not limited.
	Closed piping systems	The quantity of flammable and combustible liquids and gases utilized for the operation of machinery or equipment is not limited.
	Fuel	The quantity of liquid or gaseous fuel in fuel tanks on vehicles or motorized equipment is not limited.
		The quantity of gaseous fuels in piping systems and fixed appliances regulated by the International Fuel Gas Code is not limited.
		The quantity of liquid fuels in piping systems and fixed appliances regulated by the International Mechanical Code is not limited.
	Flammable finishing operations using flammable and combustible liquids	Buildings and structures occupied for the application of flammable finishes shall comply with Section 416.
	Fuel oil	The quantity of fuel oil storage complying with Section 605.4.2 of the *International Fire Code* is not limited. .
	Hand sanitizer	The quantity of alcohol-based hand rubs (ABHR) classified as Class I or II liquids in dispensers installed in accordance with Sections 5705.5 and 5705.5.1 of the *International Fire Code* is not limited. The location of the ABHR dispensers shall be provided in the construction documents. The quantity of alcohol-based hand rubs classified as Class I or II liquids in storage in accordance with Section 5705.5.2 of the *International Fire Code.*
	Retail and wholesale sales occupancies with flammable and combustible liquids	The quantity of medicines, foodstuffs or consumer products, and cosmetics containing not more than 50 percent by volume of water-miscible liquids, with the remainder of the solutions not being flammable, is not limited. To qualify for this allowance, such materials shall be packaged in individual containers not exceeding 1.3 gallons.
Highly toxic and toxic materials	Retail and wholesale sales occupancies	The quantity of medicines, foodstuffs or consumer products, and cosmetics containing not more than 50 percent by volume of water-miscible liquids, with the remainder of the solutions not being flammable, is not limited. To qualify for this allowance, such materials shall be packaged in individual containers not exceeding 1.3 gallons.
Any	Agricultural materials	The quantity of agricultural materials stored or utilized for agricultural purposes on the premises is not limited.
	Energy storage	The quantity of hazardous materials in stationary storage battery systems is not limited.
		The quantity of hazardous materials in stationary fuel cell power systems is not limited.
		The quantity of hazardous materials in capacitor energy storage systems is not limited.
	Refrigeration Systems	The quantity of refrigerants in refrigeration systems is not limited.

For SI: 1 gallon = 3.785L, °C = (°F - 32)/1.8.

a. Exempted materials and conditions listed in this table are required to comply with applicable provisions of the International Fire Code.

Reason: The main purpose of this proposal is to add a new Section (5705.5.2) for storage requirements and quantity limitations. This new section adds reasonable storage quantity limits and requirements based on experience over the past 4 years of the pandemic. Two key points to consider.1. Alcohol-based hand-sanitizer solutions at the 60 - 95% level recommended by CDC are classified as Class IB based on flashpoint. However, alcohol type polar solvents have other characteristics that differentiate them from the more volatile petroleum-based flammable (ignitable) liquids: quick evaporation, water-soluble, respond well to water based automatic fire sprinklers. 2. The proposed storage quantity allowances are for ABHR replacement solution stored in their factory containers intended for replacement qualities of one dispenser can be compared to MAQs permitted for Class IB flammable liquids in Group M Occupancies for wholesale and retail sales uses (Table5704.3.4.1) need to explain this comparison; the values don't match. The proposal addresses storage of alcohol-based rub solutions in a maximum individual container size of 1 gallon; provides maximum storage quantities for sprinklered and nonsprinklered buildings and incorporates allowances for higher storage quantities based on whether the storage room is for only alcohol-based sanitizer solutions and whether the storage room has 1 or 2 hour fire resistance rated construction for compartmentation of the hazard. The current MAQs for Class IB flammable liquids (typical classification for an alcohol-based hand rub solutions) is 120 gallons with 100% increase for sprinklers and approved storage cabinets). The quantities in Table 5705.5.2 are modeled after these MAQ allowances recognizing: the storage challenges created during the pandemic and the experience of storage in these amounts without unreasonable fire risk or notable fire incidents; the benefit of fire sprinkler protection and fire separations for hazard mitigation for ABHR solution in storage.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC), ICC Committee for Healthcare (CHC) and the Pandemic Task Force Code Development Work Group (PTF CDWG).

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**.

The Committee on Healthcare (CHC) was established by the ICC Board of Directors in 2011 to pursue opportunities to study and develop effective and efficient provisions for Hospital, Nursing Homes, Assisted Living and Ambulatory Care Facilities. This committee was formed in cooperation with the American Society for Healthcare Engineering (ASHE). In July of 2017, the ICC Board made CHC a standing committee. In 2023 the CHC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the CHC website at CHC webpage.

The ICC/NEHA Pandemic Task Force (PTF) was organized and tasked with researching the effects of the COVID-19 pandemic on the built environment and developing a roadmap and proposing needed resources – including guidelines, recommended practices, publications and updates to the International Codes® (I-Codes®) – that are necessary to overcome the numerous challenges that may be faced during future pandemics and to construct and manage safe, sustainable and affordable occupancy of the built environment. The ICC Pandemic Task Force Code Development Work Group (PTF CDWG) has conducted a comprehensive review of current code requirements as they relate to the prevention of the transmission of diseases and other serious health concerns and suggested revisions to current code requirements based on this assessment.

Cost Impact: Increase

Estimated Immediate Cost Impact:

$0.00

Estimated Immediate Cost Impact Justification (methodology and variables):

Storage of ABHR solution is not mandated by this code requirement, but the storage of large quantities of ABHR may necessitate the construction of separated storage room (fire resistance-rated construction) or the installation of an automatic fire sprinkler system. In those instances there could be a cost for construction for new buildings or a cost of construction to renovate an existing building. However, these requirements provide an increase in amounts of hazardous materials thus further avoiding classification as a Group H occupancy.

F260-24

F261-24

IFC: SECTION 5706, 5706.5.4.5, SECTION 5707, 5707.2, 5707.2.2, 5707.2.1

Proponents: Robert J Davidson, Davidson Code Concepts LLC, Self (rjd@davidsoncodeconcepts.com); Darcy Davidson, Carlsbad Fire Department, California Fire Prevention Officers (darcy.davidson@carlsbadca.gov)

2024 International Fire Code

SECTION 5706
SPECIAL OPERATIONS

Delete without substitution:

~~**5706.5.4.5 Commercial, industrial, governmental or manufacturing.**~~
~~Dispensing of Class I, II and III motor vehicle fuel from tank vehicles into the fuel tanks of motor vehicles located at commercial, industrial, governmental or manufacturing establishments is allowed where *approved*, provided that such dispensing operations are conducted in accordance with the following:~~

1. ~~Dispensing shall occur only at sites that have been issued a permit to conduct *mobile fueling*.~~
2. ~~The *owner* of a *mobile fueling* operation shall provide to the jurisdiction a written response plan that demonstrates readiness to respond to a fuel spill and carry out appropriate mitigation measures, and describes the process to dispose properly of contaminated materials.~~
3. ~~A detailed site plan shall be submitted with each application for a permit. The site plan shall indicate: all buildings, structures and appurtenances on site and their use or function; all uses adjacent to the *lot lines* of the site; the locations of all storm drain openings, adjacent waterways or wetlands; information regarding slope, natural drainage, curbing, impounding and how a spill will be retained on the site property; and the scale of the site plan.~~
   ~~Provisions shall be made to prevent liquids spilled during dispensing operations from flowing into buildings or off-site. Acceptable methods include, but shall not be limited to, grading driveways, raising doorsills or other *approved* means.~~
4. ~~The *fire code official* is allowed to impose limits on the times and days during which *mobile fueling* operations is allowed to take place, and specific locations on a site where fueling is permitted.~~
5. ~~*Mobile fueling* operations shall be conducted in areas not open to the public or shall be limited to times when the public is not present.~~
6. ~~*Mobile fueling* shall not take place within 15 feet (4572 mm) of buildings, property lines, combustible storage or storm drains.~~

   ~~**Exceptions:**~~

   1. ~~The distance to storm drains shall not apply where an *approved* storm drain cover or an *approved* equivalent that will prevent any fuel from reaching the drain is in place prior to fueling or a fueling hose being placed within 15 feet (4572 mm) of the drain. Where placement of a storm drain cover will cause the accumulation of excessive water or difficulty in conducting the fueling, such cover shall not be used and the fueling shall not take place within 15 feet (4572 mm) of a drain.~~
   2. ~~The distance to storm drains shall not apply for drains that direct influent to *approved* oil interceptors.~~

7. ~~The tank vehicle shall comply with the requirements of NFPA 385 and local, state and federal requirements. The tank vehicle's specific functions shall include that of supplying fuel to motor vehicle fuel tanks. The vehicle and all its equipment shall be maintained in good repair.~~
8. ~~Signs prohibiting smoking or open flames within 25 feet (7620 mm) of the tank vehicle or the point of fueling shall be prominently posted on three sides of the vehicle including the back and both sides.~~
9. ~~A portable fire extinguisher with a minimum rating of 40:BC shall be provided on the vehicle with signage clearly indicating its location.~~

~~10. The dispensing nozzles and hoses shall be of an *approved* and *listed* type.~~

~~11. The dispensing hose shall not be extended from the reel more than 100 feet (30 480 mm) in length.~~

~~12. Absorbent materials, nonwater-absorbent pads, a 10-foot-long (3048 mm) containment boom, an *approved* container with lid and a nonmetallic shovel shall be provided to mitigate a minimum 5-gallon (19 L) fuel spill.~~

~~13. Tank vehicles shall be equipped with a "fuel limit" switch such as a count-back switch, to limit the amount of a single fueling operation to not more than 500 gallons (1893 L) before resetting the limit switch.~~

~~**Exception:** Tank vehicles where the operator carries and can utilize a remote emergency shutoff device that, when activated, immediately causes flow of fuel from the tank vehicle to cease.~~

~~14. Persons responsible for dispensing operations shall be trained in the appropriate mitigating actions in the event of a fire, leak or spill. Training records shall be maintained by the dispensing company.~~

~~15. Operators of tank vehicles used for *mobile fueling* operations shall have in their possession at all times an emergency communications device to notify the proper authorities in the event of an emergency.~~

~~16. The tank vehicle dispensing equipment shall be constantly attended and operated only by designated personnel who are trained to handle and dispense motor fuels.~~

~~17. Fuel dispensing shall be prohibited within 25 feet (7620 mm) of any source of ignition.~~

~~18. The engines of vehicles being fueled shall be shut off during dispensing operations.~~

~~19. Nighttime fueling operations shall only take place in adequately lighted areas.~~

~~20. The tank vehicle shall be positioned with respect to vehicles being fueled to prevent traffic from driving over the delivery hose.~~

~~21. During fueling operations, tank vehicle brakes shall be set, chock blocks shall be in place and warning lights shall be in operation.~~

~~22. Motor vehicle fuel tanks shall not be topped off.~~

~~23. The dispensing hose shall be properly placed on an *approved* reel or in an *approved* compartment prior to moving the tank vehicle.~~

~~24. The *fire code official* and other appropriate authorities shall be notified when a reportable spill or unauthorized discharge occurs.~~

~~25. Operators shall place a drip pan or an absorbent pillow under each fuel fill opening prior to and during dispensing operations. Drip pans shall be liquid-tight. The pan or absorbent pillow shall have a capacity of not less than 3 gallons (11.36 L). Spills retained in the drip pan or absorbent pillow need not be reported. Operators, when fueling, shall have on their person an absorbent pad capable of capturing diesel fuel overfills. Except during fueling, the nozzle shall face upward and an absorbent pad shall be kept under the nozzle to catch drips. Contaminated absorbent pads or pillows shall be disposed of regularly in accordance with local, state and federal requirements.~~

SECTION 5707
ON-DEMAND MOBILE FUELING OPERATIONS

5707.2 Mobile fueling vehicle.
An on-demand *mobile fueling* vehicle shall be that which is utilized in on-demand fueling operations for the dispensing of Class I, II or III liquids into the fuel tanks of motor vehicles.

Revise as follows:

~~5707.2.2~~ <u>5707.2.1</u> Mobile fueling vehicle requirements.
Each *mobile fueling* vehicle shall comply with all local, state and federal requirements, as well as the following:

~~1.~~ ~~*Mobile fueling* vehicles with a chassis-mounted tank in excess of 110 gallons (416 L) shall also comply with the requirements of Section 5706.6 and NFPA 385.~~

~~2.~~ 1 The on-demand *mobile fueling* vehicle and its equipment shall be maintained in good repair.

~~3.~~ 2 Safety cans ~~and *approved* metal containers~~ shall be secured to the *mobile fueling* vehicle except when in use.

~~4.~~ 3. Fueling a motor vehicle from tanks or containers mounted in a trailer connected to a *mobile fueling* vehicle shall be prohibited.

~~5707.2.1~~ 5707.2.2 Mobile fueling vehicle classifications.

An on-demand *mobile fueling* vehicle shall be characterized as one of the following:

1. ~~**Tier 1 *mobile fueling* vehicle.** A tank vehicle that complies with NFPA 385 and that has chassis-mounted tanks where the aggregate capacity does not exceed 1,600 gallons (6057 L)~~ On-demand mobile fueling vehicles complying with Section 5706.6 and NFPA 385 with one or more chassis-mounted tanks or containers not exceeding an aggregate capacity of 3,000 gallons (11,356 L)..
2. ~~**Tier 2 *mobile fueling* vehicle.** A vehicle with one or more chassis-mounted tanks or containers that do not exceed 110 gallons (416 L) in capacity with an aggregate capacity that does not exceed 800 gallons (3028 L) or the weight capacity of the vehicle in accordance with DOTn~~ On-demand mobile fueling vehicles with one or more chassis-mounted tanks or containers and each tank or container does not exceed 110 gallons (416 L) shall not exceed an aggregate capacity of 800 gallons (3028 L)..
3. ~~**Tier 3 *mobile fueling* vehicle.** A vehicle that carries a maximum aggregate capacity of 60 gallons (227 L) of motor fuel in metal safety cans *listed* in accordance with UL 30 or other *approved* metal containers, each not to exceed 5 gallons (19 L) in capacity~~ Safety cans carried on mobile fueling vehicles shall be listed in accordance with UL 30 and shall not exceed 5 gallons (19 L) in capacity. The aggregate capacity of such safety cans shall not exceed 60 gallons (227 L).

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Reason: This proposal is intended to correct a conflict within the code, eliminate duplicate sections addressing the same activity and improve the language for On-Demand Mobile Fueling.

The proposal seeks to delete Section 5706.5.4.5 commonly known as Fleet Fueling. It is a form of mobile fueling which is now covered by Section 5707. There is no need to have two sections of the code covering the same activity.

Additionally, the addition of the Class I liquids to 5706.5.4.5 created serious conflicts between the levels of safety provided because 5706.5.4.5 was written to address hazards of Class II and Class III liquids two decades ago, and Section 5707 was written to specifically include and address the hazards of Class I liquid dispensing. See table for the serious disparities.

	Class II and III Section 5706.5.4.5	Class I Section 5707
Separation from buildings and lot lines	15′	25′
Tank Vehicle/mobile fuel vehicle fuel limits	None	1600/800/60 gal
Fuel limit switch	500 gal	30 gal
Dispensing hose length	100′	50′
Fire extinguisher rating	40:BC	4A:80-BC
Approval and listing of nozzles and hoses	None	Required
Listed breakaway at nozzle	None	Required
Safety Cones	None	Required
Vehicle Flashers	None	Required
Night delivery lighting	None	Required

What was commonly referred to as Fleet Fueling can easily comply with Section 5707 On-Demand Mobile Fueling with the proper safety protocols.

In Section 5707, Section 5707.2.1 and Section 5707.2.2 have been re-ordered to have the vehicle requirements comes first, then the vehicle classifications.

In the new Section 5707.2.1 Item 1 has been deleted and Item 1 under new Section 5707.2.2 has been modified to cover that topic.

In new Section 5707.2.1 Item 2 the "other approved metal" reference has been deleted as subjective language and to ensure "safety cans" are utilized.

In new Section 5707.2.2 The scoping has been changed from "classification" to "capacity". Though requested by industry the "tier" concept was not embraced and the core issue was always capacity.

New Section 5707.2.2 Item 1 has been modified to eliminate the tier language and to reference Section 5706.6 besides NFPA 385 to capture existing IFC requirements and the capacity has been increased to 3,000 gallons which is typically the size of a small oil delivery vehicle commonly on the road, this change recognizes that in some jurisdictions these vehicles are already in use for mobile fueling and to adjust the section due to the deletion of fleet fueling language.

New Section 5707.2.2 Item 2 has been modified to eliminate the Tier language and to eliminate a reference to DOTn weight capacity as that is an issue enforced by law enforcement agencies and DOT.

New Section 5707.2.3 has been modified to eliminate the Tier language and to delete reference to "other approved metal containers" to default to "safety cans".

The proposed changes eliminate duplication of sections covering the same topic, eliminate serious differences in safety levels provided, and increases the NFPA 385 compliant vehicle capacity to recognize capacities currently being safely utilized and which reduce the number of vehicle fills and trips necessary.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

There are no construction cost impacts, this language regulates mobile fueling activities utilizing vehicles.

F261-24

F262-24

IFC: 5803.1.1

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Robert J Davidson, Davidson Code Concepts LLC, Self (rjd@davidsoncodeconcepts.com); Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C., Self (jbengineer@aol.com)

2024 International Fire Code

Revise as follows:

5803.1.1 Special limitations for indoor storage and use.
Flammable gases shall not be stored or used in Group A, E, I or R occupancies or in offices in Group B occupancies.

Exceptions:

1. Cylinders of nonliquefied *compressed gases* not exceeding a capacity of 250 cubic feet (7.08 m^3) or liquefied gases not exceeding a capacity of 40 pounds (18 kg) each at *normal temperature and pressure (NTP)* used for maintenance purposes, patient care or operation of equipment.
2. Food service operations in accordance with Section 6103.2.1.7.
3. Hydrogen gas systems located in a hydrogen fuel gas room constructed in accordance with Section 421 of the International Building Code.
4. The temporary storage of Category 1B Flammable Gas refrigerants in machinery rooms during refrigeration equipment and system maintenance, that requires the refrigerant to be removed from the equipment.

Reason: During maintenance of refrigeration systems, the refrigerant is temporarily captured in compressed gas cylinders in the machinery room the refrigeration system is located within, then when maintenance or repair work is completed, the refrigerant is reloaded into the equipment. The new exception permits this necessary activity and correlates with the industry standards these activities are conducted under.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This added language addresses an operational issue not new construction. It clarifies that the prohibition in Section 5803.1.1 was not intended to apply to temporary storage of Category 1B Flammable Gas refrigerants in machinery rooms during refrigeration equipment and system maintenance.

F262-24

F263-24

IFC: TABLE 6104.3

Proponents: Bruce Swiecicki, National Propane Gas Association, National Propane Gas Association (bswiecicki@npga.org)

2024 International Fire Code

Revise as follows:

TABLE 6104.3 LOCATION OF LP-GAS CONTAINERS

LP-GAS CONTAINER CAPACITY (water gallons)[h]	MINIMUM SEPARATION BETWEEN LP-GAS CONTAINERS AND BUILDINGS, PUBLIC WAYS[g] OR LOT LINES OF ADJOINING PROPERTY THAT CAN BE BUILT ON		MINIMUM SEPARATION BETWEEN LP-GAS CONTAINERS[b, c] (feet)
	Mounded or underground LP-gas containers[a] (feet)	Above-ground LP-gas containers[b] (feet)	
Less than 125[c, d]	10	5[e]	None
125 to 250	10	10	None
251 to 500	10	10	3
501 to 2,000	10	25[e, f]	3
2,001 to 30,000	50	50	5
30,001 to 70,000	50	75	(0.25 of sum of diameters of adjacent LP-gas containers)
70,001 to 90,000	50	100	
90,001 to 120,000	50	125	

For SI: 1 foot = 304.8 mm, 1 gallon = 3.785 L.

a. Minimum distance for underground LP-gas containers shall be measured from the pressure relief device and the filling or liquid-level gauge vent connection at the container, except that all parts of an underground LP-gas container shall be not less than 10 feet from a building or lot line of adjoining property that can be built on.

b. For other than installations in which the overhanging structure is 50 feet or more above the relief-valve discharge outlet. In applying the distance between buildings and ASME LP-gas containers with a water capacity of 125 gallons or more, not less than 50 percent of this horizontal distance shall also apply to all portions of the building that project more than 5 feet from the building wall and that are higher than the relief valve discharge outlet. This horizontal distance shall be measured from a point determined by projecting the outside edge of such overhanging structure vertically downward to grade or other level on which the LP-gas container is installed. Distances to the building wall shall be not less than those prescribed in this table.

c. Where underground multicontainer installations are composed of individual LP-gas containers having a water capacity of 125 gallons or more, such containers shall be installed so as to provide access at their ends or sides to facilitate working with cranes or hoists.

d. At a consumer site, if the aggregate water capacity of a multiple-container installation, comprised of individual LP-gas containers having a water capacity of less than 125 gallons, is 500 gallons or more, the minimum distance shall comply with the appropriate portion of this table, applying the aggregate capacity rather than the capacity per LP-gas container. If more than one such installation is made, each installation shall be separated from other installations by not less than 25 feet. Minimum distances between LP-gas containers need not be applied.

e. The following shall apply to above-ground containers installed alongside buildings:

1. LP-gas containers of less than a 125-gallon water capacity are allowed without a separation distance where in compliance with Items 2, 3 and 4.

2. Department of Transportation (DOTn) specification LP-gas containers shall be located and installed so that the discharge from the container pressure relief device is not less than 3 feet horizontally from building openings below the level of such discharge and shall not be beneath buildings unless the space is well ventilated to the outside and is not enclosed for more than 50 percent of its perimeter. The discharge from LP-gas container pressure relief devices shall be located not less than 5 feet from exterior sources of ignition, openings into direct-vent (sealed combustion system) appliances or mechanical ventilation air intakes.

3. ASME LP-gas containers of less than a 125-gallon water capacity shall be located and installed such that the discharge from pressure relief devices shall not terminate in or beneath buildings and shall be located not less than 5 feet horizontally from building openings below the level of such discharge and not less than 5 feet from exterior sources of ignition, openings into direct vent (sealed combustion system) appliances, or mechanical ventilation air intakes.

4. The filling connection and the vent from liquid-level gauges on either DOTn or ASME LP-gas containers filled at the point of installation shall be not less than 10 feet from exterior sources of ignition, openings into direct vent (sealed combustion system) appliances or mechanical ventilation air intakes.

f. This distance is allowed to be reduced to not less than 10 feet for a single LP-gas container of 1,200-gallon water capacity or less, provided that such container is not less than 25 feet from other LP-gas containers of more than 125-gallon water capacity.

g. Above-ground LP-gas containers with a water capacity of 2,000 gallons or less shall be separated from public ways by a distance of not less than 5 feet. Containers with a water capacity greater than 2,000 gallons shall be separated from public ways in accordance with this table.

h. Containers greater than 120,000 gallons water capacity shall comply with NFPA 58.

Reason: Table 6104.3 currently stops its entries at 120,000 gallons water capacity. NFPA 58 provides three additional entries that address containers between 120,000-200,000 gallons; 200,001-1,000,000 gallons; and, greater than 1,000,000 gallons. These installations are not addressed by the current Table 6104.3, so reference is made to NFPA 58 for the requirements.

Bibliography: NFPA 58 "Liquefied Petroleum Gas Code," 2024 edition published by the National Fire Protection Association.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The cost of construction will not change as a result of this proposal. This proposal is simply providing guidance on what to do when amounts exceed 120,000 gallons in size. There is no change to the cost of installing a propane container on site due to this proposal.

F263-24

F264-24

IFC: 6104.3.2, 6104.3.3 (New)

Proponents: Gregory Wilson, Federal Emergency Management Agency, FEMA (gregory.wilson2@fema.dhs.gov); Rebecca Quinn, RCQuinn Consulting, Inc., FEMA Building Science (rebecca@rcquinnconsulting.com)

2024 International Fire Code

6104.3.2 Special hazards.
LP-gas containers shall be located with respect to special hazards including, but not limited to, above-ground *flammable* or *combustible liquid* tanks, oxygen or gaseous hydrogen containers, flooding or electric power lines as specified in Section 6.5.3 of NFPA 58.

Add new text as follows:

6104.3.3 Flood hazard areas. LP-gas containers located in *flood hazard areas* established in Section 1612.3 of the *International Building Code* shall be located and installed in accordance with ASCE 24.

Reason: Section 6104.3.2 requires location of LP-gas containers "with respect to flooding" but does not provide specifics on what that means. This proposal adds a pointer on the minimum I-Code requirements for LP-gas containers located in flood hazard areas. The proposed change is not a new requirement; it is simply adding a reference to existing requirements for utilities and equipment in flood hazard areas.

Bibliography: *Flood Resistant Design and Construction,* ASCE/SEI 24-14

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal does not increase or decrease the initial construction costs or life-cycle costs because it does not change any requirements; it only points to existing requirements for development in flood hazard areas.

F264-24

F265-24

IFC: 6107.2

Proponents: Bruce Swiecicki, National Propane Gas Association, National Propane Gas Association (bswiecicki@npga.org)

2024 International Fire Code

Revise as follows:

6107.2 Smoking and other sources of ignition.
“No Smoking” signs complying with Section 310 shall be posted where required by the *fire code official*. Smoking within 25 feet (7620 mm) of a point of transfer, while filling operations are in progress at LP-gas containers or vehicles, shall be prohibited.
Control of other sources of ignition shall comply with Chapter 3 of this code and Section ~~6.25~~ 6.26 of NFPA 58.

Reason: This proposal will update the reference to the 2024 edition of NFPA 58.

Bibliography: NFPA 58 "LP-Gas Code," 2024 edition, National Fire Protection Association.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

There is no cost impact for this proposal as it is simply updating to the correction section within the referenced standard.

F265-24

F266-24

IFC: 6107.3

Proponents: Bruce Swiecicki, National Propane Gas Association, National Propane Gas Association (bswiecicki@npga.org)

2024 International Fire Code

Revise as follows:

6107.3 Clearance to combustibles. ~~Weeds, grass, brush, trash and other combustible materials shall be kept not less than 10 feet (3048 mm) from LP-gas tanks or containers.~~Combustible materials shall not accumulate or be stored within 10 ft (3048 mm) of a container.

Reason: Vegetation of any kind is not considered to be a hazard. This requirement applies to stored or accumulated fuel-dense combustible materials such as wood pallets, boxes and other materials that when ignited, can impinge flames on the container. This proposal is consistent with the current requirements in NFPA 58.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

There is no cost impact for this proposal as it is simply clarifying intent and is consistent with NFPA 58.

F266-24

F267-24

IFC: 6108.1

Proponents: Bruce Swiecicki, National Propane Gas Association, National Propane Gas Association (bswiecicki@npga.org)

2024 International Fire Code

Revise as follows:

6108.1 General.
Fire protection shall be provided for installations having LP-gas storage containers with a water capacity of more than 4,000 gallons (15 140 L), as required by Section ~~6.29~~ 6.30 of NFPA 58.

Reason: This proposal will update the text in the IFC to the current section in the 2024 edition of NFPA 58.

Bibliography: NFPA 58 "LP-Gas Code," 2024 edition, National Fire Protection Association.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

There is no cost impact for this proposal as it is simply updating to the correct section within the referenced standard.

F267-24

F268-24

IFC: 6109.11.2

Proponents: Bruce Swiecicki, National Propane Gas Association, National Propane Gas Association (bswiecicki@npga.org)

2024 International Fire Code

Revise as follows:

6109.11.2 Construction.
The construction of such buildings and rooms shall comply with requirements for Group H occupancies in the *International Building Code*, Chapter 10 of NFPA 58 and both of the following:

1. Adequate vents shall be provided to the outside at both top and bottom, located not less than 5 feet (1524 mm) from building openings.
2. The entire area shall be classified for the purposes of ignition source control in accordance with Section ~~6.25~~ 6.26 of NFPA 58.

Staff Analysis: There is an errata that corrects the edition of NFPA 58 to 2024 in the 2024 IFC.

Reason: This proposal will update the reference to the current section of the 2024 edition of NFPA 58.

Bibliography: NFPA 58 "LP-Gas Code," 2024 edition, National Fire Protection Association.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

There is no cost impact due to this proposal as it simply updates to the correct section of the standard.

F268-24

F269-24

IFC: CHAPTER 62, SECTION 6201, 6201.1, 6201.2, SECTION 6202, 6202.1, SECTION 6203, 6203.1, 6203.1.1, 6203.1.1.1, 6203.1.1.2, 6203.1.1.3, 6203.1.1.4, 6204.1.7, TABLE 6204.1.7, 6203.1.3 (New), 6203.1.4 (New), 6203.1.5 (New), TABLE 6203.1.5 (New), 6203.1.6 (New), 6203.1.7 (New), 6203.1.7.1 (New), 6203.1.7.2 (New), 6203.1.7.3 (New), 6203.1.8 (New), 6203.1.9 (New), 6203.1.10 (New), 6203.1.11 (New), 6203.1.12 (New), 6203.1.13 (New), 6204.1.14 (New), 6203.1.15 (New), 6203.2, SECTION 6204, 6204.1, 6204.1.1 (New), 6204.1.1, 6204.1.2, TABLE 6204.1.2, 6204.1.3, 6204.1.4, 6204.1.5, 6204.1.6, 6204.1.8, 6204.1.9, 6204.1.10 (New), 6204.1.10, 6204.1.12 (New), 6204.1.11, 6204.1.11.1, 6204.1.15 (New), 6204.2, 6204.2.1, 6204.2.2, 6204.2.3, 6204.2.4, 6204.2.5, SECTION 6205, 6205.1, 6205.2 (New), (New), 903.2.5.6 (New), 5003.9.8, 5004.8.1; IBC: 903.2.5.6 (New)

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Kris Jaggari, Nouryon/OPPSD Representative (kris.jaggari@nouryon.com)

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CHAPTER 62 ORGANIC PEROXIDES

SECTION 6201 GENERAL

Revise as follows:

6201.1 Scope. The storage and use of *organic peroxides* shall be in accordance with this chapter and Chapter 50.Storage of ~~U~~u nclassified detonable *organic peroxides* that are capable of *detonation* in their normal shipping containers under conditions of fire exposure shall ~~be stored in accordance~~ comply with Chapter 56.

6201.2 Permits.
Permits shall be required for organic peroxides as set forth in Section 105.5.

SECTION 6202 DEFINITION

6202.1 Definition.
The following term is defined in Chapter 2:
ORGANIC PEROXIDE.

- **Class I.**
- **Class II.**
- **Class III.**
- **Class IV.**
- **Class V.**
- **Unclassified detonable.**

SECTION 6203 GENERAL REQUIREMENTS

6203.1 Quantities not exceeding the maximum allowable quantity per control area.
The storage and use of *organic peroxides* in amounts not exceeding the *maximum allowable quantity per control area* indicated in Section 5003.1 shall be in accordance with Sections 5001, 5003, 6201 and 6203.

6203.1.1 Special limitations for indoor storage and use by occupancy.

The indoor storage and use of *organic peroxides* shall be in accordance with Sections 6203.1.1.1 through 6203.1.1.4.

Revise as follows:

6203.1.1.1 Group A, E, I or U occupancies.
In Group A, E, I or U occupancies, ~~any amount of~~ unclassified detonable and Class I organic peroxides shall be stored in accordance with the following:

1. The quantity of *detonable organic peroxides* shall not exceed 1 pound (0.5 kg).
2. The quantity of Class I *organic peroxides* shall not exceed 5 pounds (2.3 kg).
3~~1~~. Unclassified detonable and Class I *organic peroxides* shall be stored in hazardous materials storage cabinets complying with Section 5003.8.7.
4~~2~~. The hazardous materials storage cabinets shall not contain other storage.

6203.1.1.2 Group R occupancies. Unclassified detonable and Class I *organic peroxides* shall not be stored or used within Group R occupancies.

6203.1.1.3 Group B, F, M or S occupancies. Unclassified detonable and Class I *organic peroxides* shall not be stored or used in offices, or retail sales areas of Group B, F, M or S occupancies.

6203.1.1.4 Classrooms.
In classrooms in Group B, F or M occupancies, any amount of unclassified detonable and Class I *organic peroxides* shall be stored in accordance with the following:

1. Unclassified detonable and Class I *organic peroxides* shall be stored in hazardous materials storage cabinets complying with Section 5003.8.7.
2. The hazardous materials storage cabinets shall not contain other storage.

Revise as follows:

~~6204.1.7~~ 6203.1.2 Storage ~~arrangement~~.
Storage ~~arrangements for~~ of *organic peroxides* shall be in accordance with Table ~~6204.1.7~~ 6203.1.2 and ~~shall comply with all of~~ the following.

1. Containers and packages in storage areas shall be closed.
~~2. Bulk storage shall not be in piles or bins.~~
2. Storage in hazardous materials storage cabinets shall be in accordance with Section 5003.8.7 and be designed to vent an overpressure event.
3. Refrigerators or freezers for storage of *organic peroxides* shall be listed for Class I, Division 2 locations and be designed to vent an overpressure event.
4. A minimum separation distance of 3 feet (900 mm) shall be maintained between hazardous materials storage cabinets, refrigerators or freezers and other storage.
5~~3~~. A minimum ~~2-foot (610 mm)~~1-foot (305 mm) clear space shall be maintained between storage and uninsulated metal or combustible walls.
6. A minimum 6-inch (152 mm) clear space shall be maintained between storage and insulated metal or noncombustible walls.
7. For temperature-controlled storage areas, a minimum 3-inch (76 mm) clear space shall be maintained between pallets.
8~~4~~. Fifty-five-gallon (208 L) drums shall not be stored more than one drum high.
9. Intermediate bulk containers shall be permitted to be stacked two-high provided such storage is in accordance with the *organic peroxide* manufacturer’s storage instructions.

10. *Organic peroxides* shall be stored in a manner to prevent contamination.

TABLE ~~6204.1.7~~ 6203.1.2 STORAGE OF ORGANIC PEROXIDES

ORGANIC PEROXIDE CLASS	PILE CONFIGURATION Maximum width (feet)	Maximum height (feet)	Minimum distance to next pile (feet)	~~Minimum distance to walls (feet)~~	MAXIMUM QUANTITY PER BUILDING
I	6	8	4[a]	~~4[b]~~	Note ~~c~~b
II	10	8	4[a]	~~4[b]~~	Note ~~c~~b
III	10	8	4[a]	~~4[b]~~	Note ~~c~~b
IV	16	10	3[a, ~~d~~c]	~~4[b]~~	No Requirement
V	No Requirement	No Requirement	No Requirement	~~No Requirement~~	No Requirement

For SI: 1 foot = 304.8 mm.

a. Not less than one main aisle with a minimum width of 8 feet shall divide the storage area.

~~b. Distance to noncombustible walls is allowed to be reduced to 2 feet.~~

b~~c~~. See Table ~~6204.1.2~~6204.1.3 for maximum quantities.

c~~d~~. The distance shall be not less than one-half the pile height.

Add new text as follows:

6203.1.3 Containers. Containers in *organic peroxide* storage shall meet the following:

1. Containers and packages shall be closed when not in use.
2. Containers shall be DOTn containers approved for the specific hazard classification.
3. Glass containers shall not be permitted.
4. Class I and II *organic peroxides* shall not be stored in intermediate bulk containers.
5. Metal containers and intermediate bulk containers shall be provided with emergency vent relief in accordance with *organic peroxide* manufacturer's recommendations.
6. Containers of liquid *organic peroxides* shall not be filled to more than 90-percent capacity.
7. Empty containers shall be disposed of in compliance with applicable regulations.

6203.1.4 Storage tanks. Storage tanks containing *organic peroxides* shall comply with Section 5003.2 and the following:

1. Only Transport Type F *organic peroxides* shall be permitted to be stored in tanks.
2. Storage tanks shall be equipped with a pressure relief device. The pressure relief device shall be designed and sized in accordance with the *organic peroxide* manufacturer's recommendations.
3. Indoor storage tanks shall have the emergency relief vent ducted to the exterior of the building.
4. Storage tanks shall be constructed of materials compatible with the *organic peroxide* it is designed to contain.
5. Storage tanks shall be designed to prevent overfilling in accordance with Section 5003.2.7 and the maximum fill level shall not exceed a capacity of 90 percent.
6. Storage tanks shall not exceed a capacity of 26,500 gallons (100 m^3).
7. Storage tanks shall have a minimum shell-to-shell separation distance of 25 feet (7620 mm).

   Exception: A 2-hour fire-resistance-rated wall without openings extending not less than 30 inches (762 mm) above and to the sides of the storage tanks shall be permitted in lieu of such distance.

8. Storage tanks shall be bonded and grounded.

9. Outdoor storage tanks shall be separated from buildings, property lines, process or use areas a minimum distance of 50 feet (15 200 mm).

10. Outdoor storage tanks shall be provided with lightning protection in accordance with NFPA 780.

11 Electrical equipment related to *organic peroxide* storage tanks shall be in accordance with Article 500 of NFPA 70.

6203.1.5 Dosing vessels. *Dosing vessels* for *organic peroxides*shall comply with Section 6203.1.4 and the following:

1. *Dosing vessels* are permitted to be designed with a hinged cover to serve as the emergency relief vent.
2. *Dosing vessels* with hinged covers shall be separated from other use areas by a minimum clear space of 25 feet (7620 mm) or a 1-hour fire-resistance-rated wall without openings extending not less than 30 inches (762 mm) above and to the sides of the *dosing vessels*.
3. Individual *dosing vessels* shall not exceed the maximum capacities in Table 6203.1.5.

TABLE 6203.1.5 MAXIMUM CAPACITY OF ORGANIC PEROXIDE DOSING VESSELS

TRANSPORT TYPE	CAPACITY gallons (liters)
B	8 (30)
C	26 (100)
D	53 (200)
E	396 (1,500)
F	1321 (5,000)

6203.1.6 Incompatible materials. Any quantity of Class I and II *organic peroxides* shall be separated from incompatible materials in accordance with Section 5003.9.8. Classes III, IV and V *organic peroxides* exceeding 5 pounds (2 kg) or 0.5 gallons (2 L) shall be separated from incompatible materials in accordance with Section 5003.9.8.

6203.1.7 Temperature control. *Organic peroxide* materials that must be kept at temperatures other than normal ambient temperatures to prevent hazardous reactions shall be provided with an approved means to maintain the temperature within the manufacturer's recommended storage temperature.

6203.1.7.1 Temperature monitoring and display. Temperature controlled storage areas shall be continuously monitored in accordance with 5004.8.1 and the temperature shall be displayed near the entrance to the area.

6203.1.7.2 Storage temperature. The maximum temperature allowed in a temperature-controlled storage area shall be posted near each entrance to the storage area.

6203.1.7.3 Standby power. Standby power shall be provided in accordance with Section 1203 for equipment used to maintain the controlled temperature.

6203.1.8 Open flames prohibited. *Organic peroxide* storage areas shall be free of fire, sparks, open flames and smoking. A sign shall be affixed outside of the storage area to indicate the prohibition of ignition sources.

6203.1.9 Hot work. Hot work shall be conducted in accordance with Chapter 35. *Organic peroxides* shall be removed from the hot work area prior to, and during, all hot work operations.

6203.1.10 Heating Systems. Hot water, steam at pressures less than 15 psig (103 kPa)] or indirectly heated warm air shall be used for heating systems.

6203.1.11 Container Contact. Heating coils, radiators, air diffusers, cooling coils, piping and ducts shall be installed to ensure no direct contact with *organic peroxide* containers.

6203.1.12 Combustible waste. *Organic peroxide* storage or use areas shall be free of storage of combustible waste.

6203.1.13 Impact sensitivity. Impact sensitive *organic peroxide* materials shall be protected from impact.

6204.1.14 Use area requirements. Use and handing of *organic peroxides* shall comply with the following requirements:

1. Quantities in the use area shall not exceed amounts necessary for the planned use.
2. *Organic peroxides* shall remain in a labelled container until transferred into process equipment.
3. *Organic peroxide* containers shall be closed when not in use.
4. Residual unused *organic peroxides* shall not be returned to the original container to avoid contamination.
5. *Organic peroxides* shall be kept away from sparks, open flames, hot surfaces and other ignition sources.
6. *Organic peroxides* shall be separated from incompatible materials and flammable or combustible liquids.
7. Dispensing of *organic peroxides* shall be accomplished with dedicated equipment.
8. *Organic peroxides* shall be handled with non-sparking tools.

6203.1.15 Liquid transfer. Liquid transfer shall comply with Section 5005.1.10 and the following:

1. All equipment used to handle or transfer *organic peroxides* shall be bonded and grounded.
2. The transfer system used for the transfer of *organic peroxides* shall be designed, operated and maintained in accordance with the *organic peroxide* manufacturer's recommendations.
3. The transfer of *organic peroxide* formulations with a flash point of 100°F (38°C) or less shall be designed to avoid accumulation of vapors.

6203.2 Quantities exceeding the maximum allowable quantity per control area.
The storage and use of *organic peroxides* in amounts exceeding the *maximum allowable quantity per control area* indicated in Section 5003.1 shall be in accordance with Chapter 50 and this chapter.

SECTION 6204
STORAGE

6204.1 Indoor storage.
Indoor storage of *organic peroxides* in amounts exceeding the *maximum allowable quantity per control area* indicated in Table 5003.1.1(1) shall be in accordance with Sections 5001, 5003, 5004 and this chapter.
Indoor storage of unclassified detonable *organic peroxides* that are capable of *detonation* in their normal shipping containers under conditions of fire exposure shall be stored in accordance with Chapter 56.

Add new text as follows:

6204.1.1 Flood Protection. Buildings and storage areas containing *organic peroxides* and required emergency equipment shall be located at or above the design flood elevation as established in Chapter 16 of the International Building Code.

Revise as follows:

~~6204.1.1~~6204.1.2 Detached storage.
Storage of *organic peroxides* shall be in detached buildings where required by Section 5003.8.2.

~~6204.1.2~~6204.1.3 Distance from detached buildings to exposures.
In addition to the requirements of the *International Building Code*, detached storage buildings for Class I, II, III, IV and V *organic peroxides* shall be located in accordance with Table ~~6204.1.2~~6204.1.3. Detached buildings containing quantities of unclassified detonable *organic peroxides* in excess of those set forth in Table 5003.8.2 shall be located in accordance with Table 5604.5.2(1).

TABLE ~~6204.1.2~~ 6204.1.3 ORGANIC PEROXIDES—DISTANCE TO EXPOSURES FROM DETACHED STORAGE BUILDINGS OR OUTDOOR STORAGE AREAS

ORGANIC PEROXIDE CLASS	MAXIMUM STORAGE QUANTITY (POUNDS) AT MINIMUM SEPARATION DISTANCE[b,c,d]					
	Distance to buildings, lot lines, public streets, public alleys, public ways or means of egress			Distance between individual detached storage buildings or individual outdoor storage areas		
	50 feet	100 feet	150 feet	20 feet	75 feet	100 feet
I	2,000	20,000	175,000	2,000	20,000	175,000
II	100,000	200,000	No Limit	100,000[a]	No Limit	No Limit
III	200,000	No Limit	No Limit	200,000[a]	No Limit	No Limit
IV	No Limit	No Limit	No Limit	No Limit	No Limit	No Limit
V	No Limit	No Limit	No Limit	No Limit	No Limit	No Limit

For SI: 1 foot = 304.8 mm, 1 pound = 0.454 kg.

a. Where the amount of organic peroxide stored exceeds this amount, the minimum separation shall be 50 feet.

b. When different classes of organic peroxides are stored in the same storage area, the aggregate sum of the ratios of the actual quantity divided by the allowed quantity for each class shall not exceed one.

c. Interpolation is permitted between tabular values.

d. The quantity of organic peroxides shall be allowed to be increased if a specially designed fire protection system to protect the organic peroxide storage area is acceptable to the fire code official.

~~6204.1.3~~6204.1.4 Liquid-tight floor.
In addition to the requirements of Section 5004.12, floors of storage areas shall be of liquid-tight construction.

~~6204.1.4~~6204.1.5 Electrical wiring and equipment.
In addition to the requirements of Section 5003.9.4, electrical wiring and equipment in storage areas ~~for Class I or II organic peroxides~~ or approved cabinets of refrigerated Class I, II and III *organic peroxides* or any *organic peroxide* that gives of flammable vapors or decomposes to release flammable decomposition products, shall comply with the requirements for electrical Class I, Division 2, locations.

~~6204.1.5~~6204.1.6 Smoke detection.
~~An~~ Rooms or areas where Class I, II or III *organic peroxides* are stored shall be provided with an *approved* ~~supervised~~ smoke detection system which activates audible and visible alarms throughout the building in accordance with Section 907.~~shall be provided in rooms or areas where Class I, II or III organic peroxides are stored. Activation of the smoke detection system shall sound a local alarm.~~

~~**Exception:** A smoke detection system shall not be required in detached storage buildings equipped throughout with an *approved automatic fire-extinguishing system* complying with Chapter 9.~~

~~6204.1.6~~6204.1.7 Maximum quantities.

Maximum ~~allowable~~ quantities per building in a mixed occupancy building shall not exceed the amounts set forth in Table 5003.8.2. Maximum ~~allowable~~ quantities per building in a detached storage building shall not exceed the amounts specified in Table ~~6204.1.2~~ 6204.1.3.

6204.1.8 Location in building. The storage of Class I or II *organic peroxides* shall be on the ground floor. Class III *organic peroxides* shall not be stored in *basements*.

Revise as follows:

6204.1.9 ~~Contamination~~Separation from incompatible materials. ~~*Organic peroxides* shall be stored in their original DOTn shipping containers. *Organic peroxides* shall be stored in a manner to prevent contamination.~~Incompatible materials are prohibited in storage rooms for Class I, II and III *organic peroxides*.

Add new text as follows:

6204.1.10 Separation from flammable and combustible liquids and flammable solids. *Flammable and combustible liquids* and *flammable solids* are prohibited in storage rooms for Class I, II and III *organic peroxides*, unless those materials are also classified as *organic peroxides*.

Revise as follows:

~~6204.1.10~~6204.1.11 Explosion control.
Indoor storage rooms, areas and buildings containing unclassified detonable and Class I *organic peroxides* shall be provided with explosion control in accordance with Section 911.

Add new text as follows:

6204.1.12 Lightning. Structures containing *organic peroxides* shall be provided with lightning protection in accordance with NFPA 780.

Revise as follows:

~~6204.1.11~~6204.1.13 Standby power.
Standby power shall be provided in accordance with Section 1203 for the following systems used to protect ~~Class I and unclassified detonable~~ *organic peroxides*:

1. Exhaust ventilation system for organic peroxides also classified as flammable liquids.

   Exception: Exhaust ventilation systems are not required for temperature-controlled organic peroxides in storage.

2. Treatment system for organic peroxides also classified as toxic or highly toxic.
3. Smoke detection system.
4. Temperature control system.
5. *Fire alarm system*.
6. *Emergency alarm system*.

~~6204.1.11.1~~6204.1.13.1 Fail-safe engineered systems. Standby power shall not be required for mechanical exhaust ventilation, treatment systems and temperature control systems where *approved* fail-safe engineered systems are installed.

Add new text as follows:

6204.1.14 Separation from use areas. Storage areas shall be separated from use and dispensing areas by a clear space of not less than 25 feet (7620 mm) or by fire barriers and horizontal assemblies with a minimum fire-resistance rating of 1-hour.

6204.1.15 Use and dispensing prohibited. Use and dispensing of *organic peroxides* in the storage area is prohibited.

6204.2 Outdoor storage.
Outdoor storage of *organic peroxides* in amounts exceeding the *maximum allowable quantities per control area* indicated in Table 5003.1.1(3) shall be in accordance with Sections 5001, 5003, 5004 and this chapter.

Revise as follows:

6204.2.1 Distance from storage to exposures.
Outdoor storage areas for *organic peroxides* shall be located in accordance with Table ~~6204.1.2~~6204.1.3.

6204.2.2 Electrical wiring and equipment.
In addition to the requirements of Section 5003.9.4, electrical wiring and equipment in outdoor storage areas containing ~~unclassified detonable, Class I or Class II~~ *organic peroxides* that release flammable vapors or when decomposing release flammable decomposition products shall comply with the requirements for electrical Class I, Division 2, locations.

6204.2.3 Maximum quantities.
Maximum quantities of *organic peroxides* in outdoor storage shall be in accordance with Table ~~6204.1.2~~6204.1.3.

6204.2.4 Storage arrangement.
Storage arrangements shall be in accordance with Table ~~6204.1.7~~6203.1.2.

6204.2.5 Separation.
In addition to the requirements of Section 5003.9.8, outdoor storage areas for *organic peroxides* in amounts exceeding those specified in Table 5003.8.2 shall be located ~~a minimum distance of 50 feet (15 240 mm)~~ the minimum separation distance specified in Table 6204.1.3 from other hazardous material storage.

SECTION 6205 USE

6205.1 General.
The use of *organic peroxides* in amounts exceeding the *maximum allowable quantity per control area* indicated in Table 5003.1.1(1) or 5003.1.1(3) shall be in accordance with Sections 5001, 5003, 5005 and this chapter.

Add new text as follows:

6205.2 Noncombustible floor. Except for surfacing, floors of areas where liquid or solid hazardous materials are dispensed or used shall be of noncombustible, liquid-tight construction.

Add new definition as follows:

DOSING VESSSEL. A vessel containing a daily use quantity of an *organic peroxide* where the *organic peroxide* is transferred to reaction vessels or process equipment. Dosing vessels can be open or closed use and can include metering vessels, mixing vessels, day storage tanks or intermediate bulk containers (IBCs).

Add new text as follows:

903.2.5.6 Organic peroxides. An automatic sprinkler system shall be provided throughout buildings where *organic peroxides* are manufactured, stored or handled in quantities exceeding the *maximum allowable quantity per control area.* The sprinkler system design criteria shall be in accordance with NFPA 400.

Revise as follows:

5003.9.8 Separation of incompatible materials. *Incompatible materials* in storage and storage of materials that are incompatible with materials in use shall be separated where the stored materials are in containers having a capacity of more than 5 pounds (2 kg), 0.5 gallon (2 L) or any amount of *compressed gases* and Class I or II *organic peroxides*. Separation shall be accomplished by:

1. Segregating *incompatible materials* in storage by a distance of not less than 20 feet (6096 mm).
2. Isolating *incompatible materials* in storage by a noncombustible partition extending not less than 18 inches (457 mm) above and to the sides of the stored material.
3. Storing liquid and solid materials in hazardous material storage cabinets.
4. Storing *compressed gases* in gas cabinets or exhausted enclosures in accordance with Sections 5003.8.5 and 5003.8.6.

Materials that are incompatible shall not be stored within the same cabinet or exhausted enclosure.

5004.8.1 Temperature control. Materials that must be kept at temperatures other than normal ambient temperatures to prevent a hazardous reaction shall be provided with an *approved* means to maintain the temperature within a safe range. Redundant temperature control equipment that will automatically operate on failure of the primary temperature control system shall be provided. Upon failure of the primary temperature control equipment, audible and visual alarm signals shall activate in the room or area and at a constantly attended location or supervising station. Where *approved*, alternative means that prevent a hazardous reaction are allowed.

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Add new text as follows:

903.2.5.6 Organic peroxides. An automatic sprinkler system shall be provided throughout buildings where *organic peroxides* are manufactured, stored or handled in quantities exceeding the *maximum allowable quantity per control area*. The sprinkler system design criteria shall be in accordance with NFPA 400.

Reason: Organic peroxides are hazardous materials with key hazard characteristics of thermal instability, explosivity and flammability with high burning rates. Organic peroxides can undergo self-accelerating decomposition and may result in fire and/or explosion when exposed to heat or when they come in contact with incompatible materials. The decomposition is further accelerated when the containers are confined. An organic peroxide safety incident can occur even when storing small quantities. There are many organic peroxides that are temperature controlled and failure of refrigeration equipment or using improper equipment even when storing even small quantities can result in fire and explosion. An organic peroxide fire can significantly impact the inventory in the storage area, the storage building itself, personnel, nearby property, local community and the environment. Exposure to heat or incompatible materials, materials of construction and addressing confinement are, therefore, very important aspects that code needs to address to ensure safe storage, handling and use of organic peroxides. The current IFC code related to organic peroxides in Chapter 62 and other chapters is missing many critical requirements for the safe storage, handling and use of organic peroxides. The comprehensive code changes proposed revise existing sections and add many additional sections with preventive and protective requirements for the safe storage, handling and use of organic peroxides. Preventive and protective requirements code changes include the following:

- Storage section with well-defined storage requirements for all organic peroxides' storage types including control area (below MAQ) storage to comply with applicable requirements of Chapter 62 in addition to Chapter 50 and other requirements.
- Containers section is added to outline container requirements for the safe storage of organic peroxides.
- Intermediate Bulk Containers (IBCs), Storage tanks and Dosing vessels are used in the industry and requirements are added for the safe storage of organic peroxides.
- Incompatible materials are required to be segregated from organic peroxides storage in control area storage.
- Temperature control section with requirements is added as temperature control, monitoring, sign display and standby power are very critical for organic peroxides storage.
- Open flames prohibited, Hot work, Heating systems, Cooling systems, Container contact, Combustible waste, Lightning sections are added, as organic peroxides can undergo self-accelerating decomposition and may result in fire and/or explosion when exposed to heat or flames.
- Impact sensitivity section is added to provide guidance to code user when storing impact sensitive organic peroxides.

- Use area requirements for safe use of organic peroxides is added.
- Liquid transfer section is added with the requirements for the safe transfer of organic peroxides.
- Flood Protection section is added as this is important for temperature controlled organic peroxides, as coming in contact with ambient flood water can result in decomposition of organic peroxides which may cause explosion and/or fire. Also, various electrically operated emergency equipment should be protected from flood water to prevent loss of power.
- Code change proposals in footnotes under Table 6204.1.3 provide clear guidance to code users on how to use the table when presented with different scenarios.
- Electrical wiring and equipment section is modified to require appropriate classification for products where needed.
- Smoke detection section code change proposal clarifies the requirement of audio and visual alarm activation when the smoke detection system is provided in organic peroxide storage areas.
- Standby power section is revised to ensure this applies to relevant organic peroxides' classes above MAQs.
- Flammable and combustible liquids, flammable solids and incompatible materials are prohibited in Group H occupancy storage rooms.
- Use and dispensing prohibited section is added as it is important that organic peroxide dispensing or transferring and using is not done in storage areas as any potential incidents that may result can jeopardize the entire organic peroxide storage.
- Noncombustible floor section with non-combustible and liquid tight requirements is added.
- Sprinkler protection requirement section is added in Chapter 9 which references NFPA 400 for sprinkler density.
- 5003.9.8 section is revised to ensure organic peroxides storage is segregated from incompatible materials in control area storage for any quantity of Class I or Class II organic peroxides. These classifications present severe explosion and fire hazards and separation from incompatible materials is appropriate even below the ½ pound or ½ gallon thresholds.
- 5004.8.1 is modified to specify where materials must be under a temperature-controlled environment, automatic operation of the backup system is necessary. Failure of the primary temperature control system will result in automatic start of the backup system and notification of primary system failure. Such notification is required in the room where the temperature-controlled materials are stored and at a constantly attended location or supervising station. Certain organic peroxide materials require temperature control and loss of temperature control can result in significant events.
- Dosing vessels are commonly used in organic peroxide industry and Chapter 62 proposed changes includes requirements for the safe storage of organic peroxides in dosing vessels. Dosing vessel is not defined in the current code and the definition as proposed addresses this deficiency.

Most of the code change proposals are already followed by the industry as the Organic Peroxide Producers Safety Division (OPPSD) has been in the lead to publish storage guidance for the safe storage, handling and use of organic peroxides and supporting users as required. With the comprehensive changes proposed, the IFC Chapter 62 and other chapters' organic peroxides code will be harmonized with Organic Peroxide Producers Safety Division (OPPSD) requirements for safe storage, handling and use of organic peroxides, NFPA 400 organic peroxides code in the USA, prominent European codes like Dutch PGS 8, German BGV B4 and French organic peroxides storage codes. The comprehensive changes took into consideration the learnings from recent and old organic peroxides fire incidents as well. The code proposals also address the Chemical Safety Board (CSB) recommendations that arose from a major organic peroxide incident in the recent years.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**.

Bibliography: Safety and Handling of Organic Peroxides - American Chemistry Council

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0.00

Estimated Immediate Cost Impact Justification (methodology and variables):

It is expected that there will not be an increase in cost of construction with the implementation of these proposals as the code change proposals are already followed by the industry. The Organic Peroxide Producers Safety Division (OPPSD) has been at the forefront to publish storage guidance (ACC Safety-and-Handling-of-Organic-Peroxides.pdf) for the safe storage, handling and use of organic peroxides and supporting users as required. The code changes are critical requirements for safe storage, handling and use of organic peroxides. Failure to follow and implement these requirements can lead to an organic peroxide explosion and or fire that can significantly impact the inventory in the storage area, the storage building itself, personnel, nearby property, local community and the environment. Users are educated and made aware of the hazards and risk associated with storing, handling and use of organic peroxides prior to the supply of the products.

Cost impact justification is based on the fact that OPPSD has established a good product stewardship program for the safe storage, handling and use of organic peroxides. Organic peroxide manufacturers adhere to this stewardship program and also provide a good guidance to the users of the organic peroxides and ensure the storage, handling and use of these products in in compliance with the stewardship program.

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IFC: SECTION 202, 202, 202 (New), 6201.1, 6202.1, 6203.1.1, 6203.1.1.1, 6203.1.1.2, 6203.1.1.3, 6203.1.1.4, 6204.1, 6204.1.2, TABLE 6204.1.2, 6204.1.4, 6204.1.5, TABLE 6204.1.7, 6204.1.8, 6204.1.10, 6204.1.11, 6204.2.2, TABLE 105.5.22, 203.6.3, 203.6.5, TABLE 911.1, TABLE 2704.2.2.1, TABLE 5003.1.1(1), TABLE 5003.1.1(3), TABLE 5003.8.2, TABLE 5004.2.2, 5004.7.1, TABLE 5005.2.1.4, E102.1.8.1, E102.1.8.1.1 (New), E102.1.8.1.2 (New), TABLE E102.1.8.1.2 (New), E102.1.8.1.3 (New), TABLE E102.1.8.2 (New), E102.1.8.2 (New), E102.1.8.3 (New), TABLE E102.1.8.3 (New), TABLE E105.1, TABLE F101.2, TABLE H102.1; IBC: SECTION 202, [F] TABLE 307.1(1), [F] 307.3, [F] 307.5, [F] TABLE 414.5.1, [F] TABLE 415.6.5, [F]TABLE 415.11.1.1

Proponents: Kris Jaggari, Nouryon/OPPSD Representative (kris.jaggari@nouryon.com)

2024 International Fire Code

Revise as follows:

ORGANIC PEROXIDE.
An organic compound that contains the bivalent -O-O- structure and which may be considered to be a structural derivative of hydrogen peroxide where one or both of the hydrogen atoms have been replaced by an organic radical. ~~Organic peroxides can present an explosion hazard (detonation or deflagration) or they can be shock sensitive. They can also decompose into various unstable compounds over an extended period of time.~~ Organic peroxide formulation is a pure or technically pure organic peroxide or a mixture of organic peroxides with an active oxygen (aO) concentration greater than 1 percent alone or in combination with one or more materials. Organic peroxide storage classification is based on the organic peroxide transportation type and burning rate. The transport type for organic peroxide formulations is determined by the UN Manual of Tests and Criteria, Part II. The methods used to determine the burning rate of organic peroxide formulations are spelled out in the Storage of Organic Peroxides in The Netherlands (also known as PGS 8). Terms such as accelerator, catalyst, initiator, and curing agent are sometimes used to describe organic peroxide formulations and are misleading because they can also refer to materials that are not or do not contain organic peroxides, some of which might present increased hazard when mixed with organic peroxides.

Class I. Describes those formulations that are capable of *deflagration* but not *detonation*. This class comprises of organic peroxide formulations with transport classification Type B, those with transport classification Type C and Type D with large-scale burning rate equal to or higher than 300 kg/min, and those with transport classification Type C and Type D with small-scale burning rate equal to or higher than 9.0 kg/min × m^2 unless the large-scale burning rate is lower than 300 kg/min.

Class IIA. Describes those formulations that burn very rapidly and that pose a moderate reactivity hazard. This class comprises of organic peroxide formulations with transport classification Type C and Type D with a large-scale burning rate equal to or higher than 140 kg/min but lower than 300 kg/min and those with transport classification Type E with a large-scale burning rate equal to or higher than 140 kg/min, those with Type C and Type D if the small-scale burning rate is equal to or higher than 2.2 kg/min × m^2 but lower than 9.0 kg/min × m^2, and Type E if the small-scale burning rate is equal to or higher than 2.2 kg/min × m^2.

Add new definition as follows:

Class IIB. Describes those formulations that burn rapidly and that pose a moderate reactivity hazard. This class comprises of organic peroxide formulations with transport classification Type C with a large-scale burning rate lower than 140 kg/min, those with transport classification Type D and Type E with a large-scale burning rate equal to or higher than 60 kg/min but lower than 140 kg/min, those with transport classification Type C if the small-scale burning rate is lower than 2.2 kg/min × m^2, and those with transport classification Type D and Type E if the small-scale burning rate is equal to or higher than 0.9 kg/min × m^2 but lower than 2.2 kg/min × m^2.

Revise as follows:

Class III. Describes those formulations that burn rapidly and that pose a moderate reactivity hazard.
This class comprises of organic peroxide formulations with transport classification Type D with a large-scale burning rate lower than 60 kg/min, those with transport classification Type E with a large-scale burning rate equal to or higher than 10 kg/min but lower than 60 kg/min, those with transport classification Type F with a large-scale burning rate equal to or higher than 10 kg/min, and those with transport classification Type D and Type E if the small-scale burning rate is lower than 0.9 kg/min × m^2, and those with transport classification Type F irrespective of the small scale burning rate.

Class IV. Describes those formulations that burn in the same manner as ordinary combustibles and that pose a minimal reactivity hazard. This class comprises of organic peroxide formulations of transport classification Type E or Type F with a large-scale burning rate lower than 10 kg/min.

Class V. Describes those formulations that burn with less intensity than ordinary combustibles or do not sustain combustion and that pose no reactivity hazard. This class comprises of organic peroxide formulations of transport classification Type G without additional subsidiary risks.

~~Unclassified detonable~~ Detonable. *Organic peroxides* that are capable of *detonation*. These peroxides pose an extremely high-explosion hazard through rapid explosive decomposition.

6201.1 Scope.
The storage and use of *organic peroxides* shall be in accordance with this chapter and Chapter 50.
~~Unclassified detonable~~ Detonable *organic peroxides* that are capable of *detonation* in their normal shipping containers under conditions of fire exposure shall be stored in accordance with Chapter 56.

6202.1 Definition.
The following term is defined in Chapter 2:
ORGANIC PEROXIDE.

Class I.
Class IIA.
Class IIB.
Class III.
Class IV.
Class V.
~~Unclassified detonable~~ Detonable.

6203.1.1 Special limitations for indoor storage and use by occupancy.
The indoor storage and use of *organic peroxides* shall be in accordance with Sections 6203.1.1.1 through 6203.1.1.4.

Revise as follows:

6203.1.1.1 Group A, E, I or U occupancies.
In Group A, E, I or U occupancies, any amount of ~~unclassified~~ detonable and Class I organic peroxides shall be stored in accordance with the following:

1. ~~Unclassified detonable~~ Detonable and Class I *organic peroxides* shall be stored in hazardous materials storage cabinets complying with Section 5003.8.7.
2. The hazardous materials storage cabinets shall not contain other storage.

6203.1.1.2 Group R occupancies. ~~Unclassified d~~Detonable and Class I *organic peroxides* shall not be stored or used within Group R occupancies.

6203.1.1.3 Group B, F, M or S occupancies. ~~Unclassified detonable~~ Detonable and Class I *organic peroxides* shall not be stored or used in offices, or retail sales areas of Group B, F, M or S occupancies.

6203.1.1.4 Classrooms.
In classrooms in Group B, F or M occupancies, any amount of ~~unclassified~~ detonable and Class I *organic peroxides* shall be stored in accordance with the following:

1. ~~Unclassified detonable~~ Detonable and Class I *organic peroxides* shall be stored in hazardous materials storage cabinets complying with Section 5003.8.7.
2. The hazardous materials storage cabinets shall not contain other storage.

6204.1 Indoor storage.

Indoor storage of *organic peroxides* in amounts exceeding the *maximum allowable quantity per control area* indicated in Table 5003.1.1(1) shall be in accordance with Sections 5001, 5003, 5004 and this chapter.

Indoor storage of ~~unclassified~~ detonable *organic peroxides* that are capable of *detonation* in their normal shipping containers under conditions of fire exposure shall be stored in accordance with Chapter 56.

6204.1.2 Distance from detached buildings to exposures.

In addition to the requirements of the *International Building Code*, detached storage buildings for Class I, IIA, IIB,III, IV and V *organic peroxides* shall be located in accordance with Table 6204.1.2. Detached buildings containing quantities of ~~unclassified~~ detonable *organic peroxides* in excess of those set forth in Table 5003.8.2 shall be located in accordance with Table 5604.5.2(1).

TABLE 6204.1.2 ORGANIC PEROXIDES—DISTANCE TO EXPOSURES FROM DETACHED STORAGE BUILDINGS OR OUTDOOR STORAGE AREAS

ORGANIC PEROXIDE CLASS	MAXIMUM STORAGE QUANTITY (POUNDS) AT MINIMUM SEPARATION DISTANCE					
	Distance to buildings, lot lines, public streets, public alleys, public ways or means of egress			Distance between individual detached storage buildings or individual outdoor storage areas		
	50 feet	100 feet	150 feet	20 feet	75 feet	100 feet
I	2,000	20,000	175,000	2,000	20,000	175,000
IIA	100,000	200,000	No Limit	100,000[a]	No Limit	No Limit
IIB	175,000	No Limit	No Limit	175,000[a]	No Limit	No Limit
III	200,000	No Limit	No Limit	200,000[a]	No Limit	No Limit
IV	No Limit	No Limit	No Limit	No Limit	No Limit	No Limit
V	No Limit	No Limit	No Limit	No Limit	No Limit	No Limit

For SI: 1 foot = 304.8 mm, 1 pound = 0.454 kg.

a. Where the amount of organic peroxide stored exceeds this amount, the minimum separation shall be 50 feet.

6204.1.4 Electrical wiring and equipment.

In addition to the requirements of Section 5003.9.4, electrical wiring and equipment in storage areas for Class I, IIA or IIB *organic peroxides* shall comply with the requirements for electrical Class I, Division 2, locations.

6204.1.5 Smoke detection. An *approved* supervised smoke detection system in accordance with Section 907 shall be provided in rooms or areas where Class I, IIA, IIB or III *organic peroxides* are stored. Activation of the smoke detection system shall sound a local alarm.

Exception: A smoke detection system shall not be required in detached storage buildings equipped throughout with an *approved automatic fire-extinguishing system* complying with Chapter 9.

TABLE 6204.1.7 STORAGE OF ORGANIC PEROXIDES

ORGANIC PEROXIDE CLASS	PILE CONFIGURATION				MAXIMUM QUANTITY PER BUILDING
	Maximum width (feet)	Maximum height (feet)	Minimum distance to next pile (feet)	Minimum distance to walls (feet)	
I	6	8	4[a]	4[b]	Note c
IIA	10	8	4[a]	4[b]	Note c
IIB	10	8	4[a]	4[b]	Note c
III	10	8	4[a]	4[b]	Note c
IV	16	10	3[a, d]	4[b]	No Requirement
V	No Requirement	No Requirement	No Requirement	No Requirement	No Requirement

For SI: 1 foot = 304.8 mm.

a. Not less than one main aisle with a minimum width of 8 feet shall divide the storage area.

b. Distance to noncombustible walls is allowed to be reduced to 2 feet.

c. See Table 6204.1.2 for maximum quantities.

d. The distance shall be not less than one-half the pile height.

6204.1.8 Location in building. The storage of Class I, IIA or IIB *organic peroxides* shall be on the ground floor. Class III *organic peroxides* shall not be stored in *basements*.

6204.1.10 Explosion control.

Indoor storage rooms, areas and buildings containing ~~unclassified~~ detonable and Class I *organic peroxides* shall be provided with explosion control in accordance with Section 911.

6204.1.11 Standby power.

Standby power shall be provided in accordance with Section 1203 for the following systems used to protect Class I and ~~unclassified~~ detonable *organic peroxides*:

1. Exhaust ventilation system.
2. Treatment system.
3. Smoke detection system.
4. Temperature control system.
5. *Fire alarm system*.
6. *Emergency alarm system*.

6204.2.2 Electrical wiring and equipment.

In addition to the requirements of Section 5003.9.4, electrical wiring and equipment in outdoor storage areas containing ~~unclassified~~ detonable, Class I, IIA or ~~Class~~ IIB *organic peroxides* shall comply with the requirements for electrical Class I, Division 2, locations.

TABLE 105.5.22 PERMIT AMOUNTS FOR HAZARDOUS MATERIALS

TYPE OF MATERIAL	AMOUNT
Combustible liquids	See Section 105.5.18
Corrosive materials	
Gases	See Section 105.5.9
Liquids	55 gallons
Solids	1,000 pounds
Explosive materials	See Section 105.5.16
Flammable materials	
Gases	See Section 105.5.9
Liquids	See Section 105.5.18
Solids	100 pounds
Highly toxic materials	
Gases	See Section 105.5.9
Liquids	Any Amount
Solids	Any Amount
Organic peroxides	
Liquids Class I Class IIA Class IIB Class III Class IV Class V	Any Amount Any Amount Any Amount 1 gallon 2 gallons No Permit Required

TYPE OF MATERIAL	AMOUNT
Solids	
Class I	Any Amount
Class IIA	Any Amount
Class IIB	Any Amount
Class III	10 pounds
Class IV	20 pounds
Class V	No Permit Required
Oxidizing materials	
Gases	See Section 105.5.9
Liquids	
Class 4	Any Amount
Class 3	1 gallon[a]
Class 2	10 gallons
Class 1	55 gallons
Solids	
Class 4	Any Amount
Class 3	10 pounds[b]
Class 2	100 pounds
Class 1	500 pounds
Pyrophoric materials	
Gases	Any Amount
Liquids	Any Amount
Solids	Any Amount
Toxic materials	
Gases	See Section 105.5.9
Liquids	10 gallons
Solids	100 pounds
Unstable (reactive) materials	
Liquids	
Class 4	Any Amount
Class 3	Any Amount
Class 2	5 gallons
Class 1	10 gallons
Solids	
Class 4	Any Amount
Class 3	Any Amount
Class 2	50 pounds
Class 1	100 pounds
Water-reactive materials	
Liquids	
Class 3	Any Amount
Class 2	5 gallons
Class 1	55 gallons
Solids	
Class 3	Any Amount
Class 2	50 pounds
Class 1	500 pounds

For SI: 1 gallon = 3.785 L, 1 pound = 0.454 kg.

a. 22 gallons where Table 5003.1.1(1) Note k applies and hazard identification signs in accordance with Section 5003.5 are provided for quantities of 22 gallons or less.

b. 220 pounds where Table 5003.1.1(1) Note k applies and hazard identification signs in accordance with Section 5003.5 are provided for quantities of 220 pounds or less.

203.6.3 High-hazard Group H-1. Buildings and structures containing materials that pose a *detonation* hazard shall be classified as Group

203.6.3 High-hazard Group H-1. Buildings and structures containing materials that pose a *detonation* hazard shall be classified as Group H-1. Such materials shall include, but not be limited to, the following:

Detonable *pyrophoric* materials

Explosives:

Division 1.1

Division 1.2

Division 1.3

Division 1.4

Division 1.5

Division 1.6

Organic peroxides, u~~nclassified detonable~~ detonable

Oxidizers, Class 4

Unstable (reactive) materials, Class 3 detonable and Class 4

203.6.5 High-hazard Group H-3. Buildings and structures containing materials that readily support combustion or that pose a *physical hazard* shall be classified as Group H-3. Such materials shall include, but not be limited to, the following:

Class I, II or IIIA flammable or *combustible liquids* that are used or stored in normally closed containers or systems pressurized at 15 pounds per square inch gauge (103.4 kPa) or less

Combustible fibers, other than densely packed baled cotton, where manufactured, generated or used in such a manner that the concentration and conditions create a fire or explosion hazard based on information prepared in accordance with Section 414.1.3 of the *International Building Code*

Consumer fireworks, 1.4G (Class C, Common)

Cryogenic fluids, oxidizing

Category 1B flammable gases having a burning velocity of 3.9 inches per second (99 mm/s) or less

Flammable solids

Organic peroxides, Class IIA, IIB and III

Oxidizers, Class 2

Oxidizers, Class 3, that are used or stored in normally closed containers or systems pressurized at 15 pounds per square inch gauge (103 kPa) or less

Oxidizing gases

Unstable (reactive) materials, Class 2

Water-reactive materials, Class 2

TABLE 911.1 EXPLOSION CONTROL REQUIREMENTS[f]

MATERIAL	CLASS	EXPLOSION CONTROL METHODS	
		Barricade construction	Explosion (deflagration) venting or explosion (deflagration) prevention systems
Hazard Category			
Combustible dusts[a]	—	Not required	Required
Cryogenic fluids	Flammable	Not required	Required
Explosives	Division 1.1	Required	Not required
	Division 1.2	Required	Not required
	Division 1.3	Not required	Required
	Division 1.4[i]	Not required	Required
	Division 1.5	Required	Not required
	Division 1.6	Required	Not required
Flammable gas	Gaseous	Not required	Required[h]
	Liquefied	Not required	Required[h]
Flammable liquids	IA[b]	Not required	Required
	IB[c]	Not required	Required
Organic peroxides	~~Unclassified d~~Detonable	Required	Not permitted
	I	Required	Not permitted
Oxidizer liquids and solids	4	Required	Not permitted
Pyrophoric	Gases	Not required	Required
Unstable (reactive)	4	Required	Not permitted
	3 detonable	Required	Not permitted
	3 nondetonable	Not required	Required
Water-reactive liquids and solids	3	Not required	Required
	2[e]	Not required	Required
Special Uses			

MATERIAL	CLASS	EXPLOSION CONTROL METHODS	
		Barricade construction	Explosion (deflagration) venting or explosion (deflagration) prevention systems
Hazard Category			
Acetylene generator rooms	—	Not required	Required
Electrochemical energy storage systems[g]	—	Not required	Required
Energy storage systems[g]	—	Not required	Required
Grain processing	—	Not required	Required
Liquefied petroleum gas distribution facilities	—	Not required	Required
Where explosion hazards exist[d]	Detonation	Required	Not permitted
	Deflagration	Not required	Required

For SI: 1 inch per second = 25.4 mm/s.

a. Combustible dusts where manufactured, generated or used in such a manner that the concentration and conditions create a fire or explosion hazard based on information prepared in accordance with Section 104.2.2. See definition of “Combustible dust” in Chapter 2.

b. Storage or use.

c. In open use or dispensing.

d. Rooms containing dispensing and use of hazardous materials where an explosive environment can occur because of the characteristics or nature of the hazardous materials or as a result of the dispensing or use process.

e. A method of explosion control shall be provided where Class 2 water-reactive materials can form potentially explosive mixtures.

f. Explosion venting is not required for Group H-5 Fabrication Areas complying with Chapter 27 and the International Building Code.

g. Where explosion control is required in Section 1207.6.3.

h. Not required for Category 1B Flammable Gases having a burning velocity not exceeding 3.9 inches per second.

i. Does not apply to consumer fireworks, 1.4G.

TABLE 2704.2.2.1 QUANTITY LIMITS FOR HAZARDOUS MATERIALS IN A SINGLE FABRICATION AREA IN GROUP H-5[a]

HAZARD CATEGORY	SOLIDS (pounds per square foot)	LIQUIDS (gallons per square foot)	GAS (cubic feet @ NTP per square foot)
Physical-Hazard Materials			
Combustible dust	Note b	Not Applicable	Not Applicable
Combustible fiberLooseBaled	Note b Notes b and c	Not Applicable	Not Applicable
Combustible liquidClass IIClass IIIAClass IIIBCombination Class I, II and IIIA	Not Applicable	0.02 0.04 Not Limited 0.08	Not Applicable
Cryogenic gasFlammableOxidizing	Not Applicable	Not Applicable	Note d 2.5
Explosives	Note b	Note b	Note b
Flammable gasGaseousLiquefied	Not Applicable	Not Applicable	Note d Note d
Flammable liquidClass IAClass IBClass ICCombination Class IA, IB and ICCombination Class I, II and IIIA	Not Applicable	0.005 0.05 0.05 0.05 0.08	Not Applicable
Flammable solid	0.002	Not Applicable	Not Applicable

HAZARD CATEGORY	SOLIDS (pounds per square foot)	LIQUIDS (gallons per square foot)	GAS (cubic feet @ NTP per square foot)
Organic peroxide			Not Applicable
~~Unclassified d~~Detonable	Note b	Note b	
Class I	Note b	Note b	
Class IIA	0.05	0.0025	
Class IIB	0.1	0.01	
Class III	0.2	0.02	
Class IV	Not Limited	Not Limited	
Class V	Not Limited	Not Limited	
Oxidizing gasGaseousLiquefiedCombination of gaseous and liquefied	Not Applicable	Not Applicable	2.5 2.5 2.5
OxidizerClass 4Class 3Class 2Class 1Combination Class 1, 2, 3	Note b 0.006 0.006 0.006 0.006	Note b 0.06 0.06 0.06 0.06	Not Applicable
Pyrophoric materials	Note b	0.0025	Notes d and e
Unstable (reactive)Class 4Class 3Class 2Class 1	Note b 0.05 0.2 Not Limited	Note b 0.005 0.02 Not Limited	Note b Note b Note b Not Limited
Water reactiveClass 3Class 2Class 1	0.02 [f] 0.5 Not Limited	0.0025 0.05 Not Limited	Not Applicable
Health-Hazard Materials			
Corrosives	Not Limited	Not Limited	Not Limited
Highly toxic	Not Limited	Not Limited	Note d
Toxics	Not Limited	Not Limited	Note d

For SI: 1 pound = 0.454 kg, 1 pound per square foot = 4.882 kg/m^2, 1 gallon per square foot = 40.7 L/m^2, 1 cubic foot @ NTP/square foot = 0.305 m^3 @ NTP/m^2, 1 cubic foot = 0.02832 m^3.

a. Hazardous materials within piping shall not be included in the calculated quantities.

b. Quantity of hazardous materials in a single fabrication area shall not exceed the maximum allowable quantities per control area in Tables 5003.1.1(1) and 5003.1.1(2).

c. Densely packed baled cotton that complies with the packing requirements of ISO 8115 shall not be included in this material class.

d. The aggregate quantity of flammable, pyrophoric, toxic and highly toxic gases shall not exceed the greater of 0.2 cubic feet at NTP/square foot or 9,000 cubic feet at NTP.

e. The aggregate quantity of pyrophoric gases in the building shall not exceed the amounts set forth in Table 5003.8.2.

f. Quantity of Class 3 water-reactive solids in a single tool shall not exceed 1 pound.

TABLE 5003.1.1(1) MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD[a, c, i, l, m, o]

Portions of table not shown remain unchanged.

MATERIAL	CLASS	GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED	STORAGE[b]			USE-CLOSED SYSTEMS[b]			USE-OPEN SYSTEMS[b]	
			Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds (cubic feet)	Liquid gallons (pounds)
Combustible dust	NA	H-2	See Note p	NA	NA	See Note p	NA	NA	See Note p	NA
Combustible fibers [p]	Loose	H-3	(100)	NA	NA	(100)	NA	NA	(20)	NA
	Baled		(1,000)			(1,000)			(200)	

MATERIAL	CLASS	GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED	STORAGE			USE-CLOSED SYSTEMS			USE-OPEN SYSTEMS	
			Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds (cubic feet)	Liquid gallons (pounds)
Combustible liquid	II	H-2 or H-3	NA	120[d, e]	NA	NA	120[d]	NA	NA	30[d]
	IIIA	H-2 or H-3		330[d, e]			330[d]			80[d]
	IIIB	NA		13,200[e, f]			13,200[f]			3,300[f]
CryogenicFlammable	NA	H-2	NA	45[d]	NA	NA	45[d]	NA	NA	10[d]
CryogenicInert	NA	NA	NA	NA	NL	NA	NA	NL	NA	NA
CryogenicOxidizing	NA	H-3	NA	45[d]	NA	NA	45[d]	NA	NA	10[d]
Explosives	Division 1.1	H-1	1[e, g]	(1)[e, g]	NA	0.25[g]	(0.25)[g]	NA	0.25[g]	(0.25)[g]
	Division 1.2	H-1	1[e, g]	(1)[e, g]		0.25[g]	(0.25)[g]		0.25[g]	(0.25)[g]
	Division 1.3	H-1 or H-2	5[e, g]	(5)[e, g]		1[g]	(1)[g]		1[g]	(1)[g]
	Division 1.4	H-3	50[e, g]	(50)[e, g]		50[g]	(50)[g]		NA	NA
	Division 1.4G	H-3	125[e, k]	NA		NA	NA		NA	NA
	Division 1.5	H-1	1[e, g]	(1)[e, g]		0.25[g]	(0.25)[g]		0.25[g]	(0.25)[g]
	Division 1.6	H-1	1[e, g]	NA		NA	NA		NA	NA
Flammable gas	Gaseous	H-2	NA	NA		NA	NA		NA	NA
	1A and 1B (High BV)[q]				1,000[d, e]			1,000[d, e]		
	1B (Low BV)[q]				162,500[d, e]			162,500[d, e]		
	Liquefied				NA			NA		
	1A and 1B (High BV)[q]			(150)[d, e]			(150)[d, e]			
	1B (Low BV)[q]			(10,000)[d, e]			(10,000)[d, e]			
Flammable liquid[n]	IA	H-2	NA	30[d, e]	NA	NA	30[d]	NA	NA	10d
		or		120[d, e]			120[d]			30d
	IB and IC	H-3								
Flammable liquid, combination (IA, IB, IC)[n]	NA	H-2 or H-3	NA	120[d, e, h]	NA	NA	120[d, h]	NA	NA	30[d, h]
Flammable solid	NA	H-3	125[d, e]	NA	NA	125[d]	NA	NA	25[d]	NA
Inert gas	Gaseous	NA	NA	NA	NL	NA	NA	NL	NA	NA
	Liquefied	NA	NA	NA	NL	NA	NA	NL	NA	NA
Organic peroxide	~~UD~~ Detonable	H-1	1[e, g]	(1)[e, g]	NA	0.25[g]	(0.25)[g]	NA	0.25[g]	(0.25)[g]
	I	H-2	16~~5~~[d, e]	(16~~5~~)[d, e]		16~~1~~[d]	(16~~1~~)[d]		8~~1~~[d]	(8~~1~~)[d]
	IIA	H-3	100~~50~~[d, e]	(100~~50~~)[d, e]		100~~50~~[d]	(100~~50~~)[d]		20~~10~~[d]	(20~~10~~)[d]
	IIB	H-3	200[d, e]	(200)[d, e]		200[d]	(200)[d]		50[d]	(50)[d]
	III	H-3	400~~125~~[d, e]	(400~~125~~)[d, e]		400~~125~~[d]	(400~~125~~)[d]		100~~25~~[d]	(100~~25~~)[d]
	IV	NA	NL	NL		NL	NL		NL	NL
	V	NA	NL	NL		NL	NL		NL	NL
Oxidizer	4	H-1	1[g]	(1)[e, g]	NA	0.25[g]	(0.25)[g]	NA	0.25[g]	(0.25)[g]
	3[j]	H-2 or H-3	10[d, e]	(10)[d, e]		2[d]	(2)[d]		2[d]	(2)[d]
	2	H-3	250[d, e]	(250)[d, e]		250[d]	(250)[d]		50[d]	(50)[d]
	1	NA	4,000[e, f]	(4,000)[e, f]		4,000[f]	(4,000)[f]		1,000[f]	(1,000)[f]
Oxidizing gas	Gaseous	H-3	NA	NA	1,500[d,e]	NA	NA	1,500[d, e]	NA	NA
	Liquefied			(150)[d, e]	NA		(150)[d, e]	NA		
Pyrophoric	NA	H-2	4[e, g]	(4)[e, g]	50[e, g]	1[g]	(1)[g]	10[e, g]	0	0
Unstable (reactive)	4	H-1	1[e, g]	(1)[e, g]	10[e, g]	0.25[g]	(0.25)[g]	2[e, g]	0.25[g]	(0.25)[g]
	3	H-1 or H-2	5[d, e]	(5)[d, e]	50[d, e]	1[d]	(1)[d]	10[d, e]	1[d]	(1)[d]
	2	H-3	50[d, e]	(50)[d, e]	750[d, e]	50[d]	(50)[d]	750[d, e]	10[d]	(10)[d]
	1	NA	NL	NL	NL	NL	NL	NL	NL	NL
Water reactive	3	H-2	5[d, e]	(5)[d, e]	NA	5[d]	(5)[d]	NA	1[d]	(1)[d]
	2	H-3	50[d, e]	(50)[d, e]		50[d]	(50)[d]		10[d]	(10)[d]
	1	NA	NL	NL		NL	NL		NL	NL

For SI: 1 cubic foot = 0.02832 m^3, 1 pound = 0.454 kg, 1 gallon = 3.785 L.

NA = Not Applicable, NL = Not Limited~~, UD = Unclassified Detonable.~~

a. For use of control areas, see Section 5003.8.3.

b. The aggregate quantity in use and storage shall not exceed the maximum allowance quantity for storage, including applicable increases.

c. For hazardous materials in Group B higher education laboratory occupancies, see Section 428 of the *International Building Code* and Chapter 38.

d. Maximum allowable quantities shall be increased 100 percent in buildings equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1. Where Note e applies, the increase for both notes shall be applied accumulatively.

e. Maximum allowable quantities shall be increased 100 percent where stored in approved storage cabinets, day boxes, gas cabinets, gas rooms, exhausted enclosures or in listed safety cans in accordance with Section 5003.9.10. Where Note d applies, the increase for both notes shall be applied accumulatively.

f. Quantities shall not be limited in a building equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1.

g. Allowed only in buildings equipped throughout with an approved automatic sprinkler system.

h. Containing not more than the maximum allowable quantity per control area of Class IA, Class IB or Class IC flammable liquids.

i. Quantities in parentheses indicate quantity units in parentheses at the head of each column.

j. A maximum quantity of 220 pounds of solid or 22 gallons of liquid Class 3 oxidizers is allowed where such materials are necessary for maintenance purposes, operation or sanitation of equipment where the storage containers and the manner of storage are approved.

k. Net weight of pyrotechnic composition of the fireworks. Where the net weight of the pyrotechnic composition of the fireworks is not known, 25 percent of the gross weight of the fireworks including packaging shall be used.

l. For gallons of liquids, divide the amount in pounds by 10 in accordance with Section 5003.1.2.

m. For oxidizers, unstable (reactive) materials and water-reactive materials stored or displayed in Group M occupancies or storedin Group S occupancies, see Section 5003.11..

n. For flammable and combustible liquid storage in Group M occupancy wholesale and retail sales uses, see Section 5704.3.6.

o. Quantities in this table shall be modified in accordance with Table 5003.1.1(5).

p. Where manufactured, generated or used in such a manner that the concentration and conditions create a fire or explosion hazard based on information prepared in accordance with Section 104.2.2.

q. "High BV" Category 1B flammable gas has a burning velocity greater than 3.9 in/s (10 cm/s). "Low BV" Category 1B flammable gas has a burning velocity of 3.9 in/s (10 cm/s) or less.

TABLE 5003.1.1(3) MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD IN AN OUTDOOR CONTROL AREA[a, b, c, d]

MATERIAL	CLASS	STORAGE[b]			USE-CLOSED SYSTEMS[b]			USE-OPEN SYSTEMS[b]	
		Solid pounds (cubic feet)	Liquid gallons (pounds)[d]	Gas cubic feet at NTP	Solid pounds (cubic feet)	Liquid gallons (pounds)[d]	Gas cubic feet at NTP	Solid pounds (cubic feet)	Liquid gallons (pounds)[d]
Flammable gas	Gaseous	Not Applicable	Not Applicable		Not Applicable	Not Applicable		Not Applicable	Not Applicable
	1A and 1B (High BV)[e]			3,000			1,500		
	1B (Low BV)[e]			195,000			97,500		
	Liquefied			Not Applicable			Not Applicable		
	1A and 1B (High BV)[e]		(300)			(150)			
	1B (Low BV)[e]		(20,000)			(10,000)			
Flammable solid	Not Applicable	500	Not Applicable	Not Applicable	250	Not Applicable	Not Applicable	50	Not Applicable
Inert Gas	Gaseous Liquefied	Not Applicable Not Applicable	Not Applicable Not Applicable	Not Limited Not Limited	Not Applicable Not Applicable	Not Applicable Not Applicable	Not Limited Not Limited	Not Applicable Not Applicable	Not Applicable Not Applicable
Cryogenic inert	Not Applicable	Not Applicable	Not Applicable	Not Limited	Not Applicable	Not Applicable	Not Limited	Not Applicable	Not Applicable
Organic peroxide	~~Unclassified~~ Detonable	1	(1)	Not Applicable	0.25	(0.25)	Not Applicable	0.25	(0.25)

MATERIAL	CLASS	STORAGE Solid pounds (cubic feet)	STORAGE Liquid gallons (pounds)	STORAGE Gas cubic feet at NTP	USE-CLOSED SYSTEMS Solid pounds (cubic feet)	USE-CLOSED SYSTEMS Liquid gallons (pounds)	USE-CLOSED SYSTEMS Gas cubic feet at NTP	USE-OPEN SYSTEMS Solid pounds (cubic feet)	USE-OPEN SYSTEMS Liquid gallons (pounds)
Organic peroxide	I IIA IIB III IV V	20 200 400 840~~500~~ Not Limited Not Limited	(20) (200) (400) (840~~500~~) Not Limited Not Limited	Not Applicable	10 100 200 400~~250~~ Not Limited Not Limited	(10) (100) (200) (400~~250~~) Not Limited Not Limited	Not Applicable	8~~2~~ 50~~20~~ 100 200~~50~~ Not Limited Not Limited	(8~~2~~) (50~~20~~) (100) (200~~50~~) Not Limited Not Limited
Oxidizer	4 3 2 1	2 40 1,000 Not Limited	(2) (40) (1,000) Not Limited	Not Applicable	1 20 500 Not Limited	(1) (20) (500) Not Limited	Not Applicable	0.25 4 100 Not Limited	(0.25) (4) (100) Not Limited
Oxidizing gas	Gaseous Liquefied	Not Applicable	Not Applicable (600)	6,000 Not Applicable	Not Applicable	Not Applicable (300)	1,500 Not Applicable	Not Applicable	Not Applicable
Pyrophoric materials	Not Applicable	8	(8)	100	4	(4)	10	0	0
Unstable (reactive)	4 3 2 1	2 20 200 Not Limited	(2) (20) (200) Not Limited	20 200 1,000 Not Limited	1 10 100 Not Limited	(1) (10) (100) Not Limited	2 10 250 Not Limited	0.25 1 10 Not Limited	(0.25) (1) (10) Not Limited
Water reactive	3 2 1	20 200 Not Limited	(20) (200) Not Limited	Not Applicable	10 100 Not Limited	(10) (100) Not Limited	Not Applicable	1 10 Not Limited	(1) (10) Not Limited

For SI: 1 pound = 0.454 kg, 1 gallon = 3.785 L, 1 cubic foot = 0.02832 m^3.

a. For gallons of liquids, divide the amount in pounds by 10 in accordance with Section 5003.1.2.

b. The aggregate quantities in storage and use shall not exceed the maximum allowable quantity for storage, including applicable increases.

c. The aggregate quantity of nonflammable solid and nonflammable or noncombustible liquid hazardous materials allowed in outdoor storage per single property under the same ownership or control used for retail or wholesale sales is allowed to exceed the maximum allowable quantity per control area where such storage is in accordance with Section 5003.11.

d. Quantities in parentheses indicate quantity units in parentheses at the head of each column.

e. “High BV” Category 1B flammable gas has a burning velocity greater than 3.9 in/s (10 cm/s). “Low BV” Category 1B flammable gas has a burning velocity of 3.9 in/s (10 cm/s) or less.

TABLE 5003.8.2 DETACHED BUILDING REQUIRED

A DETACHED BUILDING IS REQUIRED WHERE THE QUANTITY OF MATERIAL EXCEEDS THAT LISTED HEREIN			
Material	Class	Solids and liquids (tons)[a, b]	Gases (cubic feet)[a, b]
Explosives	Division 1.1 Division 1.2 Division 1.3 Division 1.4[e] Division 1.4[c, e] Division 1.5 Division 1.6	Maximum Allowable Quantity Maximum Allowable Quantity Maximum Allowable Quantity Maximum Allowable Quantity 1 Maximum Allowable Quantity Maximum Allowable Quantity	Not Applicable
Oxidizers	Class 4	Maximum Allowable Quantity	Maximum Allowable Quantity
Unstable (reactives) detonable	Class 3 or 4	Maximum Allowable Quantity	Maximum Allowable Quantity
Oxidizer, liquids and solids	Class 3 Class 2	1,200 2,000	Not Applicable

A DETACHED BUILDING IS REQUIRED WHERE THE QUANTITY OF MATERIAL EXCEEDS THAT LISTED HEREIN			
Material	**Class**	**Solids and liquids (tons)**	**Gases (cubic feet)**
Organic peroxides	Detonable Class I Class IIA Class IIB Class III	Maximum Allowable Quantity Maximum Allowable Quantity 25[f] 40[f] 50[f]	Not Applicable
Unstable (reactives) nondetonable	Class 3 Class 2	125	2,000 10,000
Water reactives	Class 3 Class 2	125	Not Applicable
Pyrophoric gases[d]	Not Applicable	Not Applicable	2,000

For SI: 1 pound = 0.454 kg, 1 cubic foot = 0.02832 m^3, 1 ton = 2000 lb = 907.2 kg.

a. For materials that are detonable, the distance to other buildings or lot lines shall be in accordance with Section 415.6 of the International Building Code or Chapter 56 based on the trinitrotoluene (TNT) equivalence of the material, whichever is greater.

b. “Maximum Allowable Quantity” means the maximum allowable quantity per control area set forth in Table 5003.1.1(1).

c. Limited to Division 1.4 materials and articles, including articles packaged for shipment, that are not regulated as an explosive under Bureau of Alcohol, Tobacco, Firearms and Explosives regulations, or unpackaged articles used in process operations that do not propagate a detonation or deflagration between articles, providing the net explosive weight of individual articles does not exceed 1 pound.

d. Detached buildings are not required for gases in gas rooms that support H-5 fabrication facilities where the gas room is separated from other areas by a fire barrier with a fire-resistance rating of not less than 2 hours and the gas is located in a gas cabinet that is internally sprinklered, equipped with continuous leak detection, automatic shutdown, and is not manifolded upstream of pressure controls. The gas supply is limited to cylinders that do not exceed 125 pounds water capacity in accordance with DOTn 49 CFR 173.192 for Hazard Zone A toxic gases.

e. Does not apply to consumer fireworks, Division 1.4G.

f. Where different classes of organic peroxides are stored in the same building, the aggregate sum of the ratios of the actual quantity divided by the allowed quantity for each class shall not exceed one.

TABLE 5004.2.2 REQUIRED SECONDARY CONTAINMENT—HAZARDOUS MATERIAL SOLIDS AND LIQUIDS STORAGE

MATERIAL		INDOOR STORAGE		OUTDOOR STORAGE	
		Solids	**Liquids**	**Solids**	**Liquids**
1. Physical-hazard materials					
Combustible liquids	Class II	Not Applicable	See Chapter 57	Not Applicable	See Chapter 57
	Class IIIA		See Chapter 57		See Chapter 57
	Class IIIB		See Chapter 57		See Chapter 57
Cryogenic fluids			See Chapter 55		See Chapter 55
Explosives		See Chapter 56		See Chapter 56	
Flammable liquids	Class IA	Not Applicable	See Chapter 57	Not Applicable	See Chapter 57
	Class IB		See Chapter 57		See Chapter 57
	Class IC		See Chapter 57		See Chapter 57
Flammable solids		Not Required	Not Applicable	Not Required	Not Applicable
Organic peroxides	~~Unclassified~~ Detonable	Required	Required	Not Required	Not Required
	Class I				
	Class IIA Class IIB				
	Class III				
	Class IV				

MATERIAL		INDOOR STORAGE		OUTDOOR STORAGE	
		Solids	Liquids	Solids	Liquids
	Class V	Not Required	Not Required	Not Required	Not Required
Oxidizers	Class 4	Required	Required	Not Required	Not Required
	Class 3				
	Class 2				
	Class 1	Not Required	Not Required	Not Required	Not Required
Pyrophorics		Not Required	Required	Not Required	Required
Unstable (reactives)	Class 4	Required	Required	Required	Required
	Class 3				
	Class 2				
	Class 1	Not Required	Not Required	Not Required	Not Required
Water reactives	Class 3	Required	Required	Required	Required
	Class 2				
	Class 1	Not Required	Not Required	Not Required	Not Required
2. Health-hazard materials					
Corrosives		Not Required	Required	Not Required	Required
Highly toxics		Required	Required	Required	Required
Toxics					

5004.7.1 Exempt applications. Standby or emergency power is not required for mechanical ventilation systems for any of the following:

1. Storage of Class IB and IC *flammable liquids* and Class II and III *combustible liquids* in closed containers not exceeding a capacity of 6$^{1}/_{2}$ gallons (25 L).
2. Storage of Class 1 and 2 *oxidizers*.
3. Storage of Class IIA, IIB, III, IV and V *organic peroxides*.
4. Storage of asphyxiant, irritant and radioactive gases.

TABLE 5005.2.1.4 REQUIRED SECONDARY CONTAINMENT—HAZARDOUS MATERIAL LIQUIDS USE

MATERIAL		INDOOR LIQUIDS USE	OUTDOOR LIQUIDS USE
1. Physical-hazard materials			
Combustible liquids	Class II	See Chapter 57	See Chapter 57
	Class IIIA	See Chapter 57	See Chapter 57
	Class IIIB	See Chapter 57	See Chapter 57
Cryogenic fluids		See Chapter 55	See Chapter 55
Explosives		See Chapter 56	See Chapter 56
Flammable liquids	Class IA	See Chapter 57	See Chapter 57
	Class IB	See Chapter 57	See Chapter 57
	Class IC	See Chapter 57	See Chapter 57
Flammable solids		Not Applicable	Not Applicable
Organic peroxides	~~Unclassified~~ Detonable	Required	Required
	Class I	Required	Required
	Class IIA Class IIB		
	Class III		
	Class IV		
	Class V	Not Required	Not Required
Oxidizers	Class 4	Required	Required
	Class 3		
	Class 2		
	Class 1		
Pyrophorics		Required	Required
Unstable (reactives)	Class 4	Required	Required
	Class 3		
	Class 2		
	Class 1	Not Required	Required
Water reactives	Class 3	Required	Required
	Class 2		
	Class 1	Not Required	Required
2. Health-hazard materials			
Corrosives		Required	Required
Highly toxics			
Toxics			

E102.1.8.1 Classification of organic peroxides ~~according to hazard~~.

~~**E102.1.8.1 Classification of organic peroxides according to hazard.**~~

~~Examples include:~~

~~Unclassified: Unclassified *organic peroxides* are capable of *detonation* and are regulated in accordance with Chapter 56.~~

~~Class I: acetyl cyclohexane sulfonyl 60-65 percent concentration by weight, fulfonyl peroxide, benzoyl peroxide over 98 percent concentration, t-butyl hydroperoxide 90 percent, t-butyl peroxyacetate 75 percent, t-butyl peroxyisopropylcarbonate 92 percent, diisopropyl peroxydicarbonate 100 percent, di-n-propyl peroxydicarbonate 98 percent, and di-n-propyl peroxydicarbonate 85 percent.~~

~~Class II: acetyl peroxide 25 percent, t-butyl hydroperoxide 70 percent (with DTBP and t-BuOH diluents), t-butyl peroxybenzoate 98 percent, t-butyl peroxy-2-ethylhexanoate 97 percent, t-butyl peroxyisobutyrate 75 percent, t-butyl peroxyisopropyl carbonate 75 percent, t-butyl peroxypivalate 75 percent, dybenzoyl peroxydicarbonate 85 percent, di-sec-butyl peroxydicarbonate 98 percent, di-secbutyl peroxydicarbonate 75 percent, 1,1-di-(t-butylperoxy)-3,5,5-trimethyecyclohexane 95 percent, di-(2-ethythexyl) peroxydicarbonate 97 percent, 2,5-dymethyl-2-5 di (benzoylperoxy) hexane 92 percent, and peroxyacetic acid 43 percent.~~

~~Class III: acetyl cyclohexane sulfonal peroxide 29 percent, benzoyl peroxide 78 percent, benzoyl peroxide paste 55 percent, benzoyl peroxide paste 50 percent peroxide/50 percent butylbenzylphthalate diluent, cumene hydroperoxide 86 percent, di-(4-butylcyclohexyl) peroxydicarbonate 98 percent, t-butyl peroxy-2-ethylhexanoate 97 percent, t-butyl peroxyneodecanoate 75 percent, decanoyl peroxide 98.5 percent, di-t-butyl peroxide 99 percent, 1,1-di-(t-butylperoxy)3,5,5-trimethylcyclohexane 75 percent, 2,4-dichlorobenzoyl peroxide 50 percent, di-isopropyl peroxydicarbonate 30 percent, 2, 5-di-methyl-2,5-di-(2-ethylhexanolyperoxy)-hexane 90 percent, 2,5-dimethyl-2,5-di-(t-butylperoxy) hexane 90 percent and methyl ethyl ketone peroxide 9 percent active oxygen diluted in dimethyl phthalate.~~

~~Class IV: benzoyl peroxide 70 percent, benzoyl peroxide paste 50 percent peroxide/15 percent water/35 percent butylphthalate diluent, benzoyl peroxide slurry 40 percent, benzoyl peroxide powder 35 percent, t-butyl hydroperoxide 70 percent, (with water diluent), t-butyl peroxy-2-ethylhexanoate 50 percent, decumyl peroxide 98 percent, di-(2-ethylhexal) peroxydicarbonate 40 percent, laurel peroxide 98 percent, p-methane hydroperoxide 52.5 percent, methyl ethyl ketone peroxide 5.5 percent active oxygen and methyl ethyl ketone peroxide 9 percent active oxygen diluted in water and glycols.Class V: benzoyl peroxide 35 percent, 1,1-di-t-butyl peroxy 3,5,5-trimethylcyclohexane 40 percent, 2,5-di-(t-butyl peroxy) hexane 47 percent and 2,4-pentanedione peroxide 4 percent active oxygen.~~

Organic peroxide requirements in the IFC are based on the hazard classification, burning rate and transport type.

Add new text as follows:

E102.1.8.1.1 Hazard classification. Organic peroxide formulations are classified into seven hazard classifications (Detonable, I, IIA, IIB, III, IV and V). These classifications are used to determine the occupancy classifications and maximum allowable quantities. Detonable organic peroxides are explosive. As such, the storage requirements for detonable organic peroxides are found in Chapter 56, and Chapter 62 contains additional use, handling and transfer provisions.

E102.1.8.1.2 Transport types. Organic peroxides are also categorized based on the explosion hazard rating—referred to as the Transport Type. The transport type for organic peroxide formulations is determined in accordance with the UN RTDG. The explosion hazard levels are divided into "Types" (Type A-G) and a corresponding UN Number is identified based on whether the formulations are liquid or solid, and whether they require temperature control. Table E102.1.8.1.2 lists the transport types, UN Numbers, explosion hazard level and the maximum size container based on the transport type.

TABLE E102.1.8.1.2 TRANSPORT TYPES FOR ORGANIC PEROXIDES

Portions of table not shown remain unchanged.

TRANSPORT TYPE	EXPLOSIVE HAZARD RATING	MAXIMUM CONTAINER SIZE		UN NUMBER			
		Solid	Liquid	Ambient Temperature		Temperature Controlled	
		pounds (kg)	gallons (L)	Liquid	Solid	Liquid	Solid
A	Explosive	NP	NP	NA	NA	NA	NA
B	Very high	55 (25)	8 (30)	3101	3102	3111	3112
C	High	110 (50)	16 (60)	3103	3104	3113	3114
D	Medium	110 (50)	16 (60)	3105	3106	3115	3116
E	Low	882 (400)	60 (225)	3107	3108	3117	3118

F	Very low	IBC or Portable Tank	IBC or Portable Tank	3109	3110	3119	3120
G	None	NL	NL	NA	NA	NA	NA

NA – Not applicable; NL = Not Limited; NP = Not Permitted

E102.1.8.1.3 Burning rate. Organic peroxides are capable of high heat release and large quantities of smoke when they are involved in fire. The burning rate varies for each organic peroxide material and is determined in accordance with PGS 8. The burning rate is calculated from results of large-scale testing or small-scale testing detailed in PGS 8. Where the burning rate is not known, the highest classification for the organic peroxide shall be used.

TABLE E102.1.8.2 STORAGE CLASSIFICATION OF ORGANIC PEROXIDES

TRANSPORT TYPE	**BURNING RATE**					
	Large Scale Test (kg/minute)	**<10**	**≥10 and <60**	**≥60 and <140**	**≥140 and <300**	**≥300**
	OR					
	Small Scale Test [a] (kg/m²/minute)	**NA**	**<0.9**	**≥0.9 and <2.2**	**≥2.2 and <9.0**	≥9.0
B		I	I	I	I	I
C		IIB	IIB	IIB	IIA	I
D		III	III	IIB	IIA	I
E		IV	III	IIB	IIA	IIA
F		IV	III	III	III	III
G		V	V	V	V	V

a. Solid materials shall be tested using the large-scale test. Liquid materials can be tested using either the large-scale test or the small-scale test.

E102.1.8.2 Classification process. The classification process is based on the definitions of the various classes of organic peroxides. The classification for use in the IFC is based on the transport type and burning rate and is shown in Table E102.1.8.2. For example, a Transport Type C organic peroxide with a burning rate equal to or greater than 300 kilograms (662 pounds) per minute will be treated a Class I organic peroxide; and another Transport Type C organic peroxide with a burning rate less than 140 kilograms (309 pounds) per minute will be treated as a Class IIB organic peroxide.

E102.1.8.3 Organic peroxide classification. Organic peroxides and their corresponding classifications are listed in Table E102.1.8.3.

TABLE E102.1.8.3 ORGANIC PEROXIDE STORAGE CLASSIFICATIONS

Organic Peroxide Storage Class	**Organic Peroxide Name**	**CAS#**	**Concentration (mass%)**	**Diluent type A**	**Diluent type B**	**Inert solid**	**Water**	**UN Number (Generic entry)**	**Transport Type**	**Subsidiary risks and remarks**
III	Acetyl acetone peroxide	37187-22-7	≤42	≥48			≥8	3105	Type D	2
III	Acetyl acetone peroxide [as a paste]	37187-22-7	≤32					3106	Type D	20
I	Acetyl cyclohexanesulfonyl peroxide	3179-56-4	≤82				≥12	3112	Type B	3
III	Acetyl cyclohexanesulfonyl peroxide	3179-56-4	≤32		≥68			3115	Type D	
IIA	tert-Amyl hydroperoxide	3425-61-4	≤88	≥6			≥6	3107	Type E	

Organic Peroxide Storage Class	Organic Peroxide Name	CAS#	Concentration (mass%)	Diluent type A	Diluent type B	Inert solid	Water	UN Number (Generic entry)	Transport Type	Subsidiary risks and remarks
IIA	tert-Amyl peroxyacetate	690-83-5	≤62	≥38				3105	Type D	
IIA	tert-Amyl peroxybenzoate	4511-39-1	≤100					3103	Type C	
IIA	tert-Amyl peroxy-2-ethylhexanoate	686-31-7	≤100					3115	Type D	
IIB	tert-Amyl peroxy-2-ethylhexanoate	686-31-7	≤52	≥48				3115	Type D	
IIA	tert-Amyl peroxy-2-ethylhexyl carbonate	70833-40-8	≤100					3105	Type D	
I	tert-Amyl peroxy isopropyl carbonate	2372-22-7	≤77	≥23				3103	Type C	
IIA	tert-Amyl peroxyneodecanoate	68299-16-1	≤77	≥23				3115	Type D	
III	tert-Amyl peroxyneodecanoate	68299-16-1	≤47	≥53				3119	Type F	
IIA	tert-Amyl peroxypivalate	29240-17-3	≤77	≥23				3113	Type C	
IIA	tert-Amyl peroxy-3,5,5-trimethylhexanoate	68860-54-8	≤100					3105	Type D	
III	tert-Butyl cumyl peroxide	3457-61-2	>42-100					3109	Type F	
III	tert-Butyl cumyl peroxide	3457-61-2	≤52			≥48		3108	Type E	
IIA	n-Butyl-4,4-di-(tert-butylperoxy)valerate	995-33-5	>52-100					3103	Type C	
III	n-Butyl-4,4-di-(tert-butylperoxy)valerate	995-33-5	≤52			≥48		3108	Type E	
I	tert-Butyl hydroperoxide	75-91-2	>79-90				≥10	3103	Type C	13
IIA	tert-Butyl hydroperoxide	75-91-2	≤80	≥20				3105	Type D	4, 13
IIB	tert-Butyl hydroperoxide	75-91-2	≤79				>14	3107	Type E	13, 23
III	tert-Butyl hydroperoxide	75-91-2	≤72				≥28	3109	Type F	13, 32
I	tert-Butyl hydroperoxide [and] Di-tert-butylperoxide	75-91-2	<82+>9				≥7	3103	Type C	13
I	tert-Butyl monoperoxymaleate	1931-62-0	>52-100					3102	Type B	3
IIB	tert-Butyl monoperoxymaleate	1931-62-0	≤52	≥48				3103	Type C	
IIB	tert-Butyl monoperoxymaleate	1931-62-0	≤52			≥48		3108	Type E	
IIB	tert-Butyl monoperoxymaleate [as a paste]	1931-62-0	≤52					3108	Type E	
I	tert-Butyl peroxyacetate	107-71-1	>52-77	≥23				3101	Type B	3
IIA	tert-Butyl peroxyacetate	107-71-1	>32-52	≥48				3103	Type C	
III	tert-Butyl peroxyacetate	107-71-1	≤32	≥68				3109	Type F	
IIA	tert-Butyl peroxybenzoate	614-45-9	>77-100					3103	Type C	
IIA	tert-Butyl peroxybenzoate	614-45-9	>52-77	≥23				3105	Type D	
IIB	tert-Butyl peroxybenzoate	614-45-9	≤52			≥48		3106	Type D	
IIB	tert-Butyl peroxybutyl fumarate		≤52	≥48				3105	Type D	
IIA	tert-Butyl peroxycrotonate	23474-91-1	≤77	≥23				3105	Type D	
IIA	tert-Butyl peroxydiethylacetate	2550-33-6	≤100					3113	Type C	
IIA	tert-Butyl peroxy-2-ethylhexanoate	3006-82-4	>52–100					3113	Type C	
IIB	tert-Butyl peroxy-2-ethylhexanoate	3006-82-4	>32-52	≥48				3117	Type E	
IIB	tert-Butyl peroxy-2-ethylhexanoate	3006-82-4	≤52			≥48		3118	Type E	
III	tert-Butyl peroxy-2-ethylhexanoate	3006-82-4	≤32	≥68				3119	Type F	
III	tert-Butyl peroxy-2-ethylhexanoate [and] 2,2-di-(tert-Butylperoxy)butane	3006-82-4 & 2167-23-9	≤12+≤14	≥14		≥60		3106	Type D	
IIA	tert-Butyl peroxy-2-ethylhexanoate [and] 2,2-di-(tert-Butylperoxy)butane	3006-82-4 & 2167-23-9	≤31+≤36		≥33			3115	Type D	
IIA	tert-Butyl peroxy-2-ethylhexylcarbonate	34443-12-4	≤100					3105	Type D	
I	tert-Butyl peroxyisobutyrate	109-13-7	>52-77		≥23			3111	Type B	3
IIB	tert-Butyl peroxyisobutyrate	109-13-7	≤52		≥48			3115	Type D	
IIB	tert-Butylperoxy isopropylcarbonate	2372-21-6	≤77	≥23				3103	Type C	
IIA	1-(2-tert-Butylperoxy isopropyl)-3-isopropenylbenzene	96319-55-0	≤77	≥23				3105	Type D	
IIB	1-(2-tert-Butylperoxy isopropyl)-3-isopropenylbenzene	96319-55-0	≤42			≥58		3108	Type E	
I	tert-Butyl peroxy-2-methylbenzoate	22313-62-8	≤100					3103	Type C	
I	tert-Butyl peroxyneodecanoate	26748-41-4	>77-100					3115	Type D	

Organic Peroxide Storage Class	Organic Peroxide Name	CAS#	Concentration (mass%)	Diluent type A	Diluent type B	Inert solid	Water	UN Number (Generic entry)	Transport Type	Subsidiary risks and remarks
I	tert-Butyl peroxyneodecanoate	26748-41-4	≤77	≥23				3115	Type D	
IV	tert-Butyl peroxyneodecanoate [as a stable dispersion in water]	26748-41-4	≤52					3119	Type F	
IV	tert-Butyl peroxyneodecanoate [as a stable dispersion in water (frozen)]	26748-41-4	≤42					3118	Type E	
III	tert-Butyl peroxyneodecanoate	26748-41-4	≤32	≥68				3119	Type F	
I	tert-Butyl peroxyneoheptanoate	26748-38-9	≤77	≥23				3115	Type D	
IV	tert-Butyl peroxyneoheptanoate [as a stable dispersion in water]	26748-38-9	≤42					3117	Type E	
IIA	tert-Butyl peroxypivalate	927-07-1	>67-77	≥23				3113	Type C	
IIA	tert-Butyl peroxypivalate	927-07-1	>47-67	≥53				3115	Type D	
IIA	tert-Butyl peroxypivalate	927-07-1	>27-47	≥33				3115	Type D	
III	tert-Butyl peroxypivalate	927-07-1	≤27	≥73				3119	Type F	
IIA	tert-Butylperoxy stearylcarbonate	62476-60-6	≤100					3106	Type D	
IIA	tert-Butyl peroxy-3,5,5-trimethylhexanoate	13122-18-4	>37-100					3105	Type D	
IIA	tert-Butyl peroxy-3,5,5-trimethylhexanoate	13122-18-4	>37-77	≥23				3105	Type D	
III	tert-Butyl peroxy-3,5,5-trimethlyhexanoate	13122-18-4	≤42			≥58		3106	Type D	
III	tert-Butyl peroxy-3,5,5-trimethylhexanoate	13122-18-4	≤37	>63				3109	Type F	
I	3-Chloroperoxybenzoic acid	937-14-4	>57-86			≥14		3102	Type B	3
IIA	3-Chloroperoxybenzoic acid	937-14-4	≤57			≥3	≥40	3106	Type D	
IIA	3-Chloroperoxybenzoic acid	937-14-4	≤77			≥6	≥17	3106	Type D	
IIA	Cumyl hydroperoxide	80-15-9	>90-98	≤10				3107	Type E	13
III	Cumyl hydroperoxide	80-15-9	≤80	≥20				3109	Type F	13, 18
III	Cumyl hydroperoxide	80-15-9	≤90	≥10				3109	Type F	13, 18
I	Cumyl peroxyneodecanoate	26748-47-0	≤87	≥13				3115	Type D	
IIA	Cumyl peroxyneodecanoate	26748-47-0	≤77	≥23				3115	Type D	
III	Cumyl peroxyneodecanoate [as a stable dispersion in water]	26748-47-0	≤52					3119	Type F	
I	Cumyl peroxyneoheptanoate	104852-44-0	≤77	≥23				3115	Type D	
IIA	Cumyl peroxypivalate	23383-59-7	≤77		≥23			3115	Type D	
IIA	Cyclohexanone peroxide(s)	12262-58-7	≤91				≥9	3104	Type C	13
IIB	Cyclohexanone peroxide(s)	12262-58-7	≤72	≥28				3105	Type D	5
IIB	Cyclohexanone peroxide(s) [as a paste]	12262-58-7	≤72					3106	Type D	5, 20
V	Cyclohexanone peroxide(s)	12262-58-7	≤32			≥68		Exempt	Type G	29
IIA	([3R- (3R, 5aS, 6S, 8aS, 9R, 10R, 12S, 12aR**)]-Decahydro-10-methoxy-3, 6, 9-trimethyl-3, 12-epoxy-12H-pyrano [4, 3- j]-1, 2-benzodioxepin)	71963-77-4	<100					3106	Type D	
IIB	Diacetone alcohol peroxides	54693-46-8	≤57		≥26		≥8	3115	Type D	6
IIB	Diacetyl peroxide	110-22-5	≤27		≥73			3115	Type D	7, 13
IIB	Di-tert-amyl peroxide	10508-09-5	≤100					3107	Type E	
IIA	2,2-Di-(tert-amylperoxy)-butane	13653-62-8	≤57	≥43				3105	Type D	
IIA	1,1-Di-(tert-amylperoxy)cyclohexane	15667-10-4	≤82	≥18				3103	Type C	
I	Dibenzoyl peroxide	94-36-0	>52-100			≤48		3102	Type B	3
I	Dibenzoyl peroxide	94-36-0	>77-94				≥6	3102	Type B	3
IIB	Dibenzoyl peroxide	94-36-0	≤77				≥23	3104	Type C	
IIB	Dibenzoyl peroxide	94-36-0	≤62			≥28	≥10	3106	Type D	
IIB	Dibenzoyl peroxide [as a paste]	94-36-0	>52–62					3106	Type D	20
IIB	Dibenzoyl peroxide	94-36-0	>35-52			≥48		3106	Type D	
IIB	Dibenzoyl peroxide	94-36-0	>36-42	≥18			≤40	3107	Type E	
IIB	Dibenzoyl peroxide [as a paste]	94-36-0	≤56.5				≥15	3108	Type E	
IIB	Dibenzoyl peroxide [as a paste]	94-36-0	≤52					3108	Type E	20
III	Dibenzoyl peroxide [as a stable dispersion in water]	94-36-0	≤42					3109	Type F	
V	Dibenzoyl peroxide	94-36-0	≤35			≥65		Exempt	Type G	29

Organic Peroxide Storage Class	Organic Peroxide Name	CAS#	Concentration (mass%)	Diluent type A	Diluent type B	Inert solid	Water	UN Number (Generic entry)	Transport Type	Subsidiary risks and remarks
I	Di-(4-tert-butylcyclohexyl)peroxydicarbonate	15520-11-3	≤100					3114	Type C	
IIB	Di-(4-tert-butylcyclohexyl)peroxydicarbonate	15520-11-3	≤75				≥ 25	3114	Type C	
IV	Di-(4-tert-butylcyclohexyl)peroxydicarbonate [as a stable dispersion in water]	15520-11-3	≤42					3119	Type F	
IIA	Di-tert-butyl peroxide	110-05-4	>52-100					3107	Type E	
III	Di-tert-butyl peroxide	110-05-4	≤52	≥48				3109	Type F	25
IIB	Di-tert-butyl peroxyazelate	16580-06-6	≤52	≥48				3105	Type D	
IIB	2,2-Di-(tert-butylperoxy)butane	2167-23-9	≤52	≥48				3103	Type C	
I	1,6-Di-(tert-butylperoxycarbonyloxy)hexane		≤72	≥28				3103	Type C	
I	1,1-Di-(tert-butylperoxy)cyclohexane	3006-86-8	>80-100					3101	Type B	3
IIA	1,1-Di-(tert-butylperoxy)cyclohexane	3006-86-8	≤72	≥28				3103	Type C	30
IIA	1,1-Di-(tert-butylperoxy)cyclohexane	3006-86-8	>52-80	≥20				3103	Type C	
IIA	1,1-Di-(tert-butylperoxy)cyclohexane	3006-86-8	>42-52	≥48				3105	Type D	
III	1,1-Di-(tert-butylperoxy)cyclohexane	3006-86-8	≤42	≥13		≥45		3106	Type D	
III	1,1-Di-(tert-butylperoxy)cyclohexane	3006-86-8	≤42	≥58				3109	Type F	
III	1,1-Di-(tert-butylperoxy)cyclohexane	3006-86-8	≤27	≥25				3107	Type E	21
III	1,1-Di-(tert-Butylperoxy)cyclohexane	3006-86-8	≤13	≥13	≥74			3109	Type F	
IIA	1,1-Di-(tert-butylperoxy)cyclohexane [and] Tert-butyl peroxy-2-ethylhexanoate	3006-86-8 & 3006-82-4	≤43+≤16	≥41				3105	Type D	
IIB	Di-n-butyl peroxydicarbonate	16215-49-9	>27-52		≥48			3115	Type D	
IV	Di-n-butyl peroxydicarbonate [as a stable dispersion in water (frozen)]	16215-49-9	≤42					3118	Type E	
III	Di-n-butyl peroxydicarbonate	16215-49-9	≤27		≥73			3117	Type E	
I	Di-sec-butyl peroxydicarbonate	19910-65-7	>62-100					3113	Type C	
I	Di-sec-butyl peroxydicarbonate	19910-65-7	>52-62	≥38				3113	Type C	
I	Di-sec-butyl peroxydicarbonate	19910-65-7	≤52		≥48			3115	Type D	
IIB	Di-(tert-butylperoxyisopropyl) benzene(s)	25155-25-3	>42-100			≤57		3106	Type D	
V	Di-(tert-butylperoxyisopropyl) benzene(s)	25155-25-3	≤42			≥58		Exempt	Type G	29
IIB	Di-(tert-butylperoxy)phthalate	15042-77-0	>42-52	≥48				3105	Type D	
IIB	Di-(tert-butylperoxy)phthalate [as a paste]	15042-77-0	≤52					3106	Type D	20
IIB	Di-(tert-butylperoxy)phthalate	15042-77-0	≤42	≥58				3107	Type E	
IIB	2,2-Di-(tert-butylperoxy)propane	2167-23-9	≤52	≥48				3105	Type D	
III	2,2-Di-(tert-butylperoxy)propane	2167-23-9	≤42	≥13		≥45		3106	Type D	
I	1,1-Di-(tert-butylperoxy)-3,3,5-trimethylcyclohexane	6731-36-8	>90-100					3101	Type B	3
IIA	1,1-Di-(tert-butylperoxy)-3,3,5-trimethylcyclohexane	6731-36-8	≤90	≥10				3103	Type C	30
IIA	1,1-Di-(tert-butylperoxy)-3,3,5-trimethylcyclohexane	6731-36-8	>57-90	≥10				3103	Type C	
IIA	1,1-Di-(tert-butylperoxy)-3,3,5-trimethylcyclohexane	6731-36-8	≤77	≥23				3103	Type C	
III	1,1-Di-(tert-butylperoxy)-3,3,5-trimethylcyclohexane	6731-36-8	≤57			≥43		3110	Type F	
IIA	1,1-Di-(tert-butylperoxy)-3,3,5-trimethylcyclohexane	6731-36-8	≤57	≥43				3107	Type E	
IIB	1,1-Di-(tert-butylperoxy)-3,3,5-trimethylcyclohexane	6731-36-8	≤32	≥26	≥42			3107	Type E	
III	Dicetyl peroxydicarbonate	26322-14-5	≤100					3120	Type F	
IV	Dicetyl peroxydicarbonate [as a stable dispersion in water]	26322-14-5	≤42					3119	Type F	
I	Di-4-chlorobenzoyl peroxide	94-17-7	≤77				≥23	3102	Type B	3
IIB	Di-4-chlorobenzoyl peroxide [as a paste]	94-17-7	≤52					3106	Type D	20
V	Di-4-chlorobenzoyl peroxide	94-17-7	≤32			≥68		Exempt	Type G	29
III	Dicumyl peroxide	80-43-3	>52-100					3110	Type F	12
V	Dicumyl peroxide	80-43-3	≤52			≥48		Exempt	Type G	29
I	Dicyclohexyl peroxydicarbonate	1561-49-5	>91-100					3112	Type B	3
IIA	Dicyclohexyl peroxydicarbonate	1561-49-5	≤91				≥9	3114	Type C	
IV	Dicyclohexyl peroxydicarbonate [as a stable dispersion in water]	1561-49-5	≤42					3119	Type F	

Organic Peroxide Storage Class	Organic Peroxide Name	CAS#	Concentration (mass%)	Diluent type A	Diluent type B	Inert solid	Water	UN Number (Generic entry)	Transport Type	Subsidiary risks and remarks
IIB	Didecanoyl peroxide	762-12-9	≤100					3114	Type C	
III	2,2-Di-(4,4-di(tert-butylperoxy)cyclohexyl)propane	1705-60-8	≤42			≥58		3106	Type D	
III	2,2-Di-(4,4-di(tert-butylperoxy)cyclohexyl)propane	1705-60-8	≤22		≥78			3107	Type E	
I	Di-2,4-dichlorobenzoyl peroxide	133-14-2	≤77				≥23	3102	Type B	3
IIB	Di-2,4-dichlorobenzoyl peroxide [as a paste]	133-14-2	≤52					3118	Type E	
IIB	Di-2,4-dichlorobenzoyl peroxide [as a paste with silicone oil]	133-14-2	≤52					3106	Type D	
I	Di-(2-ethoxyethyl) peroxydicarbonate		≤52		≥48			3115	Type D	
IIA	Di-(2-ethylhexyl) peroxydicarbonate	16111-62-9	>77-100					3113	Type C	
IIA	Di-(2-ethylhexyl) peroxydicarbonate	16111-62-9	≤77	≥23				3115	Type D	
III	Di-(2-ethylhexyl) peroxydicarbonate [as a stable dispersion in water]	16111-62-9	≤62					3119	Type F	
IV	Di-(2-ethylhexyl) peroxydicarbonate [as a stable dispersion in water (frozen)]	16111-62-9	≤52					3120	Type F	
I	2,2-Dihydroperoxypropane	2614-76-8	≤27			≥73		3102	Type B	3
IIB	Di-(1-hydroxycyclohexyl)peroxide	2407-94-5	≤100					3106	Type D	
I	Diisobutyryl peroxide	3437-84-1	>32-52	≥48				3111	Type B	3
IIB	Diisobutyryl peroxide	3437-84-1	≤32	≥68				3115	Type D	
IIB	Diisopropylbenzene dihydroperoxide		≤82	≥5			≥5	3106	Type D	24
I	Diisopropyl peroxydicarbonate	105-64-6	>52-100					3112	Type B	3
IIB	Diisopropyl peroxydicarbonate	105-64-6	≤52		≥48			3115	Type D	
IIB	Diisopropyl peroxydicarbonate	105-64-6	≤32	≥68				3115	Type D	
IIB	Dilauroyl peroxide	105-74-8	≤100					3106	Type D	
IV	Dilauroyl peroxide [as a stable dispersion in water]	105-74-8	≤42					3109	Type F	
I	Di-(3-methoxybutyl) peroxydicarbonate	52238-68-3	≤52		≥48			3115	Type D	
I	Di-(2-methylbenzoyl)peroxide	22313-62-8	≤87				≥13	3112	Type B	3
IIA	Di-(3-methylbenzoyl) peroxide + Benzoyl (3-methylbenzoyl) peroxide + Dibenzoyl peroxide		≤20+≤18+≤4		≥58			3115	Type D	
IIB	Di-(4-methylbenzoyl)peroxide [as a paste with silicone oil]	895-85-2	≤52					3106	Type D	
I	2,5-Dimethyl-2,5-di-(benzoylperoxy)hexane	2618-77-1	>82-100					3102	Type B	3
IIA	2,5-Dimethyl-2,5-di-(benzoylperoxy)hexane	2618-77-1	≤82			≥18		3106	Type D	
IIB	2,5-Dimethyl-2,5-di-(benzoylperoxy)hexane	2618-77-1	≤82				≥18	3104	Type C	
IIB	2,5-Dimethyl-2,5-di-(tert-butylperoxy)hexane	78-63-7	>90-100					3103	Type C	
IIB	2,5-Dimethyl-2,5-di-(tert-butylperoxy)hexane	78-63-7	>52-90	≥10				3105	Type D	
IIB	2,5-Dimethyl-2,5-di-(tert-butylperoxy)hexane	78-63-7	≤77			≥23		3108	Type E	
III	2,5-Dimethyl-2,5-di-(tert-butylperoxy)hexane	78-63-7	≤52	≥48				3109	Type F	
IIB	2,5-Dimethyl-2,5-di-(tert-butylperoxy)hexane [as a paste]	78-63-7	≤47					3108	Type E	
I	2,5-Dimethyl-2,5-di-(tert-butylperoxy)hexyne-3	1068-27-5	>86-100					3101	Type B	3
IIA	2,5-Dimethyl-2,5-di-(tert-butylperoxy)hexyne-3	1068-27-5	>77-86	≥14				3103	Type C	26
IIA	2,5-Dimethyl-2,5-di-(tert-butylperoxy)hexyne-3	1068-27-5	>52-77	≥23				3103	Type C	26
III	2,5-Dimethyl-2,5-di-(tert-butylperoxy)hexyne-3	1068-27-5	≤52			≥48		3106	Type D	
IIA	2,5-Dimethyl-2,5-di-(2-ethylhexanoylperoxy)hexane	13052-09-0	≤100					3113	Type C	
IIA	2,5-Dimethyl-2,5-dihydroperoxyhexane	3025-88-5	≤82				≥18	3104	Type C	
IIA	2,5-Dimethyl-2,5-di-(3,5,5-trimethylhexanoylperoxy)hexane		≤77	≥23				3105	Type D	
IIB	1,1-Dimethyl-3-hydroxybutylperoxyneoheptanoate	110972-57-1	≤52	≥48				3117	Type E	
III	Dimyristyl peroxydicarbonate	53220-22-7	≤100					3116	Type D	
IV	Dimyristyl peroxydicarbonate [as a stable dispersion in water]	53220-22-7	≤42					3119	Type F	
IIB	Di-(2-neodecanoylperoxyisopropyl)benzene	117663-11-3	≤52	≥48				3115	Type D	
IIA	Di-n-nonanoyl peroxide	762-13-0	≤100					3116	Type D	
IIA	Di-n-octanoyl peroxide	762-16-3	≤100					3114	Type C	

Organic Peroxide Storage Class	Organic Peroxide Name	CAS#	Concentration (mass%)	Diluent type A	Diluent type B	Inert solid	Water	UN Number (Generic entry)	Transport Type	Subsidiary risks and remarks
I	Di-(2-phenoxyethyl)peroxydicarbonate	41935-39-1	>85-100					3102	Type B	3
IIA	Di-(2-phenoxyethyl)peroxydicarbonate	41935-39-1	≤85				≥15	3106	Type D	
III	Dipropionyl peroxide	3248-28-0	≤27		≥73			3117	Type E	
I	Di-n-propyl peroxydicarbonate	16066-38-9	≤100					3113	Type C	
I	Di-n-propyl peroxydicarbonate	16066-38-9	≤77		≥23			3113	Type C	
I	Disuccinic acid peroxide	123-23-9	>72-100					3102	Type B	3, 17
IIB	Disuccinic acid peroxide	123-23-9	≤72				≥28	3116	Type D	
IIA	Di-(3,5,5-trimethylhexanoyl) peroxide	3851-87-4	>62-82	≥18				3115	Type D	
IIB	Di-(3,5,5-trimethylhexanoyl) peroxide	3851-87-4	>52-62	≥38				3115	Type D	
III	Di-(3,5,5-trimethylhexanoyl) peroxide	3851-87-4	>38-52	≥48				3115	Type D	
III	Di-(3,5,5-trimethylhexanoyl)peroxide [as a stable dispersion in water]	3851-87-4	≤52					3119	Type F	
III	Di-(3,5,5-trimethylhexanoyl)peroxide	3851-87-4	≤38	≥62				3119	Type F	
IIA	Ethyl 3,3-di-(tert-amylperoxy)butyrate	67567-23-1	≤67	≥33				3105	Type D	
IIA	Ethyl 3,3-di-(tert-butylperoxy)butyrate	55794-20-2	>77-100					3103	Type C	
IIA	Ethyl 3,3-di-(tert-butylperoxy)butyrate	55794-20-2	≤77	≥23				3105	Type D	
III	Ethyl 3,3-di-(tert-butylperoxy)butyrate	55794-20-2	≤52			≥48		3106	Type D	
IIA	1-(2-ethylhexanoylperoxy)-1,3-Dimethylbutyl peroxypivalate	228415-62-1	≤52	≥45	≥10			3115	Type D	
IIA	tert-Hexyl peroxyneodecanoate	62178-88-5	≤71	≥29				3115	Type D	
IIA	tert-Hexyl peroxypivalate	51938-28-4	≤72		≥28			3115	Type D	
IIA	3-Hydroxy-1,1-dimethylbutyl peroxyneodecanoate	95718-78-8	≤77	≥23				3115	Type D	
IIA	3-Hydroxy-1,1-dimethylbutyl peroxyneodecanoate [as a stable dispersion in water]	95718-78-8	≤52	≥48				3117	Type E	
IV	3-Hydroxy-1,1-dimethylbutyl peroxyneodecanoate	95718-78-8	≤52					3119	Type F	
I	Isopropyl sec-butyl peroxydicarbonat +Di-sec-butyl peroxydicarbonate+Di-isopropyl peroxydicarbonate		≤32+≤15-18+≤12-15	≥38				3115	Type D	
I	Isopropyl sec-butyl peroxydicarbonat +Di-sec-butyl peroxydicarbonate+Di-isopropyl peroxydicarbonate		≤52+≤28+≤22					3111	Type B	3
III	Isopropylcumyl hydroperoxide	26762-93-6	≤72	≥28				3109	Type F	13
IIA	p-Menthyl hydroperoxide	26762-92-5	>72-100					3105	Type D	13
III	p-Menthyl hydroperoxide	26762-92-5	≤72	≥28				3109	Type F	27
IIA	Methylcyclohexanone peroxide(s)		≤67		≥33			3115	Type D	
I	Methyl ethyl ketone peroxide(s)	1338-23-4	See Remark 8	≥48				3101	Type B	3, 8, 13
IIA/IIB - Consult Manufacturer	Methyl ethyl ketone peroxide(s)	1338-23-4	See Remark 9	≥55				3105	Type D	9
III	Methyl ethyl ketone peroxide(s)	1338-23-4	See Remark 10	≥60				3107	Type E	10
IIA	Methyl isobutyl ketone peroxide(s)	37206-20-5	≤62	≥19				3105	Type D	22
III	Methyl isopropyl ketone peroxide(s)	33373-82-7	See Remark 31	≥70				3109	Type F	31
IIA	Organic peroxide, Liquid, Sample							3103	Type C	11
IIA	Organic peroxide, Liquid, Sample, Temperature Controlled							3113	Type C	11
IIA	Organic Peroxide, Solid, Sample							3104	Type C	11
IIA	Organic Peroxide, Solid, Sample, Temperature Controlled							3114	Type C	11
IIA	3,3,5,7,7-Pentamethyl-1,2,4-Trioxepane	215877-64-8	≤100					3107	Type E	
IIA	Peroxyacetic acid, type D, stabilized	79-21-0	≤43					3105	Type D	13, 14, 19
III	Peroxyacetic acid, type E, stabilized	79-21-0	≤43					3107	Type E	13, 15, 19
IV	Peroxyacetic acid, type F, stabilized	79-21-0	≤43					3109	Type F	13, 16, 19
IIA	Peroxylauric acid	2388-12-7	≤100					3118	Type E	
IIA	Pinanyl hydroperoxide	28324-52-9	>56-100					3105	Type D	13
III	Pinanyl hydroperoxide	28324-52-9	≤56	≥44				3109	Type F	
IIA	Polyether poly-tert-butylperoxycarbonate	Proprietary	≤52		≥48			3107	Type E	
IIA	1,1,3,3-Tetramethylbutyl hydroperoxide	5809-08-5	≤100					3105	Type D	

Organic Peroxide Storage Class	Organic Peroxide Name	CAS#	Concentration (mass%)	Diluent type A	Diluent type B	Inert solid	Water	UN Number (Generic entry)	Transport Type	Subsidiary risks and remarks
IIA	1,1,3,3-Tetramethylbutyl peroxy-2-ethylhexanoate	22288-43-3	≤100					3115	Type D	
IIA	1,1,3,3-Tetramethylbutyl peroxyneodecanoate	51240-95-0	≤72		≥28			3115	Type D	
III	1,1,3,3-Tetramethylbutyl peroxyneodecanoate [as a stable dispersion in water]	51240-95-0	≤52					3119	Type F	
I	1,1,3,3-tetramethylbutyl peroxypivalate	22288-41-1	≤77	≥23				3115	Type D	
IIA	3,6 9-Triethyl-3,6,9-trimethyl-1,4,7-triperoxonane	24748-23-0	≤42	≥58				3105	Type D	28
IV	3,6,9-Triethyl-3,6,9-trimethyl-1,4,7-triperoxonane	24748-23-0	≤17	≥18		>65		3110	Type F	

1. Diluent type B may always be replaced by Diluent type A. The boiling point of Diluent type B should be at least 60°C higher than the SADT of the organic peroxide formulation.
2. Available (or Active) oxygen less than 4.7 percent.
3. “EXPLOSIVE” subsidiary risk label required.
4. Diluent may be replaced by di-tert-butyl peroxide.
5. Available (or Active) oxygen not greater than 4.7 percent.
6. Hydrogen peroxide not greater than 9 percent, and available (or active) oxygen not greater than 10 percent.
7. Only non-metallic packaging allowed.
8. Available (or Active) oxygen greater than 10 percent but not greater than 10.7 percent, with or without water.
9. Available (or Active) oxygen not greater than 10 percent with or without water.
10. Available (or Active) oxygen not greater than 8.2 percent with or without water.
11. See 2.5.3.2.5.1 of UN RTDG.
12. Up to 2000 kg per receptacle assigned to ORGANIC PEROXIDE TYPE F on the basis of large scale trials.
13. "CORROSIVE" subsidiary risk label required.
14. Peroxyacetic acid formulations which fulfill the criteria of 2.5.3.3.2 (d) of UN RTDG.
15. Peroxyacetic acid formulations which fulfill the criteria of 2.5.3.3.2 (e) of UN RTDG.
16. Peroxyacetic acid formulations which fulfill the criteria of 2.5.3.3.2 (f) of UN RTDG.
17. Addition of water to this organic peroxide will decrease its thermal stability.
18. No "CORROSIVE" subsidiary risk label required for concentrations not greater than 80 percent.
19. Mixtures with hydrogen peroxide, water and acid(s).
20. With Diluent type A with or without water.
21. Diluent type A 25 percent or greater by mass, and in addition to ethylbenzene.
22. Diluent type A 19 percent or greater by mass, and in addition to methyl isobutyl ketone.
23. di-tert-butyl peroxide not greater than 6 percent.
24. 1-isopropylhydroperoxy-4-isopropylhydroxybenzene not greater than 8 percent.

25. Diluent type B with a boiling point greater than 230°F (110°C).

26. Hydroperoxides content not greater than 0.5 percent.

27. Concentrations greater than 56 percent require a "CORROSIVE" subsidiary risk label.

28. Available (or Active) oxygen not greater than 7.6 percent and Diluent type A with a 95-percent boil-off point between 392°F and 500°F (200°C and 260°C).

29. Not subject to the requirements of these Model Regulations for Division 5.2 per the UN RTDG.

30. Diluent type B with boiling point greater than 266°F (130°C).

31. Available (or active) oxygen not greater than 6.7 percent.

32. Tert-Butyl hydroperoxide can be transported and stored in bulk provided that polyethylene saddles are used—DOTn 49 CFR Part 173.225(g) and (h).

Revise as follows:

TABLE E105.1 REFERENCED STANDARDS

STANDARD ACRONYM	STANDARD NAME	SECTIONS HEREIN REFERENCED
CGA P-20—2009	*Standard for Classification of Toxic Mixtures*	E103.1.3.1
CGA P-23—2008	*Standard for Categorizing Gas Mixtures Containing Flammable and Nonflammable Components*	E102.1.2
DOL 29 CFR Part 1910—2023	*Occupational Safety and Health Standards*	E104.1
DOL 29 CFR Part 1910.1200—2012	*Hazard Communication*	E102.1.7.2, E104.1, E104.2
DOTn 49 CFR—2023	*Transportation*	E104.1
DOTn 49 CFR Part 173.127—2005	*Class 5, Division 5.1—Definition and Assignment of Packing Groups*	E102.1.7.2
DOTn 49 CFR Part 173.225 - 2023	Title 49 Code of Federal Regulations; Part 173.225, *Packaging Requirements and Other Provisions for Organic Peroxides*	Table E102.1.8.3
PGS 8—21	*Organic peroxides: Storage – Guideline for the labour-safe, environment-safe and fire-safe storage of organic peroxides*	E102.1.8.1.3
UN ST/SG/AC.10/11 (Rev. 7)—2019	*Manual of Tests and Criteria*	Table E104.2
UN ST/SG/AC.10/1 (Rev 21)—2019	*Recommendations on the Transport of Dangerous Goods*	E102.1.8.1.2, Table E102.1.8.3, Table E104.2
UN ST/SG/AC.10/30 (Rev.7)—2017	*Globally Harmonized System of Classification and Labelling of Chemicals (GHS), Part 2: Physical Hazards*	E102.1.7.2, E104.1, E104.2, Table E104.2

TABLE F101.2 FIREFIGHTER WARNING PLACARD DESIGNATIONS BASED ON HAZARD CLASSIFICATION CATEGORIES

HAZARD CATEGORY	DESIGNATION
Combustible liquid II	F2
Combustible liquid IIIA	F2
Combustible liquid IIIB	F1
Combustible dust	F3 or F2[a]
Combustible fiber	F3
Cryogenic flammable	F4, H3
Cryogenic oxidizing	OX, H3
Explosive	R4
Flammable solid	F2
Flammable gas (gaseous)	F4
Flammable gas (liquefied)	F4
Flammable liquid IA	F4
Flammable liquid IB	F3
Flammable liquid IC	F3

HAZARD CATEGORY	DESIGNATION
Organic peroxide, ~~UD~~Detonable	R4
Organic peroxide I	F4, R3
Organic peroxide IIA	F3, R3
Organic peroxide IIB	F3, R3
Organic peroxide III	F2, R2
Organic peroxide IV	F1, R1
Organic peroxide V	None
Oxidizing gas (gaseous)	OX
Oxidizing gas (liquefied)	OX
Oxidizer 4	OX4
Oxidizer 3	OX3
Oxidizer 2	OX2
Oxidizer 1	OX1
Pyrophoric gases	F4
Pyrophoric solids, liquids	F3
Unstable reactive 4D	R4
Unstable reactive 3D	R4
Unstable reactive 3N	R2
Unstable reactive 2	R2
Unstable reactive 1	None
Water reactive 3	W3
Water reactive 2	W2
Corrosive	H3, COR
Toxic	H3
Highly toxic	H4

a. F3 = Finely divided solids, typically less than 75 micrometers (µm) (200 mesh), that pose an elevated risk of forming an ignitable dust cloud, such as finely divided sulfur, *National Electric Code* Group E dusts (for example, aluminum, zirconium and titanium) and bisphenol A. F2 = Finely divided solids less than 420 µm (40 mesh) that pose an ordinary risk of forming an ignitable dust cloud.

F—Flammable category.

R—Reactive category.

H—Health category.

W—Special hazard: water reactive.

OX—Special hazard: oxidizing properties.

COR—Corrosive.

~~UD—Unclassified detonable material.~~

4D—Class 4 detonable material.

3D—Class 3 detonable material.

3N—Class 3 nondetonable material.

TABLE H102.1 SECTION II—HAZARDOUS MATERIALS INVENTORY STATEMENT (HMIS) SUMMARY REPORT[a] (Storage[b] Conditions)[c]

IBC/IFC HAZARD CLASS	HAZARD CLASS	INVENTORY AMOUNT			IBC/IFC MAXIMUM ALLOWABLE QUANTITY[d]		
	(Abbrev)	Solid (lb)	Liquid (gal)	Gas (cu ft, gal, lb)	Solid (lb)	Liquid (gal)	Gas (cu ft, gal, lb)
Combustible Liquid	C2		5			120	
	C3A					330	
	C3B		6			13,200	
Combustible Fiber	Loose/Baled						
Cryogenics, Flammable	Cryo-Flam					45	
Cryogenic, Oxidizing	Cryo-OX					45	
Flammable Gas	FLG						
(Gaseous)				150			1,000
(Liquefied)						30	
Flammable Liquid	F1A					30	
	F1B & F1C		5			120	
Combination (1A, 1B, 1C)			5			120	
Flammable Solid	FLS				125		
Organic Peroxide	~~OPU~~OPD				~~0~~1		

IBC/IFC HAZARD CLASS	HAZARD CLASS	INVENTORY AMOUNT			IBC/IFC MAXIMUM ALLOWABLE QUANTITY		
	(Abbrev)	Solid (lb)	Liquid (gal)	Gas (cu ft, gal, lb)	Solid (lb)	Liquid (gal)	Gas (cu ft, gal, lb)
	OP1				~~5~~16		
	OP2A				~~50~~100		
	OP2B				400		
	OP3				~~125~~840		
	OP4				NL		
	OP5				NL		
Oxidizer	OX4				0		
	OX3				10		
	OX2				250		
	OX1				4,000		

a. Complete a summary report for each *control area* and Group H occupancy.

b. Storage = storage + use-closed + use-open systems.

c. Separate reports are required for use-closed and use-open systems.

d. Include increases for sprinklers or storage in cabinets, if applicable.

(This is an example; add additional hazard classes as needed.)

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Revise as follows:

[F] ORGANIC PEROXIDE. An organic compound that contains the bivalent -O-O- structure and which may be considered to be a structural derivative of hydrogen peroxide where one or both of the hydrogen atoms have been replaced by an organic radical. ~~Organic peroxides can pose an *explosion* hazard (*detonation* or *deflagration*) or they can be shock sensitive. They can also decompose into various unstable compounds over an extended period of time.~~Organic peroxide formulation is a pure or technically pure organic peroxide or a mixture of organic peroxides with an active oxygen (aO) concentration greater than 1 percent alone or in combination with one or more materials. Organic peroxide storage classification is based on the organic peroxide transportation type and burning rate. The transport type for organic peroxide formulations is determined by the UN Manual of Tests and Criteria, Part II. The methods used to determine the burning rate of organic peroxide formulations are spelled out in the Storage of Organic Peroxides in The Netherlands (also known as PGS 8). Terms such as accelerator, catalyst, initiator, and curing agent are sometimes used to describe organic peroxide formulations and are misleading because they can also refer to materials that are not or do not contain organic peroxides, some of which might present increased hazard when mixed with organic peroxides.

~~Unclassified detonable~~ Detonable. *Organic peroxides* that are capable of *detonation*. These peroxides pose an extremely high *explosion* hazard through rapid *explosive* decomposition.

Class IIB. Describes those formulations that burn rapidly and that pose a moderate reactivity hazard. This class comprises of organic peroxide formulations with transport classification Type C with a large-scale burning rate lower than 140 kg/min, those with transport classification Type D and Type E with a large-scale burning rate equal to or higher than 60 kg/min but lower than 140 kg/min, those with transport classification Type C if the small-scale burning rate is lower than 2.2 kg/min × m^2, and those with transport classification Type D and Type E if the small-scale burning rate is equal to or higher than 0.9 kg/min × m^2 but lower than 2.2 kg/min × m^2.

Class I. Those formulations that are capable of *deflagration* but not *detonation*.This class comprises of organic peroxide formulations with transport classification Type B, those with transport classification Type C and Type D with large-scale burning rate equal to or higher than 300 kg/min, and those with transport classification Type C and Type D with small-scale burning rate equal to or higher than 9.0 kg/min × m^2 unless the large-scale burning rate is lower than 300 kg/min.

Class IIA. Those formulations that burn very rapidly and that pose a moderate reactivity hazard.This class comprises of organic peroxide formulations with transport classification Type C and Type D with a large-scale burning rate equal to or higher than 140 kg/min but lower than 300 kg/min and those with transport classification Type E with a large-scale burning rate equal to or higher than 140 kg/min, those with Type C and Type D if the small-scale burning rate is equal to or higher than 2.2 kg/min × m^2 but lower than 9.0 kg/min × m^2, and Type E if the small-scale burning rate is equal to or higher than 2.2 kg/min × m^2.

Class III. Those formulations that burn rapidly and that pose a moderate reactivity hazard.This class comprises of organic peroxide formulations with transport classification Type D with a large-scale burning rate lower than 60 kg/min, those with transport classification Type E with a large-scale burning rate equal to or higher than 10 kg/min but lower than 60 kg/min, those with transport classification Type F with a large-scale burning rate equal to or higher than 10 kg/min, and those with transport classification Type D and Type E if the small-scale burning rate is lower than 0.9 kg/min × m^2, and those with transport classification Type F irrespective of the small scale burning rate.

Class IV. Those formulations that burn in the same manner as ordinary combustibles and that pose a minimal reactivity hazard. This class comprises of organic peroxide formulations of transport classification Type E or Type F with a large-scale burning rate lower than 10 kg/min.

Class V. Those formulations that burn with less intensity than ordinary combustibles or do not sustain combustion and that pose no reactivity hazard. This class comprises of organic peroxide formulations of transport classification Type G without additional subsidiary risks.

[F] TABLE 307.1(1) MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD[a, c, i, l, m]

MATERIAL	CLASS	GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED	STORAGE[b]			USE-CLOSED SYSTEMS[b]			USE-OPEN SYSTEMS[b]	
			Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds (cubic feet)	Liquid gallons (pounds)
Combustible dust	NA	H-2	See Note o	NA	NA	See Note o	NA	NA	See Note o	NA
Combustible fiber[o]	Loose	H-3	(100)	NA	NA	(100)	NA	NA	(20)	NA
	Baled		(1,000)			(1,000)			(200)	
Combustible liquid[n]	II	H-2 or H-3	NA	120[d, e]	NA	NA	120[d]	NA	NA	30[d]
	IIIA	H-2 or H-3		330[d, e]			330[d]			80[d]
	IIIB	NA		13,200[e, f]			13,200[f]			3,300[f]
Cryogenic flammable	NA	H-2	NA	45[d]	NA	NA	45[d]	NA	NA	10[d]
Cryogenic inert	NA	NA	NA	NA	NL	NA	NA	NL	NA	NA
Cryogenic oxidizing	NA	H-3	NA	45[d]	NA	NA	45[d]	NA	NA	10[d]
Explosives	Division 1.1	H-1	1[e, g]	(1)[e, g]	NA	0.25[g]	(0.25)[g]	NA	0.25[g]	(0.25)[g]
	Division 1.2	H-1	1[e, g]	(1)[e, g]		0.25[g]	(0.25)[g]		0.25[g]	(0.25)[g]
	Division 1.3	H-1 or H-2	5[e, g]	(5)[e, g]		1[g]	(1)[g]		1[g]	(1)[g]
	Division 1.4	H-3	50[e, g]	(50)[e, g]		50[g]	(50)[g]		NA	NA
	Division 1.4G	H-3	125[e, k]	NA		NA	NA		NA	NA
	Division 1.5	H-1	1[e, g]	(1)[e, g]		0.25[g]	(0.25)[g]		0.25[g]	(0.25)[g]
	Division 1.6	H-1	1[e, g]	NA		NA	NA		NA	NA
Flammable gas	Gaseous	H-2	NA	NA		NA	NA		NA	NA
	1A and 1B (High BV)[p]				1,000[d, e]			1,000[d, e]		
	1B (Low BV)[p]				162,500[d, e]			162,500[d, e]		
	Liquefied				NA			NA		
	1A and 1B (High BV)[p]			(150)[d, e]			(150)[d, e]			
	1B (Low BV)[p]			(10,000)[d, e]			(10,000)[d, e]			
Flammable liquid[n]	IA	H-2 or H-3	NA	30[d, e]	NA	NA	30[d]	NA	NA	10[d]
	IB and IC			120[d, e]			120[d]			30[d]
Flammable liquid, combination (IA, IB, IC)[n]	NA	H-2 or H-3	NA	120[d, e, h]	NA	NA	120[d, h]	NA	NA	30[d, h]
Flammable solid	NA	H-3	125[d, e]	NA	NA	125[d]	NA	NA	25[d]	NA
Inert gas	Gaseous	NA	NA	NA	NL	NA	NA	NL	NA	NA
	Liquefied	NA	NA	NA	NL	NA	NA	NL	NA	NA
Organic peroxide	~~UD~~ Detonable	H-1	1[e, g]	(1)[e, g]	NA	0.25[g]	(0.25)[g]	NA	0.25[g]	(0.25)[g]
	I	H-2	16 ~~5~~[d, e]	(16 ~~5~~)[d, e]		16 ~~1~~[d]	(16 ~~1~~)[d]		8 ~~1~~[d]	(8 ~~1~~)[d]
	IIA	H-3	100 ~~50~~[d, e]	(100 ~~50~~)[d, e]		100 50[d]	(100 ~~50~~)[d]		20 ~~10~~[d]	(20 ~~10~~)[d]
	IIB	H-3	200[d, e]	(200)[d, e]		200[d]	(200)[d]		50[d]	(50)[d]
	III	H-3	400 ~~125~~[d, e]	(400 ~~125~~)[d, e]		400 ~~125~~[d]	(400 ~~125~~)[d]		100 ~~25~~[d]	(100 ~~25~~)[d]
	IV	NA	NL	NL		NL	NL		NL	NL
	V	NA	NL	NL		NL	NL		NL	NL
Oxidizer	4	H-1	1[g]	(1)[e, g]	NA	0.25[g]	(0.25)[g]	NA	0.25[g]	(0.25)[g]
	3[j]	H-2 or H-3	10[d, e]	(10)[d, e]		2[d]	(2)[d]		2[d]	(2)[d]
	2	H-3	250[d, e]	(250)[d, e]		250[d]	(250)[d]		50[d]	(50)[d]
	1	NA	4,000[e, f]	(4,000)[e, f]		4,000[f]	(4,000)[f]		1,000[f]	(1,000)[f]
Oxidizing gas	Gaseous	H-3	NA	NA	1,500[d, e]	NA	NA	1,500[d,e]	NA	NA
	Liquefied			(150)[d, e]	NA		(150)[d,e]	NA		
Pyrophoric	NA	H-2	4[e, g]	(4)[e, g]	50[e, g]	1[g]	(1)[g]	10[e, g]	0	0
Unstable (reactive)	4	H-1	1[e, g]	(1)[e, g]	10[e, g]	0.25[g]	(0.25)[g]	2[e, g]	0.25[g]	(0.25)[g]

MATERIAL	CLASS	GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED	STORAGE			USE-CLOSED SYSTEMS			USE-OPEN SYSTEMS	
			Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds (cubic feet)	Liquid gallons (pounds)
	3	H-1 or H-2	5[d, e]	(5)[d, e]	50[d, e]	1[d]	(1)[d]	10[d, e]	1[d]	(1)[d]
	2	H-3	50[d, e]	(50)[d, e]	750[d, e]	50[d]	(50)[d]	750[d, e]	10[d]	(10)[d]
	1	NA	NL	NL	NL	NL	NL	NL	NL	NL
Water reactive	3	H-2	5[d, e]	(5)[d, e]	NA	5[d]	(5)[d]	NA	1[d]	(1)[d]
	2	H-3	50[d, e]	(50)[d, e]		50[d]	(50)[d]		10[d]	(10)[d]
	1	NA	NL	NL		NL	NL		NL	NL

For SI: 1 cubic foot = 0.028 m^3, 1 pound = 0.454 kg, 1 gallon = 3.785 L.

NL = Not Limited; NA = Not Applicable; ~~UD = Unclassified Detonable.~~

a. For use of control areas, see Section 414.2.

b. The aggregate quantity in use and storage shall not exceed the maximum allowable quantity for storage, including applicable increases.

c. For hazardous materials in Group B higher education laboratory occupancies, see Section 428 of this code and Chapter 38 of the *International Fire Code*.

d. Maximum allowable quantities shall be increased 100 percent in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1. Where Note e also applies, the increase for both notes shall be applied accumulatively.

e. Maximum allowable quantities shall be increased 100 percent when stored in approved storage cabinets, day boxes, gas cabinets, gas rooms or exhausted enclosures or in listed safety cans in accordance with Section 5003.9.10 of the International Fire Code. Where Note d also applies, the increase for both notes shall be applied accumulatively.

f. Quantities shall not be limited in a building equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

g. Allowed only in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

h. Containing not more than the maximum allowable quantity per control area of Class IA, IB or IC flammable liquids.

i. Quantities in parentheses indicate quantity units in parentheses at the head of each column.

j. A maximum quantity of 220 pounds of solid or 22 gallons of liquid Class 3 oxidizers is allowed when such materials are necessary for maintenance purposes, operation or sanitation of equipment when the storage containers and the manner of storage are approved.

k. Net weight of the pyrotechnic composition of the fireworks. Where the net weight of the pyrotechnic composition of the fireworks is not known, 25 percent of the gross weight of the fireworks, including packaging, shall be used.

l. For gallons of liquids, divide the amount in pounds by 10 in accordance with Section 5003.1.2 of the International Fire Code.

m. For oxidizers, unstable (reactive) materials, and water-reactive materials stored or displayed in Group M occupancies or stored in Group S occupancies, see Section 414.2.5.1.

n. For flammable and combustible liquid storage in Group M occupancy wholesale and retail sales uses, see Section 414.2.5.2.

o. Where manufactured, generated or used in such a manner that the concentration and conditions create a fire or explosion hazard based on information prepared in accordance with Section 414.1.3.

p. “High BV” Category 1B flammable gas has a burning velocity greater than 3.9 inches per second (10 cm/s). "Low BV" Category 1B flammable gas has a burning velocity of 3.9 inches per second (10 cm/s) or less.

[F] 307.3 High-hazard Group H-1.

Buildings and *structures* containing materials that pose a *detonation* hazard shall be classified as Group H-1. Such materials shall include, but not be limited to, the following:

Detonable *pyrophoric* materials

Explosives:

Division 1.1

Division 1.2

Division 1.3

Division 1.4

Division 1.5

Division 1.6

Organic peroxides, ~~unclassified detonable~~ detonable

Oxidizers, Class 4

Unstable (reactive) materials, Class 3 detonable and Class 4

[F] 307.5 High-hazard Group H-3.

Buildings and *structures* containing materials that readily support combustion or that pose a *physical hazard* shall be classified as Group H-3. Such materials shall include, but not be limited to, the following:

Class I, II or IIIA *flammable or combustible liquids* that are used or stored in normally closed containers or systems pressurized at 15 pounds per square inch gauge (103.4 kPa) or less

Combustible fibers, other than *densely packed baled cotton*, where manufactured, generated or used in such a manner that the concentration and conditions create a fire or *explosion* hazard based on information prepared in accordance with Section 414.1.3

Consumer *fireworks*, 1.4G (Class C, Common)

Cryogenic fluids, oxidizing

Category 1B flammable gases having a burning velocity of 3.9 inches per second (10 cm/s) or less

Flammable solids

Organic peroxides, Class IIA, IIB and III

Oxidizers, Class 2

Oxidizers, Class 3, that are used or stored in normally closed containers or systems pressurized at 15 pounds per square inch gauge (103 kPa) or less

Oxidizing gases

Unstable (reactive) materials, Class 2

Water-reactive materials, Class 2

[F] TABLE 414.5.1 EXPLOSION CONTROL REQUIREMENTS[a, h]

MATERIAL	CLASS	EXPLOSION CONTROL METHODS	
		Barricade construction	Explosion (deflagration) venting or explosion (deflagration) prevention systems[b]
HAZARD CATEGORY			
Combustible dusts[c]	—	Not Required	Required
Cryogenic flammables	—	Not Required	Required
Explosives	Division 1.1	Required	Not Required
	Division 1.2	Required	Not Required
	Division 1.3	Not Required	Required
	Division 1.4[j]	Not Required	Required
	Division 1.5	Required	Not Required
	Division 1.6	Required	Not Required
Flammable gas	Gaseous	Not Required	Required[k]
	Liquefied	Not Required	Required[k]
Flammable liquid	IA[d]	Not Required	Required
	IB[e]	Not Required	Required
Organic peroxides	~~U~~Detonable	Required	Not Permitted
	I	Required	Not Permitted
Oxidizer liquids and solids	4	Required	Not Permitted
Pyrophoric gas	—	Not Required	Required
Unstable (reactive)	4	Required	Not Permitted
	3 Detonable	Required	Not Permitted
	3 Nondetonable	Not Required	Required
Water-reactive liquids and solids	3	Not Required	Required
	2[g]	Not Required	Required

MATERIAL	CLASS	EXPLOSION CONTROL METHODS	
		Barricade construction	Explosion (deflagration) venting or explosion (deflagration) prevention systems
SPECIAL USES			
Acetylene generator rooms	—	Not Required	Required
Electrochemical energy storage system[l]	—	Not Required	Required
Energy storage system[l]	—	Not Required	Required
Grain processing	—	Not Required	Required
Liquefied petroleum gas-distribution facilities	—	Not Required	Required
Where explosion hazards exist[f]	Detonation	Required	Not Permitted
	Deflagration	Not Required	Required

a. See Section 414.1.3.

b. See the International Fire Code.

c. Combustible dusts where manufactured, generated or used in such a manner that the concentration and conditions create a fire or explosion hazard based on information prepared in accordance with Section 104.2.2 of the *International Fire Code*. See definition of "Combustible dust" in Chapter 2.

d. Storage or use.

e. In open use or dispensing.

f. Rooms containing dispensing and use of hazardous materials where an explosive environment can occur because of the characteristics or nature of the hazardous materials or as a result of the dispensing or use process.

g. A method of explosion control shall be provided where Class 2 water-reactive materials can form potentially explosive mixtures.

h. Explosion venting is not required for Group H-5 fabrication areas complying with Section 415.11.1 and the International Fire Code.

i. Where explosion control is required in Section 1207 of the *International Fire Code*.

j. Does not apply to consumer fireworks, Division 1.4G.

k. Not required for Category 1B Flammable Gases having a burning velocity not exceeding 3.9 inches per second (10 cm/s).

[F] TABLE 415.6.5 DETACHED BUILDING REQUIRED

A DETACHED BUILDING IS REQUIRED WHERE THE QUANTITY OF MATERIAL EXCEEDS THAT SPECIFIED HEREIN			
Material	**Class**	**Solids and Liquids (tons)[a, b]**	**Gases (cubic feet)[a, b]**
Explosives	Division 1.1	Maximum Allowable Quantity	Not Applicable
	Division 1.2	Maximum Allowable Quantity	
	Division 1.3	Maximum Allowable Quantity	
	Division 1.4 [e]	Maximum Allowable Quantity	
	Division 1.4[c, e]	1	
	Division 1.5	Maximum Allowable Quantity	
	Division 1.6	Maximum Allowable Quantity	
Oxidizers	Class 4	Maximum Allowable Quantity	Maximum Allowable Quantity
Unstable (reactives) detonable	Class 3 or 4	Maximum Allowable Quantity	Maximum Allowable Quantity
Oxidizer, liquids and solids	Class 3	1,200	Not Applicable
	Class 2	2,000	Not Applicable
Organic peroxides	Detonable	Maximum Allowable Quantity	Not Applicable
	Class I	Maximum Allowable Quantity	Not Applicable
	Class IIA	25[f]	Not Applicable
	Class IIB	40[f]	
	Class III	50[f]	Not Applicable
Unstable (reactives) nondetonable	Class 3	1	2,000
	Class 2	25	10,000
Water reactives	Class 3	1	Not Applicable
	Class 2	25	Not Applicable
Pyrophoric gases[d]	Not Applicable	Not Applicable	2,000

For SI: 1 ton = 906 kg, 1 cubic foot = 0.02832 m^3, 1 pound = 0.454 kg.

a. For materials that are detonable, the distance to other buildings or lot lines shall be in accordance with Section 415.6 of this code or Chapter 56 of the International Fire Code based on trinitrotoluene (TNT) equivalence of the material, whichever is greater.

b. “Maximum Allowable Quantity” means the maximum allowable quantity per control area set forth in Table 307.1(1).

c. Limited to Division 1.4 materials and articles, including articles packaged for shipment, that are not regulated as an explosive under Bureau of Alcohol, Tobacco, Firearms and Explosives (BATF) regulations or unpackaged articles used in process operations that do not propagate a detonation or deflagration between articles, provided that the net explosive weight of individual articles does not exceed 1 pound.

d. Detached buildings are not required, for gases in gas rooms that support H-5 fabrication facilities where the gas room is separated from other areas by a fire barrier with a fire-resistance rating of not less than 2 hours and the gas is located in a gas cabinet that is internally sprinklered, equipped with continuous leak detection, automatic shutdown and is not manifolded upstream of pressure controls. Additionally, the gas supply is limited to cylinders that do not exceed 125 pounds (57 kg) water capacity in accordance with 49 CFR 173.192 for Hazard Zone A toxic gases.

e. Does not apply to consumer fireworks, Division 1.4G.

f. Where different classes of organic peroxides are stored in the same building, the aggregate sum of the ratios of the actual quantity divided by the allowed quantity for each class shall not exceed one.

[F]TABLE 415.11.1.1 QUANTITY LIMITS FOR HAZARDOUS MATERIALS IN A SINGLE FABRICATION AREA IN GROUP H-5[a]

HAZARD CATEGORY		SOLIDS (pounds per square foot)	LIQUIDS (gallons per square foot)	GAS (cubic feet @ NTP/square foot)
PHYSICAL-HAZARD MATERIALS				
Combustible dust		Note b	Not Applicable	Not Applicable
Combustible fiber	Loose	Note b	Not Applicable	Not Applicable
	Baled	Notes b and c		
Combustible liquid	II	Not Applicable	0.02	Not Applicable
	IIIA		0.04	
	IIIB		Not Limited	
Combination Class	I, II and IIIA		0.08	
Cryogenic gas	Flammable	Not Applicable	Not Applicable	Note d
	Oxidizing			2.5
Explosives		Note b	Note b	Note b
Flammable gas	Gaseous	Not Applicable	Not Applicable	Note d
	Liquefied			Note d
Flammable liquid	IA	Not Applicable	0.005	Not Applicable
	IB		0.05	
	IC		0.05	
Combination Class	IA, IB and IC		0.05	
Combination Class	I, II and IIIA		0.08	
Flammable solid		0.002	Not Applicable	Not Applicable
Organic peroxide	~~Unclassified detonable~~ Detonable	Note b	Note b	Not Applicable
	Class I	Note b	Note b	

HAZARD CATEGORY		SOLIDS (pounds per square foot)	LIQUIDS (gallons per square foot)	GAS (cubic feet @ NTP/square foot)
	Class IIA	0.05	0.0025	
	Class IIB	0.1	0.01	
	Class III	0.2	0.02	
	Class IV	Not Limited	Not Limited	
	Class V	Not Limited	Not Limited	
Oxidizing gas	Gaseous	Not Applicable	Not Applicable	2.5
	Liquefied			2.5
Combination of gaseous and liquefied				2.5
Oxidizer	Class 4	Note b	Note b	Not Applicable
	Class 3	0.006	0.06	
	Class 2	0.006	0.06	
	Class 1	0.006	0.06	
Combination Class	1, 2, 3	0.006	0.06	
Pyrophoric materials		Note b	0.0025	Notes d and e
Unstable (reactive)	Class 4	Note b	Note b	Note b
	Class 3	0.05	0.005	Note b
	Class 2	0.2	0.02	Note b
	Class 1	Not Limited	Not Limited	Not Limited
Water reactive	Class 3	0.02 [f]	0.0025	Not Applicable
	Class 2	0.5	0.05	
	Class 1	Not Limited	Not Limited	
HEALTH-HAZARD MATERIALS				
Corrosives		Not Limited	Not Limited	Not Limited
Highly toxic		Not Limited	Not Limited	Note d
Toxics		Not Limited	Not Limited	Note d

For SI: 1 pound = 0.454 kg, 1 pound per square foot = 4.882 kg/m^2, 1 gallon per square foot = 40.7 L/m^2, 1 cubic foot @ *NTP*/square foot = 0.305 m^3 @ *NTP*/m^2, 1 cubic foot = 0.02832 m^3.

a. Hazardous materials within piping shall not be included in the calculated quantities.

b. Quantity of hazardous materials in a single fabrication shall not exceed the maximum allowable quantities per control area in Tables 307.1(1) and 307.1(2).

c. Densely packed baled cotton that complies with the packing requirements of ISO 8115 shall not be included in this material class.

d. The aggregate quantity of flammable, pyrophoric, toxic and highly toxic gases shall not exceed the greater of 0.2 cubic feet at *NTP*/square foot or 9,000 cubic feet at *NTP*.

e. The aggregate quantity of pyrophoric gases in the building shall not exceed the amounts set forth in Table 415.6.5.

f. Quantity of Class 3 water-reactive solids in a single tool shall not exceed 1 pound.

Staff Analysis: A review of the standard proposed for inclusion in the code, ***Organic Peroxides: Storage – Guideline for the labour-safe, environment-safe and fire-safe storage of organic peroxides (PGS 8-2021)***, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: Organic peroxides are hazardous materials with key hazard characteristics of thermal instability, explosivity and flammability with high burning rates. Organic peroxides can undergo self-accelerating decomposition and may result in fire and/or explosion when exposed to heat or when they come in contact with incompatible materials. The decomposition process is further accelerated when the containers are confined. The explosion hazard rating for organic peroxides is determined by the transport type testing in accordance with the UN Recommendations on the Transport of Dangerous Goods, Manual of tests and criteria, and is divided into Type A through G. The transport type testing addresses the explosivity hazard of the organic peroxide and the package size but not the flammability or the burning rate. The flammability aspect of organic peroxide is determined by the burning rate test methods listed in PGS8 Storage Code. Organic peroxides burn vigorously once ignited and the burning rates may be significantly high when compared to that of ordinary flammables. Organic peroxide fires may be characterized by large fire heights, high heat release, high flame temperatures and large amounts of smoke. Given the importance of both the explosivity and high flammability characteristics of organic peroxides, it is very important the storage classification takes into consideration both the transport type and burning rate test results, especially as organic peroxides in storage are stored for long term unlike in transport. An organic peroxide fire can significantly impact the inventory in the storage area, the storage building itself, personnel, nearby property, local community and the environment. The proposed storage classification of organic peroxides is based on both the transport type and the burning rate as shown in the below table (included in Appendix E) and the organic peroxide class definitions are defined accordingly. With the proposed changes, the organic peroxides storage class definitions are defined quantitively as against current qualitative definitions. The proposed storage class definitions harmonize with the definitions in NPFA 400 code and the European organic peroxides codes.

Appendix E is revised as part of this code change proposal, which provides the code official and the code user with the details of organic peroxide classification types, basis for classification, test method references, classification details and classification list of all organic peroxides with composition information included. This information provides the code official and code user the storage classification to be used for a given organic peroxide formulation and how this is determined.

STORAGE CLASSIFICATION OF ORGANIC PEROXIDES

TRANSPORT TYPE	BURNING RATE					
	Large Scale Test (kg/minute)	<10	≥10 and <60	≥60 and <140	≥140 and <300	≥300
	OR					
	Small Scale Test [a] (kg/m²/minute)	NA	<0.9	≥0.9 and <2.2	≥2.2 and <9.0	≥9.0
B		I	I	I	I	I
C		IIB	IIB	IIB	IIA	I
D		III	III	IIB	IIA	I
E		IV	III	IIB	IIA	IIA
F		IV	III	III	III	III
G		V	V	V	V	V

a. Solid materials shall be tested using the large-scale test. Liquid materials can be tested using either the large-scale te[illegible]or the small-scale test.

This code change proposal also revises Unclassified Detonable classification name to Detonable. Organic peroxides are classified by transport type A to transport type G. There is no such class called Unclassified Detonable. If an organic peroxide is detonable, then it is classified as transport type A per the UN and DOT organic peroxides definitions. As such, Detonable is an appropriate word to denote such class. This change from Unclassified Detonable to Detonable is made throughout Chapter 62, other chapters and appendices.

This code change proposal also proposes organic peroxide classification Class II is split into two classes: Class IIA and Class IIB, since the range of burn rate for Class II is broad - lower limit is 60 kg/min and upper limit is 300 kg/min. By subdividing the range into Class IIA (burn rates of 140 kg/min to 300 kg/min) and Class IIB (60 kg/min to 140 kg/min) we have two classes with materials similarly classed for transportation (Type C, D, or E) by explosion hazard but are distinguished by their burning rate in the storage class definition. This additional distinction of the storage classification system allows better definition of separation distances versus quantity and other features that reflect the burning behavior of the materials, beyond the explosion hazard concerns identified in the transport type designation. This change is made throughout Chapter 62 and other chapters. Maximum quantities are defined for Class IIA and IIB where required. Footnote is added under the maximum quantities table in Chapter 62 which states that when multiple classes of organic peroxides are stored, the sum of the ratios is used to determine the maximum quantity allowed. So even though the proposal is adding Class IIB quantities, the aggregate of all organic peroxide materials must be considered based on the footnote which is more restrictive than the current code.

The IFC Organic Peroxides Task Group is aware of IFC's intention to align storage classification definitions with GHS classifications in this code cycle as the GHS classification is listed on a safety data sheet of each material and a fire code official can then easily determine the storage classification of that material. In the case of organic peroxides, however, the GHS classification aligns with transport type definitions. The transport type testing, as explained above, addresses only the explosivity hazard of the organic peroxide and not the flammability or the burning rate. This proposal requests that the storage classifications for organic peroxides be as proposed in this code change proposal which is based on both the transport type and the burning rate, and an exception be made for organic peroxides to not align with GHS classifications. The storage classification for all organic peroxides is easily available for a code official as this is now listed in the Appendix E.

If the organic peroxide storage classification definitions are aligned with GHS definitions:

1. 20 organic peroxide formulations which are classified as Class I based on transport type and burning rate will be classified in a less severe hazard class of Class II organic peroxides based on GHS definition.
2. 24 organic peroxide formulations which are classified as Class II (IIA or IIB) based on transport type and burning rate will be classified in a less severe hazard class of Class III organic peroxides based on GHS definition.
3. 27 organic peroxide formulations which are classified as Class III based on transport type and burning rate will be classified in a less severe hazard class of Class IV organic peroxides based on GHS definition.
4. a total of 71 organic peroxide formulations will be classified in a less severe hazard class despite the presence of high burning rate hazard. Classifying the organic peroxide formulation into a less severe hazard class means a code user would be allowed to store increased quantities and/or at a shorter separation distance which will put the code user's storage area, personnel, nearby property, local community and the environment at increased risk in case of a fire.
5. 15 organic peroxide formulations which are classified as Class IV based on transport type and burning rate will be classified in a more severe hazard class of Class III organic peroxides based on GHS definition. These Class IV formulations are those that do not burn at all, or their burning rate is significantly low due to the presence of decompositions products like carbon dioxide, and these will be reclassified to a higher hazard storage class despite their lower hazard.

Therefore, it is strongly requested that an exception be made for organic peroxides to not align with GHS classifications and classify as proposed based on both the burning rate and explosivity hazard.

Bibliography: Safety and Handling of Organic Peroxides - American Chemistry Council

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is to define and update storage classification of organic peroxides based on both the explosivity and flammability hazards. This code change proposal also revises Unclassified Detonable classification name change to Detonable and split Class II into two classes: Class IIA and Class IIB for the reasons stated in reason statement. These changes are made throughout Chapter 62, other chapters and appendices. Appendix E is revised as part of this code change proposal, which provides the code official and the code user with the details of organic peroxide classification types, basis for classification, test method references, classification details and classification list of all organic peroxides with composition information included. The information provided in this proposal helps both the code official and the code user to effectively implement the code. The proposal does not impact the cost of construction.

F270-24

F271-24

IFC: 6306.2, 6306.5 (New), 6306.5, 6306.6, 6306.6.1, 6306.6.2, 6306.7

Proponents: Robert Marshall, San Mateo Consolidated Fire Department, International Association of Fire Chiefs- Fire and Life Safety Section (rmarshall@smcfire.org)

2024 International Fire Code

Revise as follows:

6306.2 Information and instructions to be provided.
The seller of liquid oxygen shall provide the user with information in written form that includes, but is not limited to, the following topics:

1. Manufacturer's instructions and labeling for safe storage and use of the containers.
2. Locating containers away from ignition sources, *exits*, electrical hazards, cooking equipment and other high-temperature devices in accordance with Section 6306.3.3.
3. Restraint of containers to prevent falling in accordance with Section 6306.3.4.
4. Requirements for handling containers in accordance with Section 6306.3.5.
5. Safeguards for refilling containers in accordance with Section 6306.3.6.
6. Signage requirements in accordance with Section ~~6306.6~~ 6306.7.
7. The dangers of smoking while on oxygen
8. The use of thermal fuses provided in accordance with 6306.5

Add new text as follows:

6306.5 Thermal Fuses. Liquid oxygen concentrators and containers used in Group R occupancies shall be provided with a thermal fuse device. Such devices shall be provided by the oxygen seller at the time of installation and any time containers are refilled.

Revise as follows:

~~6306.5~~ 6306.6 Smoking prohibited. Smoking shall be prohibited in rooms or areas where liquid oxygen is in use.

~~6306.6~~ 6306.7 Signs.
Warning signs for occupancies using home health care liquid oxygen shall be in accordance with Sections 6306.6.1 and 6306.6.2.

~~6306.6.1~~ 6306.7.1 No smoking sign. A sign stating "OXYGEN— NO SMOKING" shall be posted in each room or area where liquid oxygen containers are stored, used or filled.

~~6306.6.2~~ 6306.7.2 Premises signage. Where required by the *fire code official*, each *dwelling unit* or *sleeping unit* shall have an *approved* sign indicating that the unit contains liquid oxygen home care containers.

~~6306.7~~ 6306.8 Fire department notification. ~~Where required by the *fire code official*, the liquid~~ Liquid oxygen ~~seller~~ sellers shall notify the fire department of the locations of liquid oxygen home care containers when a new installation is placed, and when the system is removed from a home.

Exception: When explicitly exempted by the fire department.

Reason: NFPA released the report *Fire and Burns Involving Home Medical Oxygen* in which they cite the Consumer Product Safety Commission (CPSC) data listing 1,041 thermal burns, 228 home fires, and 96 fire deaths per year related to home oxygen therapy use, (Hall, 2023). Because not all fire departments report to the National Fire Incident Reporting System (NFIRS), the data suggests this problem to be much more significant and under reported. According to NFPA, emergency room visits involving oxygen related burns were caused by cigarettes 59% of the time compared to the next highest cause of cooking while on oxygen at 18%. In fact, a civilian is killed at one of every three home fires in which oxygen administration equipment is used. Data suggest our home oxygen therapy fire deaths could be as high as 350 people or 12% of the US fire fatalities annually.And the fatalities are not limited to the person on home oxygen, as injuries and fatalities occur with others in the same structure who are not on oxygen.Fires involving home oxygen are a significant risk to the safety of firefighters. Two firefighters die each year fighting home oxygen therapy fires and many more are injured. “The enrichment of normal room air with oxygen increases the energy, heat release and severity of any fire. What can normally be a fairly nonflammable substance can, in the presence of oxygen, burn with vigor and produce noxious fumes very rapidly” (BPR Medical). Five firefighters in Tacoma were injured in a June 2023 fast-moving apartment fire that was later determined to be caused by smoking and home oxygen use.

This problem is not an isolated or rare anomaly. “Around 16 million people have been diagnosed with Chronic Obstructive Lung Disease (COPD) in the US (1 in 8 over the age of 45), with millions more undiagnosed. Of these, an estimated 1.5 million require home oxygen therapy” (American Thoracic Society, 2018). Research shows 1.5 million people are prescribed home oxygen. Of that number, it is estimated 52% still smoke due to the addictive nature of nicotine.

According to CDC WISQARS, in 2020 there were 281,801 fire/burn injuries in the U.S. These injuries cost $3.9 billion ($3,862,650,000) in medical costs, and $41.6 billion ($41,599,370,000) in combined medical/work/life loss costs, (National Center for Injury Prevention and Control, CDC WISQARS accessed on 8/4/2023). It costs $97,971 per day to treat an intubated patient with severe burns at a Trauma and Burn Center.   The thermal fuse is a bi-directional valve, meaning it completely shuts off the flow of oxygen – whichever way it is fitted - when exposed to fire. From 2013 – 2018 after mandated implementation in the United Kingdom, only one home fatality has been recorded associated with home oxygen use. The current cost of a thermal fuse is approximately $4.45 per unit and manufacturers recommend a thermal fuse at the oxygen concentrator and at the connection point of the nasal cannula. The thermal fuse is an FDA listed medical device manufactured in the UK with two independent medical supply wholesale companies both competitively listing the device for sale within the US. It is not required to be listed according to UL representatives due to its FDA approval. There currently does not exist another engineering solution to reduce home oxygen therapy fires.

This proposal would:

1. Require thermal fuse devices be provided to a user on the oxygen tubing of all home oxygen installations.

2. Require additional educational information on the dangers of oxygen in homes.3. Clarify that notification of the fire department is required whenever oxygen is being used in a home, rather than making it only if the AHJ requires it. The exception still exists, however, it is now an exception. The current language leads to oxygen providers not checking with the department, and the new language will at least prompt the conversation.The requirements for a thermal fuse device are not intended to be required in an institutional occupancy because of the supervised nature of oxygen use in such occupancies. The educational material requirements would still be required for all occupancies.

Bibliography: American Thoracic Society., (2018). Optimizing Home Oxygen Therapy. An Official American Thoracic Society Workshop Report | Annals of the American Thoracic Society (atsjournals.org)

BPR Medical., (2021). *A risk-based approach to safer home oxygen delivery.* http://www.firebreaks.info/wp-content/uploads/2021/11/BPR-US-Whitepaper-2021-FINAL.pdf

Cooper, Brendan G., (March 2015). *Home Oxygen and Domestic Fires.* Doi: 10.1183/20734735.000815

Hall, Shelby., (May 2023). *Fires and Burns Involving Home Medical Oxygen*. NFPA.org.

Holguin, Briseida., (June 2023). *Firefighters, neighbors hurt when Tacoma apartments erupt in flames. KIRO 7, https://www.kiro7.com/news/local/firefighters-neighbors-hurt-when-tacoma-apartments-erupt-flames/ZYPQ7ZA4WZA5ZNFHBW2FNVYZVE/*

Mastropieri et al., (2020), 18 Stop the Burn: A Smoking and Home Oxygen Safety Initiative with Use of Firebreaks, Journal of Burn Care & Research, 41(1): S15.

“NEISS Highlights, Data and Query Builder,” U.S. Consumer Product Safety Commission, https://www.cpsc.gov/cgibin/NEISSQuery/home.aspx.

Weighted to reflect population differences: BPR Medical (2019), The prevalence and impact of home oxygen fires in the US, available at: http://www.firebreaks.info/wp-content/uploads/2019/09/BPR-WhitePaper-2019-v6.1.pdf

Cost Impact: Increase

Estimated Immediate Cost Impact:

This is not a construction provision, so there is no cost impact to construction. The device itself costs between $5 and $15 USD.

Estimated Immediate Cost Impact Justification (methodology and variables):

The device itself is going to remain a fixed cost. There may be a labor charge for installation. Currently, these devices are mandated and paid for by the US Veterans Affairs, but not covered by Medicare. Many insurance companies will pay for this device.

F271-24

F272-24

IFC: CHAPTER 63, SECTION 6306, 6306.1, 6306.2, 6306.3, 6306.3.1, 6306.3.2, 6306.3.3, 6306.3.4, 6306.3.5, 6306.3.6, 6306.3.6.1, 6306.3.6.2, 6306.3.6.3, 6306.4, 6306.5, 6306.6, 6306.6.1, 6306.6.2, 6306.7

Proponents: Robert Marshall, San Mateo Consolidated Fire Department, International Association of Fire Chiefs- Fire and Life Safety Section (rmarshall@smcfire.org)

2024 International Fire Code

Revise as follows:

CHAPTER 63 OXIDIZERS, OXIDIZING GASES AND OXIDIZING CRYOGENIC FLUIDS AND RESIDENTIAL OXYGEN USE

SECTION 6306
~~LIQUID~~ RESIDENTIAL OXYGEN USE ~~IN HOME HEALTH CARE~~

6306.1 General.
The storage and use of ~~liquid~~ oxygen ~~(LOX)~~ in residential occupancies and facilities located in Group I-1, I-4 and R occupancies shall comply with Sections 6306.2 through 6306.6, or shall be stored and used in accordance with Chapter 50.

6306.2 Information and instructions to be provided.
The seller of ~~liquid~~ oxygen shall provide the user and facility with information in written form that includes, but is not limited to, the following:

1. Manufacturer's instructions and labeling for safe storage and use of oxygen and the associated containers.
2. Locating containers away from ignition sources, *exits*, electrical hazards, cooking appliances and high-temperature devices in accordance with Section 6306.3.3.
3. Restraint of containers to prevent falling in accordance with Section 6306.3.4.
4. Requirements for handling containers in accordance with Section 6306.3.5.
5. Safeguards for refilling containers in accordance with Section 6306.3.6.
6. Signage requirements in accordance with Section 6306.6.

6306.3 ~~Liquid oxygen~~ Oxygen ~~home care~~ containers.
Compressed Gas Containers and Cryogenic Containers containing oxygen used in home health care settings shall be in accordance with Sections 6306.3.1 through 6306.3.6.3.

6306.3.1 Maximum individual container capacity.
~~Liquid oxygen~~ Oxygen ~~home care~~ containers shall not exceed an individual capacity of 15.8 gallons (60 L) in Group I-1, I-4 and R occupancies. ~~Liquid oxygen~~ Oxygen ~~ambulatory~~ containers intended for ambulatory use are allowed in Group I-1, I-4 and R occupancies. ~~Containers of liquid oxygen in home health care shall also be stored, used and filled in accordance with Section 6306 and Sections 5503.1 and 5503.2.~~

6306.3.2 Manufacturer's instructions and labeling. Compressed gas containers and cryogenic containers shall be stored, used and operated in accordance with the manufacturer's instructions and labeling.

6306.3.3 Locating containers. Compressed gas containers and cryogenic containers shall not be located in areas where any of the following conditions exist:

1. They can be overturned due to operation of a door.
2. They are in the direct path of egress.

3. They are subject to falling objects.
4. They can become part of an electrical circuit.
5. Open flames and high-temperature devices can cause a hazard.

6306.3.4 Restraining containers. ~~Liquid oxygen home care~~Compressed gas containers and cryogenic containers containing oxygen shall be restrained while in storage or use to prevent falling caused by contact, vibration or seismic activity. Containers shall be restrained by one of the following methods:

1. Restraining containers to a fixed object with one or more restraints.
2. Restraining containers within a framework, stand or assembly designed to secure the container.
3. ~~Restraining containers by locating a container against two points of contact such as the walls of a corner of a room or a wall and a secure furnishing or object such as a desk.~~
4. Nesting of compressed gas containers or cryogenic containers where, if dislodged, do not obstruct the required means of egress.

6306.3.5 Container handling. Containers shall be handled by use of a cart or hand truck designed for such use.

Exceptions:

1. ~~Liquid oxygen home care containers~~ Containers equipped with a roller base.
2. ~~Liquid oxygen ambulatory containers~~ Containers for ambulatory use are allowed to be hand carried.

6306.3.6 Filling of containers.

The filling of oxygen containers shall be in accordance with Sections 6306.3.6.1 through 6306.3.6.3.

6306.3.6.1 Filling location. ~~Liquid oxygen~~ Oxygen ~~home care~~ containers ~~and ambulatory containers~~ shall be filled outdoors.

Exception: ~~Liquid oxygen ambulatory containers~~ Containers are allowed to be filled indoors where the supply container is specifically designed for filling such containers and written instructions are provided by the container manufacturer.

6306.3.6.2 Incompatible surfaces. A drip pan compatible with liquid oxygen shall be provided under ~~home care~~ container fill and vent connections during the filling process in order to protect against ~~liquid oxygen~~ spillage from coming into contact with combustible surfaces, including asphalt.

6306.3.6.3 Open flames and high-temperature devices.

The use of open flames and high-temperature devices during filling shall ~~be in accordance~~ comply with Section 5003.7.2.

6306.4 Maximum aggregate quantity.

The maximum aggregate quantity ~~of liquid~~ oxygen allowed in storage and in use in each *dwelling unit* shall be ~~31.6 gallons (120 L).~~ as follows:

1. 31.6 gallons (120 L) liquid oxygen.
2. 3650 CF (103.35 m3) oxygen gas.
3. Where 1-hour fire barriers and horizontal assemblies installed in accordance with the *International Building Code* separate individual sleeping rooms within a dwelling unit, the quantities in items 1 or 2 shall be permitted to be applied per sleeping room.

Exceptions:

~~1.~~ The maximum aggregate quantity of liquid oxygen allowed in Group I-4 occupancies shall be limited by the maximum allowable quantity set forth in Table 5003.1.1(1).

2. ~~Where individual sleeping rooms are separated from the remainder of the *dwelling unit* by *fire barriers* constructed in accordance with Section 707 of the International Building Code, and *horizontal assemblies* constructed in accordance with Section 711 of the International Building Code, or both, having a minimum *fire-resistance rating* of 1 hour, the maximum aggregate quantity per *dwelling unit* shall be increased to allow not more than 31.6 gallons (120 L) of liquid oxygen per sleeping room.~~

6306.5 Smoking prohibited. Smoking shall be prohibited in rooms or areas where ~~liquid~~ oxygen is in use.

6306.6 Signs.
Warning signs for occupancies using ~~home health care liquid~~ oxygen shall be in accordance with Sections 6306.6.1 and 6306.6.2.

6306.6.1 No smoking sign. A sign stating "OXYGEN— NO SMOKING" shall be posted in each room or area where ~~liquid~~ oxygen containers are stored, used or filled.

6306.6.2 Premises signage. Where required by the *fire code official*, each *dwelling unit* or *sleeping unit* shall have an *approved* sign indicating that the unit contains ~~liquid~~ oxygen ~~home care~~ containers.

6306.7 Fire department notification. Where required by the *fire code official*, the ~~liquid~~ oxygen seller shall notify the fire department of the locations of ~~liquid~~ oxygen ~~home care~~ containers.

Reason: NFPA released the report *Fire and Burns Involving Home Medical Oxygen* in which they cite the Consumer Product Safety Commission (CPSC) data listing 1,041 thermal burns, 228 home fires, and 96 fire deaths per year related to home oxygen therapy use, (Hall, 2023). Because not all fire departments report to the National Fire Incident Reporting System (NFIRS), the data suggests this problem to be much more significant and under reported. According to NFPA, emergency room visits involving oxygen related burns were caused by cigarettes 59% of the time compared to the next highest cause of cooking while on oxygen at 18%. In fact, a civilian is killed at one of every three home fires in which oxygen administration equipment is used. Data suggests our home oxygen therapy fire deaths could be as high as 350 people or 12% of the US fire fatalities annually.

Fires involving home oxygen are a significant risk to the safety of firefighters. A fire in June of 2023 injured 2 residents and 5 firefighters in Tacoma, Washington after a resident on home oxygen lit a cigarette. (The News Tribune). Unfortunately, incidents such as this are not rare. Talk to almost any firefighter, and they will tell you a story in which a fire or burn injury occurred as the result of home oxygen use.

The NFPA report and NFIRS data does not differentiate between liquid oxygen and gaseous oxygen, yet the fire code only addresses liquid oxygen use. In practice, both liquid oxygen and gaseous oxygen is prescribed for use in patients needing supplemental oxygen therapy.

This proposal seeks to remove all references to liquid oxygen, clarifying that the safety requirements for use of oxygen in residential occupancies apply no matter what kind of oxygen a patient in a residential setting may be on.

6306.4 added a quantity for gaseous oxygen. The quantity for liquid oxygen is in the existing language, and the quantity for the gaseous oxygen matches the quantity of liquid oxygen in a gas form. The proposal purposely does not restrict the quantity to one or the other since a patient will only be on one form at any given time, and the oxygen tubing attached to the patient is usually the cause of ignition of the fire.

Bibliography: Hall, Shelby, 2023. Fires and Burns Involving Home Medical Oxygen. Accessed 1/8/24 at https://www.nfpa.org/education-and-research/research/nfpa-research/fire-statistical-reports/fires-and-burns-involving-home-medical-oxygen

The News Tribune- https://www.thenewstribune.com/news/local/article276149236.html

Cost Impact: Increase

Estimated Immediate Cost Impact:

This is not a construction issue. That said, clarifying that the regulation extends to all use of home oxygen regardless of whether the oxygen is in a liquid or gas form. While many oxygen providers comply with these requirements, the increased printing costs of the safety materials would be the only cost, as the safety regulations are largely adhered to by providers already. This could result in a price increase of around $1.00.

Estimated Immediate Cost Impact Justification (methodology and variables):

None

F272-24

F273-24

IFC: B103.2.1 (New), B103.2.2 (New), B103.2.3 (New)

Proponents: Robert Neale, Integra Code Consultants, Self (rneale1951@outlook.com)

2024 International Fire Code

Add new text as follows:

B103.2.1 Increases based on occupancy.. The required fire flow for any building with a Group M, F-1, H or S-1 fire area shall be increased by not less than 500 gpm (1893 L/m) above the value derived from Table B105.2.

B103.2.2 Increases based on fire separation distance.. The required fire flow for any building having one or more exterior walls within a fire separation distance of less than 30 feet (9144 mm) shall increase the fire flow not less than 250 gpm (948 L/m) above the value derived from Table B105.2 for each wall within the fire separation distance of less than 30 feet (9144 mm).

B103.2.3 Aggregated Values.. The values derived from Sections B103.2.1 and B103.2.2 shall be aggregated.

Reason: The fire flow values in IFC Table B105.1(2) do not include values for two important fire protection considerations: contents' combustibility and exposure protection.

For example, using Table B105.1(2) for a sample one-story Type IIB non-sprinklered building measuring 38,000 sq. ft. requires a fire flow value of 4,250 gpm for four hours. By installing an approved fire sprinkler system, that value can be reduced to 1,062.5 gpm for two hours. There is no consideration for building contents or exposures.

In this scenario, the proposed building would be assess the same fire flow value whether it stored steel or concrete pipe products or combustible wood, paper or plastic products. The proposed 500 gpm increase for any building having a Group M, F-1, H or S-1 fire area acknowledges these occupancies are "moderate" or "high" hazard occupancies that may require more water application for suppression than a light hazard occupancy. The language is written to allow the code official to increase the fire flow for these fire areas whether the building has only one or multiple fire areas of those occupancy classifications.

Similarly, the proposed increase based on fire separation distances recognizes the need for exposure protection in the event the subject building threatens one or more adjacent properties. The fire separation distance standard is selected to align with the Building Code distances.

Finally, the proposed Section B103.2.3 "Aggregated values" is to clarify for the code official that content combustibility and exposure protection both must be considered.

Cost Impact: Increase

Estimated Immediate Cost Impact:

This proposal may increase the cost of construction where existing infrastructure (fire protection water storage and distribution) is inadequate to support the adjusted Table B103.5(2) values. Water mains may have to be upsized to accommodate increased volumes.

The following table compares estimated* retail prices for the two most commonly used water main products: PVC C-900 and ductile iron.

Size (in)	C-900	DI
4	$ 1.88	$ 9.00
6	$ 3.00	$14.74
8	$ 6.30	$18.38
10	$ 9.59	$ 23.75
12	$ 13.51	$ 30.43
14	$ 17.51	$ 40.30

Size (in)	C-900	DI
16	$ 24.06	$ 50.17

Avg. price comparisons (linear foot) C-900 vs. ductile iron based on pipe size.

Estimated Immediate Cost Impact Justification (methodology and variables):

A web search of 27 retail outlets in 14 states using the search term "C-900 v. DI unit price" provided the price per linear foot data. The data do not include sunk costs of excavation, installation and testing that would be required regardless of pipe size.

F273-24

F274-24

IFC: D105.1

Proponents: Edward Lisinski, American Wood Council (elisinski@awc.org)

2024 International Fire Code

Revise as follows:

D105.1 Where required.
Where the vertical distance between the *grade plane* and the highest roof surface exceeds 30 feet (9144 mm), *approved* aerial fire apparatus access roads shall be provided. For purposes of this section, the highest roof surface shall be determined by measurement to the eave of a pitched roof, the intersection of the roof to the *exterior wall*, or the top of parapet walls, whichever is greater.

> **Exception:** Where *approved* by the *fire code official*, buildings of Type IA, Type IB, ~~or~~ Type IIA, Type IV-A, or Type IV-B construction equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 and having firefighter access through an enclosed *stairway* with a Class I standpipe from the lowest level of fire department vehicle access to all roof surfaces.

Reason: This exception to Section D105.1 was added in the 2021 IFC by proposal F324-18. Per that reason statement, Fire Department Aerial Apparatus Access is rarely needed in these taller buildings which are equipped with an automatic sprinkler system in accordance with NFPA 13 and has fire department access through an enclosed stair with a Type I standpipe system from the lowest level of fire department access to all roof surfaces. Firefighting operations, including ventilation, can be achieved through the interior of these buildings using the enclosed stairs as a means of egress from the hazard area. The requirement for a Class I standpipe is for fire suppression and firefighter protection when operating hose lines at the roof or at a lower floor level.

These same principles and techniques to fight a fire in a taller Type I or II building could also be applied to a taller Type IV building. Because the exception of Section D105.1 was new in the 2021 IFC, it was not addressed by the ICC Ad Hoc Committee on Tall Wood Buildings in their code package for the 2021 IFC. Use of this exception requires the approval of the fire code official.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0.00 minimally but there could be a cost decrease for some buildings.

Estimated Immediate Cost Impact Justification (methodology and variables):

This proposal creates an exception for the use of narrower streets with taller Type IV buildings. This means that an existing narrow street would not have to be widened if a Type IV building is being constructed on it. Providing additional construction type options could lower the cost of construction.

F274-24

F275-24

IFC: TABLE E104.2

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Lynne Kilpatrick, HMEx Assistant LLC, self (lynne.kilpatrick@hmexassistant.com)

2024 International Fire Code

Revise as follows:

TABLE E104.2 IFC AND GHS HAZARD DEFINITIONS COMPARISON[a]

IFC MATERIAL	IFC CLASS	IFC DEFINITION	GHS ~~2017 (REV 7)~~ CLASSIFICATION (H-CODE AND CATEGORY); HAZARD STATEMENT; DEFINITION	
Aerosol	—	A combination of a container, a propellant and a material that is dispensed. Aerosol products shall be classified by means of the calculation of their chemical heats of combustion and shall be designated Level 1, Level 2 or Level 3.	Any nonrefillable receptacles made of metal, glass or plastics and containing a gas compressed, liquefied or dissolved under pressure, with or without a liquid, paste or powder, and fitted with a release device allowing the contents to be ejected as solid or liquid particles in suspension in a gas, as a foam, paste or powder or in a liquid state or in a gaseous state.	
Aerosol	Level 1	Those with a total chemical heat of combustion that is less than or equal to 8,600 Btu/lb (20 kJ/g).	H223, Category 3; ~~Pressurized container: May burst if heated.~~ 1. Any aerosol that contains ≤ 1% flammable components (by mass) and that has a heat of combustion < 20 kJ/g. 2. Any aerosol that contains > 1% (by mass) flammable components or which has a heat of combustion of ≥ 20 kJ/g but which, based on the results of the ignition distance test, the enclosed space ignition test or the aerosol foam flammability test, does not meet the criteria for Category 1 or Category 2. and H229; Pressurized container: May burst if heated	

Aerosol	Level 2	Those with a total chemical heat of combustion that is less than or equal to 8,600 Btu/lb (20 kJ/g).	H223, Category 2; Flammable aerosol~~. Pressurized container: May burst if heated~~: 1. Any aerosol that dispenses a spray that, based on the results of the ignition distance test, does not meet the criteria for Category 1, and which has: a. A heat of combustion of ≥ 20 kJ/g. b. A heat of combustion of < 20 kJ/g along with an ignition distance of ≥ 15 cm; or c. A heat of combustion of < 20 kJ/g and an ignition distance of < 15 cm along with either, in the enclosed space ignition test a time: i. A time equivalent of ≤ 300 s/m^3; or ii. A deflagration density of ≤ 300 g/m^3; or 2. Any aerosol that dispenses a foam that, based on the results of the aerosol foam flammability test, does not meet the criteria for Category 1, and which has a flame height of ≥ 4 cm and a flame duration of ≥ 2 s. and H229; Pressurized container: May burst if heated	

Aerosol	Level 3	Those with a total chemical heat of combustion that is greater than 13,000 Btu/lb (30 kJ/g).	H222, Category 1; Extremely flammable aerosol~~. Pressurized container: May burst if heated~~: 1. Any aerosol that contains ≥ 85% flammable components (by mass) and has a heat of combustion of ≥ 30 kJ/g. 2. Any aerosol that dispenses a spray that, in the ignition distance test, has an ignition distance of ≥ 75 cm. 3. Any aerosol that dispenses a foam that, in the foam flammability test, has: a. A flame height of ≥ 20 cm and a flame duration of ≥ 2 s. b. A flame height of ≥ 4 cm and a flame duration of ≥ 7 s. and H229; Pressurized container: May burst if heated	
Combustible liquid	—	A liquid having a closed cup flash point at or above 100°F (38°C). Combustible liquids shall be subdivided as follows:	A flammable liquid means a liquid having a flash point of not more than 93°C.	
Combustible liquid	II	Liquids having a closed cup flash point at or above 100°F (38°C) and below 140°F (60°C).	H226, Category 3; Flammable liquid and vapor: Flash point ≥ 23°C and ≤ 60°C	
Combustible liquid	IIIA	Liquids having a closed cup flash point at or above 140°F (60°C) and below 200°F (93°C).	H227, Category 4; Combustible liquid: Flash point > 60°C and ≤ 93°C	
Combustible liquid	IIIB	Liquids having closed cup flash points at or above 200°F (93°C).	N/A	
Compressed gas	—	A material or mixture of materials that: 1. Is a gas at 68°F (20°C) or less at 14.7 psia (101 kPa) of pressure, and 2. Has a boiling point of 68°F (20°C) or less at 14.7 psia (101 kPa) which is either liquefied, nonliquefied or in solution, except those gases that have no other health- or physical-hazard properties are not considered to be compressed until the pressure in the packaging exceeds 41 psia (282 kPa) at 68°F (20°C). States of compressed gases: 1. Nonliquefied compressed gases are gases, other than those in solution, that are in a packaging under the charged pressure and are entirely gaseous at a temperature of 68°F (20°C). 2. Liquefied compressed gases are gases that, in a packaging under the charged pressure, are partially liquid at a temperature of 68°F (20°C). 3. Compressed gases in solution are nonliquefied gases that are dissolved in a solvent. 4. Compressed gas mixtures consist of a mixture of two or more compressed gases contained in a packaging, the hazard properties of which are represented by the properties of the mixture as a whole.	Gases under pressure are gases which are contained in a receptacle at a pressure of 200 kPa (gauge) or more at 20°C, or which are liquefied, or liquefied and refrigerated. H280, Compressed gas; Contains gas under pressure: May explode if heated. A gas which when under pressure is entirely gaseous at -50°C (-58°F), including all gases with a critical temperature ≤ -50°C (-58°F). H280, Liquefied gas; Contains gas under pressure: May explode if heated. A gas which when under pressure is partially liquid at temperatures above -50°C (-58°F). H280, Dissolved gas; Contains gas under pressure: May explode if heated. A gas which when under pressure is dissolved in a liquid phase solvent.	
Corrosive	—	A chemical that causes visible destruction of, or irreversible alterations in, living tissue by chemical action at the point of contact. A chemical shall be considered corrosive if, when tested on the intact skin of albino rabbits by the method described in DOTn 49 CFR 173.137, such chemical destroys or changes irreversibly the structure of the tissue at the point of contact following an exposure period of 4 hours. This term does not refer to action on inanimate surfaces.	H314, Category 1 (1A, 1B, 1C); Causes severe skin burns and eye damage. Skin corrosion refers to the production of irreversible damage to the skin; namely, visible necrosis through the epidermis and into the dermis occurring after exposure to a substance or mixture, or H318, Category 1; Causes serious eye damage: Serious eye damage refers to the production of tissue damage in the eye, or serious physical decay of vision, which is not fully reversible, occurring after exposure of the yed to the substance or mixture.	
Cryogenic fluid	—	A fluid having a boiling point lower than -130°F (-89.9°C) at 14.7 pounds per square inch atmosphere (psia) (an absolute pressure of 101.3 kPa).	H281, Refrigerated liquefied gas; Contains refrigerated gas: May cause cryogenic burns or injury. A gas which is made partially liquid because of its low temperature.	

Cryogenic fluid, flammable	—	A cryogenic fluid that is flammable in its vapor state.	H220, Category 1A; Extremely flammable gas. Gases, which at 20° C and a standard pressure of 101.3 kPa: 1. Are ignitable when in a mixture of 13% or less by volume in air; or 2. Have a flammable range with air of at least 12 percentage points, regardless of the lower flammability limit unless data show they meet the criteria for Category 1B. Category 1A includes pyrophoric gases and chemically unstable gases~~.~~, or H221, Category 1B; Flammable gas: Gases which meet the flammability criteria for Category 1A, but which are not pyrophoric, nor chemically unstable, and which have at least either: a lower flammability limit of more than 6% by volume in air; or (b) a fundamental burning velocity of less than 10 cm/s and H281, refrigerated liquefied gas~~, would also apply.~~	
Cryogenic fluid,~~—~~Inert	—	A cryogenic fluid that is inert.	H281, Refrigerated liquefied gas. Contains refrigerated gas: May cause cryogenic burns or injury. A gas which is made partially liquid because of its low temperature.	
Cryogenic fluid, Oxidizing	—	An oxidizing gas in the cryogenic state.	H270, Category 1: May cause or intensify fire; oxidizer. Any gas which may, generally by providing oxygen, cause or contribute to the combustion of other material more than air does. and H281, refrigerated liquefied gas~~, would also apply.~~	
Explosives	—	A chemical compound, mixture or device, the primary or common purpose of which is to function by explosion. The term includes, but is not limited to, dynamite, black powder, pellet powder, initiating explosives, detonators, safety fuses, squibs, detonating cord, igniter cord and igniters. The term "Explosive" includes any material determined to be within the scope of USC Title 18: Ch. 40 and also includes any material classified as an explosive other than consumer fireworks, Division 1.4G Explosives, by the hazardous materials regulations of DOTn 49 CFR Parts 100–185.	An explosive substance (or mixture) is a solid or liquid substance (or mixture of substances) which is in itself capable by chemical reaction of producing gas at such a temperature and pressure and at such a speed as to cause damage to the surroundings. Pyrotechnic substances are included even when they do not evolve gases.	
Explosives	Unstable explosives		H200; Unstable explosive. Unstable explosives are those which are thermally unstable and/or too sensitive for normal handling, transport and use. Special precautions are necessary.	
Explosives	Division 1.1	Explosives that have a mass explosion hazard. A mass explosion is one which affects almost the entire load instantaneously.	H201; Explosive; mass explosion hazard. Substances, mixtures and articles which have a mass explosion hazard (a mass explosion is one which affects almost the entire quantity present virtually instantaneously).	
Explosives	Division 1.2	Explosives that have a projection hazard but not a mass explosion hazard.	H202; Explosive; severe projection hazard. Substances, mixtures and articles which have a projection hazard but not a mass explosion hazard.	
Explosives	Division 1.3	Explosives that have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but not a mass explosion hazard.	H203; Explosive; fire, blast or projection hazard. Substances, mixtures and articles which have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but not a mass explosion hazard: 1. Combustion of which gives rise to considerable radiant heat; or 2. Which burn one after another, producing minor blast or projection effects or both.	
Explosives	Division 1.4	Explosives that pose a minor explosion hazard. The explosive effects are largely confined to the package and no projection of fragments of appreciable size or range is to be expected. An external fire must not cause virtually instantaneous explosion of almost the entire contents of the package.	H204; Fire or projection hazard: Substances, mixtures and articles which present no significant hazard; substances, mixtures and articles which present only a small hazard in the event of ignition or initiation. The effects are largely confined to the package and no projection of fragments of appreciable size or range is to be expected. An external fire shall not cause virtually instantaneous explosion of almost the entire contents of the package.	
Explosives	Division 1.4G	Small fireworks devices containing restricted amounts of pyrotechnic composition designed primarily to produce visual or audible effects by combustion or deflagration that complies with the construction, chemical composition and labeling regulations of the DOTn for fireworks, UN No. 0336 and the US Consumer Product Safety Commission as set forth in CPSC 16 CFR Parts 1500 and 1507.	N/A	

Explosives	Division 1.5	Very insensitive explosives. This division is comprised of substances that have a mass explosion hazard but which are so insensitive that there is very little probability of initiation or of transition from burning to detonation under normal conditions of transport.	H205; May mass explode in fire. Very insensitive substances or mixtures which have a mass explosion hazard: substances and mixtures which have a mass explosion hazard but are so insensitive that there is very little probability or initiation or of transition from burning to detonation under normal conditions.	
Explosives	Division 1.6	Extremely insensitive articles that do not have a mass explosion hazard. This division is comprised of articles that contain only extremely insensitive detonating substances and that demonstrate a negligible probability of accidental initiation or propagation.	Extremely insensitive articles which do not have a mass explosion hazard: articles which predominantly contain extremely insensitive substances or mixtures and which demonstrate a negligible probability of accidental initiation or propagation.	
Flammable gas	Gaseous or Liquefied	A material that is a gas at 68° F (20° C) or less at 14.7 psia (101 kPa) of pressure [a material that has a boiling point of 68° F (20° C) or less at 14.7 psia (101 kPa)] ~~which:~~subdivided as follows: 1. Category 1A. a. A gas which i~~I~~s ignitable at 14.7 psia (101 kPa) when in a mixture of 13% or less by volume with air; or ~~2~~ b. ~~Has~~ A gas with a flammable range at 14.7 psia (101 kPa) with air of not less than 12%, regardless of the lower limit unless data shows compliance with category 1B. 2. Category 1B. A gas which meets the flammability criteria for Category 1A, is not pyrophoric or chemically unstable, and meets one of more of the following: a. A lower flammability limit of more than 6% by volume of air; or b. A fundamental burning velocity of less than 3.9 in/s (10 cm/s). The limits specified shall be determined at 14.7 psia (101 kPa) of pressure and a temperature of 68° F (20° C) in accordance with ASTM E681. Where not otherwise specified, the term "flammable gas" includes both Category 1A and 1B.	A flammable gas is a gas having a flammable range with air at 20° C and a standard pressure of 101.3 kPa. H220, Category 1A; Extremely flammable gas. Gases, which at 20° C and a standard pressure of 101.3 kPa: 1. Are ignitable when in a mixture of 13% or less by volume in air; or 2. Have a flammable range with air of at least 12 percentage points regardless of the lower flammability limit unless data show they meet the criteria for Category 1B. Category 1A includes pyrophoric gases and chemically unstable gases. H22~~0~~1, Category 1B; Flammable gas. Gases which meet the flammability criteria for Category 1A, but which are not pyrophoric nor chemically unstable, and which have at least either: 1. A lower flammability limit of more than 6% by volume in air; or 2. A fundamental burning velocity of less than 10 cm/s. and H280 or H281~~, compressed gas, would also apply.~~	
Flammable liquid	—	A liquid having a closed cup flash point below 100° F (38° C). Flammable liquids are further categorized into a group known as Class I liquids. The Class I category is subdivided as follows:	A liquid having a flash point of not more than 93° C. A flammable liquid is classified in one of the four categories for this class.	
Flammable liquid	IA	Liquids having a flash point below 73° F (23° C) and having a boiling point below 100° F (38° C).	H224, Category 1; Extremely flammable liquid and vapor. Flash point < 23° C and initial boiling point ≤ 35° C	
Flammable liquid	IB	Liquids having a flash point below 73° F (23° C) and having a boiling point at or above 100° F (38° C).	H225, Category 2; Highly flammable liquid and vapor. Flash point < 23° C and initial boiling point > 35° C	
Flammable liquid	IC	Liquids having a flash point at or above 73° F (23° C) and below 100° F (38° C).	H226, Category 3; Flammable liquid and vapor. Flash point ≥ 23° C and ≤ 60° C	

Flammable solid	—	A solid, other than a blasting agent or explosive, that is capable of causing fire through friction, absorption of moisture, spontaneous chemical change or retaining heat from manufacturing or processing, or which has an ignition temperature below 212°F (100°C) or which burns so vigorously and persistently when ignited as to create a serious hazard. A chemical shall be considered a flammable solid, as determined in accordance with the test method of CPSC 16 CFR Part 1500.44, if it ignites and burns with a self-sustained flame at a rate greater than 0.0866 inch (2.2 mm) per second along its major axis.	A flammable solid is a solid which is readily combustible, or may cause or contribute to fire through friction. A flammable solid is classified in one of the two categories for this class using method N.1 as described in Part III, subsection 33.2.1 of the Manual of Tests and Criteria, according to: H228, Category 1; Flammable solid: Burning rate test: Substances or mixtures other than metal powders: 1. Wetted zone does not stop fire; and 2. Burning time < 45 s or burning rate > 2.2 mm/s. Metal powders: burning time ≤ 5 min H228, Category 2; Flammable solid: Burning rate test: Substances or mixtures other than metal powders: 1. Wetted zone stops the fire for at least 4 min; and 2. Burning time < 45 s or burning rate > 2.2 mm/s. Metal powders: burning time > 5 min and ≤ 10 min	
Highly toxic	—	A material that produces a lethal dose or lethal concentration that falls within any of the following categories: 1. A chemical that has a median lethal dose (LD50) of 50 mg or less per kg of body weight when administered orally to albino rats weighing between 200 and 300 g each. 2. A chemical that has a medial lethal dose (LD50) of 200 mg or less per kg of body weight when administered by continuous contact for 24 hr (or less if death occurs within 24 hr) with the bare skin of albino rabbits weighing between 2 and 3 kg each. 3. A chemical that has a median lethal concentration (LC50) in air of 200 ppm by volume or less of gas or vapor, or 2 mg/l or less of mist, fume or dust, when administered by continuous inhalation for 1 hr (or less if death occurs within 1 hr) to albino rats weighing between 200 and 300 g.	Acute toxicity refers to serious adverse health effects (i.e., lethality) occurring after a single or short-term oral, dermal or inhalation exposure to a substance or mixture. Oral H300, Category 1; Fatal if swallowed: LD50 ≤ 5 mg/kg bodyweight H300, Category 2; Fatal if swallowed: LD50 > 5 ≤ 50 mg/kg bodyweight Dermal H310, Category 1; Fatal in contact with skin: LD50 ≤ 50 mg/kg bodyweight H310, Category 2; Fatal in contact with skin: LD50 > 50 ≤ 200 mg/kg bodyweight Inhalation H330, Category 1; Fatal if inhaled. Gases: LC50 ≤ 100 ppm (4 hr) ≈ 200 ppm (1 hr) Vapors: LC50 ≤ 0.5 mg/l (4 hr) ≈ 2 mg/l (1 hr) Dust/mist: LC50 ≤ 0.05 mg/l (4 hr) ≈ 0.2 mg/l (1 hr) H330, Category 2; Fatal if inhaled: Dust/mist: LC50 > 0.05 mg/l (4 hr) ≈ 0.2 mg/l (1 hr) ≤ 0.5 mg/l (4 hr) ≈ 2 mg/l (1 hr)	
Inert gas	—	A gas that is capable of reacting with other materials only under abnormal conditions such as high temperatures, pressures and similar extrinsic physical forces. Within the context of the code, inert gases do not exhibit either physical or health hazard properties as defined (other than acting as a simple asphyxiant) or hazard properties other than those of a compressed gas. Some of the more common inert gases include argon, helium, krypton, neon, nitrogen and xenon.	Gases under pressure are gases which are contained in receptacles at a pressure of 200 kPa (gauge) or more at 20°C or which are liquefied or liquefied and refrigerated. They comprise compressed gases, liquefied gases, dissolved gases and refrigerated liquefied gases. See the description of "Compressed gas."	
Organic peroxide	—	An organic compound that contains the bivalent -O-O- structure and which may be considered to be a structural derivative of hydrogen peroxide where one or both of the hydrogen atoms have been replaced by an organic radical. Organic peroxides can present an explosion hazard (detonation or deflagration) or they can be shock sensitive. They can also decompose into various unstable compounds over an extended period of time.	Organic peroxides are liquid or solid organic substances which contain the bivalent -O-O- structure and may be considered derivatives of hydrogen peroxide, where one or both of the hydrogen atoms have been replaced by organic radicals. The term also includes organic peroxide formulations (mixtures). Organic peroxides are thermally unstable substances or mixtures, which may undergo exothermic self-accelerating decomposition. In addition, they may have one or more of the following properties: 1. Be liable to explosive decomposition. 2. Burn rapidly. 3. Be sensitive to impact or friction. 4. React dangerously with other substances.	

Organic peroxide	UD	Organic peroxides that are capable of detonation. These peroxides pose an extremely high-explosion hazard through rapid explosive decomposition.	H240, Organic peroxide, Type A; Heating may cause an explosion. Any organic peroxide which, as packaged, can detonate or deflagrate rapidly will be defined as organic peroxide Type A.	
Organic peroxide	I	Describes those formulations that are capable of deflagration but not detonation.	H241, Organic peroxide, Type B; Heating may cause a fire or explosion. Any organic peroxide possessing explosive properties and which, as packaged, neither detonates nor deflagrates rapidly but is liable to undergo a thermal explosion in that package will be defined as organic peroxide Type B.	
Organic peroxide	II	Describes those formulations that burn very rapidly and that pose a moderate reactivity hazard.	H242, Organic peroxide, Type C; Heating may cause a fire. Any organic peroxide possessing explosive properties when the substance or mixture as packaged cannot detonate or deflagrate rapidly or undergo a thermal explosion will be defined as organic peroxide Type C. H242, Organic peroxide, Type D; Heating may cause a fire. Any organic peroxide which in laboratory testing: Detonates partially, does not deflagrate rapidly and shows no violent effect when heated under confinement; or Does not detonate at all, deflagrates slowly and shows no violent effect when heated under confinement; or Does not detonate or deflagrate at all and shows a medium effect when heated under confinement; will be defined as organic peroxide Type D.	
Organic peroxide	III	Describes those formulations that burn rapidly and that pose a moderate reactivity hazard.	H242, Organic peroxide, Type E; Heating may cause a fire. Any organic peroxide which, in laboratory testing, neither detonates nor deflagrates at all and shows low or no effect when heated under confinement will be defined as organic peroxide Type E.	
Organic peroxide	IV	Describes those formulations that burn in the same manner as ordinary combustibles and that pose a minimal reactivity hazard.	H242, Organic peroxide, Type F; Heating may cause a fire. Any organic peroxide which, in laboratory testing, neither detonates in the cavitated state nor deflagrates at all and shows only a low or no effect when heated under confinement as well as low or no explosive power will be defined as organic peroxide Type F.	
Organic peroxide	V	Describes those formulations that burn with less intensity than ordinary combustibles or do not sustain combustion and that pose no reactivity hazard.	Organic peroxide, Type G. Any organic peroxide which, in laboratory testing, neither detonates in the cavitated state nor deflagrates at all and shows no effect when heated under confinement nor any explosive power, provided that it is thermally stable (self-accelerating decomposition temperature is 60°C or higher for a 50 kg package), and for liquid mixtures, a diluent having a boiling point of not less than 150°C and used for desensitization will be defined as organic peroxide Type G. If the organic peroxide is not thermally stable or is a diluent having a boiling point less than 150°C and is used for desensitization, it shall be defined as organic peroxide Type F.	
Oxidizer	—	A material that readily yields oxygen or other oxidizing gas, or that readily reacts to promote or initiate combustion of combustible materials and, if heated or contaminated, can result in vigorous self-sustained decomposition.	An oxidizing solid is a solid which, while in itself is not necessarily combustible, may, generally by yielding oxygen, cause, or contribute to, the combustion of other material. An oxidizing liquid is a liquid which, while in itself not necessarily combustible, may, generally by yielding oxygen, cause, or contribute to, the combustion of other material.	
Oxidizer	4	An oxidizer that can undergo an explosive reaction due to contamination or exposure to a thermal or physical shock that causes a severe increase in the burning rate of combustible materials with which it comes into contact. Additionally, the oxidizer causes a severe increase in the burning rate and can cause spontaneous ignition of combustibles.	H271, Category 1; May cause fire or explosion; strong oxidizer. Criteria for solids (based on Test O.1 or O.3 in Part III of UN ST/SG/AC.10/11, *Manual of Tests and Criteria*): Test O.1—Any substance or mixture which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning time less than the mean burning time of a 3:2 mixture (by mass) of potassium bromate and cellulose. Test O.3—Any substance or mixture which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning rate greater than the mean burning rate of a 3:1 mixture (by mass) of calcium peroxide and cellulose. Criteria for liquids (based on Test O.2 in Part III of UN ST/SG/AC.10/11, *Manual of Tests and Criteria*): Any substance or mixture which, in the 1:1 mixture (by mass) of substance (or mixture) and cellulose tested, spontaneously ignites; or the mean pressure rise time of a 1:1 mixture (by mass) of substance and cellulose is less than that of a 1:1 mixture (by mass) of 50% perchloric acid and cellulose.	

Oxidizer	3	An oxidizer that causes a severe increase in the burning rate of combustible materials with which it comes in contact.	H271, Category 1; May cause fire or explosion; strong oxidizer. Criteria for solids (based on Test O.1 or O.3 in Part III of UN ST/SG/AC.10/11, *Manual of Tests and Criteria*): Test O.1—Any substance or mixture which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning time less than the mean burning time of a 3:2 mixture (by mass) of potassium bromate and cellulose. Test O.3—Any substance or mixture which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning rate greater than the mean burning rate of a 3:1 mixture (by mass) of calcium peroxide and cellulose. Criteria for liquids (based on Test O.2 in Part III of UN ST/SG/AC.10/11, *Manual of Tests and Criteria*): Any substance or mixture which, in the 1:1 mixture (by mass) of substance (or mixture) and cellulose tested, spontaneously ignites; or the mean pressure rise time of a 1:1 mixture (by mass) of substance and cellulose is less than that of a 1:1 mixture (by mass) of 50% perchloric acid and cellulose.	
Oxidizer	2	An oxidizer that will cause a moderate increase in the burning rate of combustible materials with which it comes in contact.	H272, Category 2; May intensify fire; oxidizer. Criteria for solids (based on Test O.1 or O.3 in Part III of UN ST/SG/AC.10/11, *Manual of Tests and Criteria*): Test O.1—Any substance or mixture which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning time equal to or less than the mean burning time of a 2:3 mixture (by mass) of potassium bromate and cellulose and the criteria for Category 1 are not met. Test O.3—Any substance or mixture which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning rate equal to or greater than the mean burning rate of a 1:1 mixture (by mass) of calcium peroxide and cellulose and the criteria for Category 1 are not met. Criteria for liquids (based on Test O.2 in Part III of UN ST/SG/AC.10/11, *Manual of Tests and Criteria*): Any substance or mixture which, in the 1:1 mixture (by mass) of substance (or mixture) and cellulose tested, exhibits a mean pressure rise time less than or equal to the mean pressure rise time of a 1:1 mixture (by mass) of a 40% aqueous sodium chlorate solution and cellulose and the criteria for Category 1 are not met.	
Oxidizer	1	An oxidizer that does not moderately increase the burning rate of combustible materials.	H272, Category 3; May intensify fire; oxidizer: Criteria for solids (based on Test O.1 or O.3 in Part III of UN ST/SG/AC.10/11, *Manual of Tests and Criteria*): Test O.1—Any substance or mixture which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning time equal to or less than the mean burning time of a 3:7 mixture (by mass) of potassium bromate and cellulose and the criteria for Categories 1 and 2 are not met. Test O.3—Any substance or mixture which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning rate equal to or greater than the mean burning rate of a 1:2 mixture (by mass) of calcium peroxide and cellulose and the criteria for Categories 1 and 2 are not met. Criteria for liquids (based on Test O.2 in Part III of UN ST/SG/AC.10/11, *Manual of Tests and Criteria*): Any substance or mixture which, in the 1:1 mixture (by mass) of substance (or mixture) and cellulose tested, exhibits a mean pressure rise time less than or equal to the mean pressure rise time of a 1:1 mixture (by mass) of a 65% aqueous nitric acid solution and cellulose and the criteria for Categories 1 and 2 are not met.	
Oxidizing gas	Gaseous or Liquefied	A gas that can support and accelerate combustion of other materials more than air does.	Any gas which may, generally by providing oxygen, cause or contribute to the combustion of other material more than air does. H270, Category 1; May cause or intensify fire; oxidizer: Any gas which may, generally by providing oxygen, cause or contribute to the combustion of other material more than air does. and H280 or H281~~, compressed gas would also apply.~~	
~~Oxidizing gas~~	~~Liquified~~	~~An oxidizing gas that is liquefied [liquefied gases are gases that, in a packaging under the charged pressure, are partially liquid at 68°F (20°C)].~~	~~Any gas which may, generally by providing oxygen, cause or contribute to the combustion of other material more than air does.~~ ~~H270, Category 1; May cause or intensify fire; oxidizer. Any gas which may, generally by providing oxygen, cause or contribute to the combustion of other material more than air does.~~ ~~H280, liquefied gas, would also apply.~~	

Pyrophoric	—	A chemical with an autoignition temperature in air, at or below a temperature of 130°F (54°C).	Separate definitions based on physical state; see each category of pyrophoric:	
Pyrophoric	Solid	A solid with an autoignition temperature in air, at or below a temperature of 130°F (54°C).	H250, Category 1; Pyrophoric solid; Catches fire spontaneously if exposed to air. A pyrophoric solid is a solid which, even in small quantities, is liable to ignite within 5 minutes after coming into contact with air. Classification criteria: The solid ignites within 5 minutes of coming into contact with air.	
Pyrophoric	Liquid	A liquid with an autoignition temperature in air, at or below a temperature of 130°F (54°C).	H250, Category 1; Pyrophoric liquid; Catches fire spontaneously if exposed to air: A pyrophoric liquid is a liquid which, even in small quantities, is liable to ignite within 5 minutes after coming into contact with air. Classification criteria: The liquid ignites within 5 minutes when added to an inert carrier and exposed to air, or it ignites or chars a filter paper on contact with air within 5 minutes. Testing is performed at 25 ±2°C and 50 ±5% relative humidity.	
Pyrophoric	Gas	A gas with an autoignition temperature in air, at or below a temperature of 130°F (54°C).	H220, Category 1A; Extremely flammable gas. May ignite spontaneously if exposed to air: A pyrophoric gas is a flammable gas that is liable to ignite spontaneously in air at a temperature of 54°C or below. and H280 or H281~~, compressed (or liquefied) gas, would also apply.~~	
Toxic	—	A chemical falling within any of the following categories: 1. A chemical that has a median lethal dose (LD50) of more than 50 mg per kg, but not more than 500 mg per kg of body weight when administered orally to albino rats weighing between 200 and 300 g each. 2. A chemical that has a medial lethal dose (LD50) of more than 200 mg per kg but not more than 1,000 mg per kg of body weight when administered by continuous contact for 24 hr (or less if death occurs within 24 hr) with the bare skin of albino rabbits weighing between 2 and 3 kg each. 3. A chemical that has a median lethal concentration (LC50) in air of more than 200 ppm but not more than 2,000 ppm by volume or less of gas or vapor, or more than 2 mg/l but not more than 20 mg/l of mist, fume or dust, when administered by continuous inhalation for 1 hr (or less if death occurs within 1 hr) to albino rats weighing between 200 and 300 g	Acute toxicity refers to serious adverse health effects (i.e., lethality) occurring after a single or short-term oral, dermal or inhalation exposure to a substance or mixture. Oral H301, Category 3; Toxic if swallowed: LD50 > 50 ≤ 300 mg/kg bodyweight H302, Category 4; Harmful if swallowed: LD50 > 300 ≤ 2,000 mg/kg bodyweight Dermal H311, Category 3, Toxic in contact with skin: LD50 > 200 ≤ 1,000 mg/kg bodyweight Inhalation H330, Category 2; Fatal if inhaled: Gases: LC50 > 100 ppm (4 hr) ≈ 200 ppm (1 hr) ≤ 500 ppm (4 hr) ≈ 1,000 ppm (1 hr) Vapours: LC50 > 0.5 mg/l (4 hr) ≈ 2 mg/l (1 hr) ≤ 2 mg/l (4 hr) ≈ 8 mg/l (1 hr) Dust/mist: LC50 > 0.05 mg/l (4 hr) ≈ 0.2 mg/l (1 hr) ≤ 0.5 mg/l (4 hr) ≈ 2 mg/l (1 hr) H331, Category 3; Toxic if inhaled: Gases: LC50 > 500 ppm (4 hr) ≈ 1,000 ppm (1 hr) ≤ 2,500 ppm (4 hr) ≈ 5,000 ppm (1 hr) Vapours: LC50 > 2 mg/l (4 hr) ≈ 8 mg/l (1 hr) ≤ 10 mg/l (4 hr) ≈ 40 mg/l (1 hr) Dust/mist: LC50 > 0.5 mg/l (4 hr) ≈ 2 mg/l (1 hr) ≤ 1 mg/l (4 hr) ≈ 4 mg/l (1 hr) H332, Category 4; Harmful if inhaled: Dust/mist: LC50 > 1 mg/l (4 hr) ≈ 4 mg/l (1 hr) ≤ 5 mg/l (4 hr) ≈ 20 mg/l (1 hr)	
Unstable (reactive)	—	A material, other than an explosive, which in the pure state or as commercially produced, will vigorously polymerize, decompose, condense or become self-reactive and undergo other violent chemical changes, including explosion, when exposed to heat, friction or shock, or in the absence of an inhibitor, or in the presence of contaminants, or in contact with incompatible materials. Unstable (reactive) materials are subdivided as follows:	Self-reactive substances or mixtures are thermally unstable liquids or solid substances or mixtures liable to undergo a strongly exothermic decomposition even without participation of oxygen (air). This definition excludes substances and mixtures classified under the GHS as explosives, organic peroxides or as oxidizing. A self-reactive substance or mixture is regarded as possessing explosive properties when in laboratory testing the formulation is liable to detonate, to deflagrate rapidly or to show a violent effect when heated under confinement.	
Unstable (reactive)	4	Materials that in themselves are readily capable of detonation or of explosive decomposition or explosive reaction at normal temperatures and pressures. This class includes materials that are sensitive to mechanical or localized thermal shock at normal temperatures and pressures.	H240, Type A; Heating may cause an explosion. Any self-reactive substance or mixture which can detonate or deflagrate rapidly, as packaged, will be defined as self-reactive substance Type A.	
Unstable (reactive)	3	Materials that in themselves are capable of detonation or of explosive decomposition or explosive reaction but which require a strong initiating source or which must be heated under confinement before initiation. This class includes materials that are sensitive to thermal or mechanical shock at the elevated temperatures and pressures.	H241, Type B; Heating may cause a fire or explosion. Any self-reactive substance or mixture possessing explosive properties and which, as packaged, neither detonates nor deflagrates rapidly, but is liable to undergo a thermal explosion in that package will be defined as self-reactive substance Type B.	

Unstable (reactive)	2	Materials that in themselves are normally unstable and readily undergo violent chemical change but do not detonate. This class includes materials that can undergo chemical change with rapid release of energy at normal temperatures and pressures, and that can undergo violent chemical change at elevated temperatures and pressures.	H242, Type C; Heating may cause a fire. Any self-reactive substance or mixture possessing explosive properties when the substance or mixture as packaged cannot detonate or deflagrate rapidly or undergo a thermal explosion will be defined as self-reactive substance Type C. H242, Type D; Heating may cause a fire. Any self-reactive substance or mixture which in laboratory testing: Detonates partially, does not deflagrate rapidly and shows no violent effect when heated under confinement; or Does not detonate at all, deflagrates slowly and shows no violent effect when heated under confinement; or Does not detonate or deflagrate at all and shows a medium effect when heated under confinement; will be defined as self-reactive substance Type D; Will be defined as self-reactive substance Type D.	
Unstable (reactive)	1	Materials that in themselves are normally stable but which can become unstable at elevated temperatures and pressures.	H242, Type E; Heating may cause a fire. Any self-reactive substance or mixture which, in laboratory testing, neither detonates nor deflagrates at all and shows low or no effect when heated under confinement will be defined as self-reactive substance Type E. H242, Type F; Heating may cause a fire. Any self-reactive substance or mixture which, in laboratory testing, neither detonates in the cavitated state nor deflagrates at all and shows only a low or no effect when heated under confinement as well as low or no explosive power will be defined as self-reactive substance Type F. Any self-reactive substance or mixture which, in laboratory testing, neither detonates in the cavitated state nor deflagrates at all and shows no effect when heated under confinement nor any explosive power, provided that it is thermally stable (self-accelerating decomposition temperature is 60°C to 75°C for a 50 kg package), and for liquid mixtures, a diluent having a boiling point greater than or equal to 150°C and used for desensitization will be defined as self-reactive substance Type G. If the mixture is not thermally stable or is a diluent having a boiling point less than 150°C and is used for desensitization, the mixture shall be defined as self-reactive substance Type F.	
Unstable (reactive) gas	Gaseous or Liquefied		A chemically unstable gas is a flammable gas that is able to react explosively even in the absence of air or oxygen. H220, Category 1A, Category A; Extremely flammable gas; May react explosively even in the absence of air. Flammable gases which are chemically unstable at 20°C and a standard pressure of 101.3 kPa. H220, Category 1A, Category B; Extremely flammable gas; May react explosively even in the absence of air at elevated pressure and/or temperature. Flammable gases which are chemically unstable at a temperature greater than 20°C and/or a standard pressure greater than 101.3 kPa. and H280 or H281~~, compressed gas, would also apply.~~	
Water reactive	3	Materials that react explosively with water without requiring heat or confinement.	H260, Category 1; Contact with water releases flammable gases which may ignite spontaneously. Any substance or mixture which reacts vigorously with water at ambient temperatures and demonstrates generally a tendency for the gas produced to ignite spontaneously, or which reacts readily with water at ambient temperatures such that the rate of evolution of flammable gas is equal to or greater than 10 liters per kilogram of substance over any 1 minute. (UN/DOT test methods: Test N.5, Part III, subsection 33.4.1.4)	
Water reactive	2	Materials that react violently with water or have the ability to boil water. Materials that produce flammable, toxic or other hazardous gases, or evolve enough heat to cause autoignition of combustibles upon exposure to water or moisture.	H261, Category 2; Contact with water releases flammable gas. Any substance or mixture which reacts readily with water at ambient temperatures such that the maximum rate of evolution of flammable gas is equal to or greater than 20 liters per kilogram of substance per hour, and which does not meet the criteria for Category 1.	
Water reactive	1	Materials that react with water with some release of energy, but not violently.	H261, Category 3; Contact with water releases flammable gas. Any substance or mixture which reacts slowly with water at ambient temperatures such that the maximum rate of evolution of flammable gas is equal to or greater than 1 liter per kilogram of substance per hour, and which does not meet the criteria for Categories 1 and 2.	

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a. The table illustrates that there is not perfect alignment between the IFC and GHS definitions and provides information on similarities and difference between the two classification systems.

Reason:

Fire Code officials must enforce the hazardous materials provisions of the International Fire Code (IFC) and the International Building Code (IBC) to ensure that people and property in our communities are safe. While code officials need to verify and validate the hazards of materials, classifying hazardous materials in accordance with definitions and hazard classes in the I-codes is the responsibility of facility owners which continues to be a challenge. Consequences of missing or incorrect classification include increased fire and life safety risk and can lead to misclassification of an occupancy.

Due to the expansion of international chemical trade, the United Nations (UN) developed a Globally Harmonized System (GHS) of classification of hazardous materials. The GHS is an internationally agreed upon standard of classification and labeling that in most cases utilizes prescriptive, standardized testing procedures and criteria to classify hazardous materials. Federal law (29 CFR 1910.1200 (OSHA) and 49 CFR 173.127 (DOT)) mandates that manufacturers selling, producing or transporting chemicals in the United States classify chemicals according to the GHS system and make the information readily available in product Safety Data Sheets (SDSs).

This proposal aims to incorporate the readily available GHS (Revision 7) classifications into the I-code definitions to better align with federal standards for hazardous materials classification. Proper identification of multiple hazards and the degree of hazard are likely outcomes of utilizing the GHS.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the FCAC Website

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is meant to provide correlation with the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) which is used globally and by OSHA. This comparison will make compliance more straightforward. In some cases, utilizing GHS definitions may more heavily regulate additional materials for new buildings; conversely, in other cases GHS definitions will result in reduced classification of materials. However, any differences are balanced out by the coordination and ease of enforcement that comes with being aligned with GHS and OSHA. US manufacturers and distributors of hazardous materials have been required to use the GHS classification system to communicate the hazards of materials in Safety Data Sheets (SDS) since 2012.

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IFC: TABLE E104.2, E104.2, E104.1

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Lynne Kilpatrick, HMEx Assistant LLC, self (lkilpatrick425@gmail.com)

2024 International Fire Code

Revise as follows:

TABLE E104.2 IFC AND GHS HAZARD DEFINITIONS COMPARISON[a]

IFC MATERIAL	IFC CLASS	IFC DEFINITION	GHS ~~2017 (REV 7)~~ CLASSIFICATION (H-CODE AND CATEGORY); HAZARD STATEMENT; DEFINITION
Aerosol	—	A combination of a container, a propellant and a material that is dispensed. Aerosol products shall be classified by means of the calculation of their chemical heats of combustion and shall be designated Level ~~1, Level 2 or Level~~ 3, Level 2, or Level 1.	Any nonrefillable receptacles made of metal, glass or plastics and containing a gas compressed, liquefied or dissolved under pressure, with or without a liquid, paste or powder, and fitted with a release device allowing the contents to be ejected as solid or liquid particles in suspension in a gas, as a foam, paste or powder or in a liquid state or in a gaseous state.
~~Aerosol~~	~~Level 1~~	~~Those with a total chemical heat of combustion that is less than or equal to 8,600 Btu/lb (20 kJ/g).~~	~~H223, Category 3; Pressurized container: May burst if heated.~~ ~~1.~~ ~~Any aerosol that contains ≤ 1% flammable components (by mass) and that has a heat of combustion < 20 kJ/g.~~ ~~2.~~ ~~Any aerosol that contains > 1% (by mass) flammable components or which has a heat of combustion of ≥ 20 kJ/g but which, based on the results of the ignition distance test, the enclosed space ignition test or the aerosol foam flammability test, does not meet the criteria for Category 1 or Category 2.~~
~~Aerosol~~	~~Level 2~~	~~Those with a total chemical heat of combustion that is less than or equal to 8,600 Btu/lb (20 kJ/g).~~	~~H223, Category 2; Flammable aerosol. Pressurized container: May burst if heated.~~ ~~1.~~ ~~Any aerosol that dispenses a spray that, based on the results of the ignition distance test, does not meet the criteria for Category 1, and which has:~~ ~~a.~~ ~~A heat of combustion of ≥ 20 kJ/g.~~ ~~b.~~ ~~A heat of combustion of < 20 kJ/g along with an ignition distance of ≥ 15 cm; or~~ ~~c.~~ ~~A heat of combustion of < 20 kJ/g and an ignition distance of < 15 cm along with either, in the enclosed space ignition test a time:~~ ~~i.~~ ~~A time equivalent of ≤ 300 s/m^3; or~~ ~~ii.~~ ~~A deflagration density of ≤ 300 g/m^3; or~~ ~~2.~~ ~~Any aerosol that dispenses a foam that, based on the results of the aerosol foam flammability test, does not meet the criteria for Category 1, and which has a flame height of ≥ 4 cm and a flame duration of ≥ 2 s.~~

Aerosol	Level 3	An aerosol product that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as an Aerosol (Category 1). Where the GHS category is not known, the following is acceptable for classification purposes: Those with a total chemical heat of combustion that is greater than 13,000 Btu/lb (30 kJ/g).	H222, Category 1; Extremely flammable aerosol. Pressurized container: May burst if heated: 1. Any aerosol that contains ≥ 85% flammable components (by mass) and has a heat of combustion of ≥ 30 kJ/g. 2. Any aerosol that dispenses a spray that, in the ignition distance test, has an ignition distance of ≥ 75 cm. 3. Any aerosol that dispenses a foam that, in the foam flammability test, has: a. A flame height of ≥ 20 cm and a flame duration of ≥ 2 s. b. A flame height of ≥ 4 cm and a flame duration of ≥ 7 s.	

Aerosol	Level 2	An aerosol product that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as an Aerosol (Category 2). Where the GHS category is not known, the following is acceptable for classification purposes: Those with a total chemical heat of combustion that is less than or equal to 8,600 Btu/lb (20 kJ/g).	H223, Category 2; Flammable aerosol: 1. Any aerosol that dispenses a spray that, based on the results of the ignition distance test, does not meet the criteria for Category 1, and which has: a. A heat of combustion of ≥ 20 kJ/g. b. A heat of combustion of < 20 kJ/g along with an ignition distance of ≥ 15 cm; or c. A heat of combustion of < 20 kJ/g and an ignition distance of < 15 cm along with either, in the enclosed space ignition test a time: i. A time equivalent of ≤ 300 s/m^3; or ii. A deflagration density of ≤ 300 g/m^3; or 2. Any aerosol that dispenses a foam that, based on the results of the aerosol foam flammability test, does not meet the criteria for Category 1, and which has a flame height of ≥ 4 cm and a flame duration of ≥ 2 s. and H229; Pressurized container: May burst if heated	

Aerosol	Level 1	An aerosol product that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as an Aerosol (Category 3). Where the GHS category is not known, the following is acceptable for classification purposes: Those with a total chemical heat of combustion that is less than or equal to 8,600 Btu/lb (20 kJ/g).	H223, Category 3: 1. Any aerosol that contains ≤ 1% flammable components (by mass) and that has a heat of combustion < 20 kJ/g. 2. Any aerosol that contains > 1% (by mass) flammable components or which has a heat of combustion of ≥ 20 kJ/g but which, based on the results of the ignition distance test, the enclosed space ignition test or the aerosol foam flammability test, does not meet the criteria for Category 1 or Category 2. and H229; Pressurized container: May burst if heated	
Combustible liquid	—	A liquid having a closed cup flash point at or above 100°F (38°C). Combustible liquids shall be subdivided as follows:	A flammable liquid means a liquid having a flash point of not more than 93°C.	
Combustible liquid	II	A liquid that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as a Flammable Liquid (Category 3) and having a flashpoint at or above 100°F (38°C). Where the GHS category is not known, the following is acceptable for classification purposes: Liquids having a closed cup flash point at or above 100°F (38°C) and below 140°F (60°C).	H226, Category 3; Flammable liquid and vapor: Flash point ≥ 23°C and ≤ 60°C	
Combustible liquid	IIIA	A liquid that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as a Flammable Liquid (Category 4). Where the GHS category is not known, the following is acceptable for classification purposes: Liquids having a closed cup flash point at or above 140°F (60°C) and below 200°F (93°C).	H227, Category 4; Combustible liquid: Flash point > 60°C and ≤ 93°C	
Combustible liquid	IIIB	Liquids having closed cup flash points at or above 200°F (93°C).	N/A	

Compressed gas	—	A material or mixture of materials that: 1. Is a gas at 68°F (20°C) or less at 14.7 psia (101 kPa) of pressure, and 2. Has a boiling point of 68°F (20°C) or less at 14.7 psia (101 kPa) which is either liquefied, nonliquefied (gaseous) or in solution (dissolved), except those gases that have no other health- or physical-hazard properties are not considered to be compressed until the pressure in the packaging exceeds 41 psia (282 kPa) at 68°F (20°C). COMPRESSED GAS, DISSOLVED. Dissolved compressed gases, or gases in solution, are non-liquefied gases that are dissolved in a solvent. Under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS), these gases are categorized as Gases Under Pressure – Dissolved Gas. COMPRESSED GAS, GASEOUS. Gaseous compressed gases are non-liquefied gases, other than those in solution (dissolved), which are in a packaging under the charged pressure and are entirely gaseous at a temperature of 68°F (20°C). Under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS), these gases are categorized as Gases Under Pressure – Compressed Gas. COMPRESSED GAS, LIQUEFIED. Liquefied compressed gases are gases that, in a packaging under the charged pressure, are partially liquid at a temperature of 68°F (20°C). Under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS), these gases are categorized as Gases Under Pressure – Liquefied Gas. ~~States of compressed gases:~~ ~~1. Nonliquefied compressed gases are gases, other than those in solution, that are in a packaging under the charged pressure and are entirely gaseous at a temperature of 68°F (20°C).~~ ~~2. Liquefied compressed gases are gases that, in a packaging under the charged pressure, are partially liquid at a temperature of 68°F (20°C).~~ ~~3. Compressed gases in solution are nonliquefied gases that are dissolved in a solvent.~~ ~~4. Compressed gas mixtures consist of a mixture of two or more compressed gases contained in a packaging, the hazard properties of which are represented by the properties of the mixture as a whole.~~	Gases under pressure are gases which are contained in a receptacle at a pressure of 200 kPa (gauge) or more at 20°C, or which are liquefied, or liquefied and refrigerated. H280, Compressed gas; Contains gas under pressure: May explode if heated. A gas which when under pressure is entirely gaseous at -50°C (-58°F), including all gases with a critical temperature ≤ -50°C (-58°F). H280, Liquefied gas; Contains gas under pressure: May explode if heated. A gas which when under pressure is partially liquid at temperatures above -50°C (-58°F). H280, Dissolved gas; Contains gas under pressure: May explode if heated. A gas which when under pressure is dissolved in a liquid phase solvent.	
Corrosive	—	A substance or mixture that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as either Skin Corrosion (Category 1A, 1B, or 1C), or Serious Eye Damage (Category 1). Where the GHS category is not known, the following is acceptable for classification purposes: A chemical that causes visible destruction of, or irreversible alterations in, living tissue by chemical action at the point of contact. A chemical shall be considered corrosive if, when tested on the intact skin of albino rabbits by the method described in DOTn 49 CFR 173.137, such chemical destroys or changes irreversibly the structure of the tissue at the point of contact following an exposure period of 4 hours. This term does not refer to action on inanimate surfaces.	H314, Category 1 (1A, 1B, 1C); Causes severe skin burns and eye damage. Skin corrosion refers to the production of irreversible damage to the skin; namely, visible necrosis through the epidermis and into the dermis occurring after exposure to a substance or mixture.	
Cryogenic fluid	—	A fluid having a boiling point lower than -130°F (-89.9°C) at 14.7 pounds per square inch atmosphere (psia) (an absolute pressure of 101.3 kPa). Under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS), Cryogenic Fluids are categorized as a Gas Under Pressure – Refrigerated Liquefied Gas. However, not all GHS Refrigerated Liquefied Gases are Cryogenic Fluids.	H281, Refrigerated liquefied gas; Contains refrigerated gas: May cause cryogenic burns or injury. A gas which is made partially liquid because of its low temperature.	
Cryogenic fluid~~,~~ flammable	—	A cryogenic fluid that is a *flammable gas* in its vapor state. These fluids are categorized under the Globally Harmonized System of Classification and Labeling of Chemicals (GHS) as Flammable Gas, Category 1A or Category 1B and Gases Under Pressure - Refrigerated Liquefied Gas. ~~A cryogenic fluid that is flammable in its vapor state.~~	H220, Category 1A; Extremely flammable gas. Gases, which at 20°C and a standard pressure of 101.3 kPa: 1. Are ignitable when in a mixture of 13% or less by volume in air; or 2. Have a flammable range with air of at least 12 percentage points, regardless of the lower flammability limit unless data show they meet the criteria for Category 1B. Category 1A includes pyrophoric gases and chemically unstable gases~~.~~ H281, refrigerated liquefied gas, would also apply	

Cryogenic fluid, ~~—~~Inert	—	A cryogenic fluid that is an *inert* gas in its vapor state. These fluids are categorized under the Globally Harmonized System of Classification and Labeling of Chemicals (GHS) as Gases Under Pressure - Refrigerated Liquefied Gas.	H281, Refrigerated liquefied gas. Contains refrigerated gas: May cause cryogenic burns or injury. A gas which is made partially liquid because of its low temperature.	
Cryogenic fluid, ~~—~~ Oxidizing	—	~~An oxidizing gas in the cryogenic state.~~A cryogenic fluid that is an *oxidizing gas* in its vapor state. These fluids are categorized under the Globally Harmonized System of Classification and Labeling of Chemicals (GHS) as Oxidizing Gas, Category 1 and Gases Under Pressure - Refrigerated Liquefied Gas.	H270, Category 1: May cause or intensify fire; oxidizer. Any gas which may, generally by providing oxygen, cause or contribute to the combustion of other material more than air does. H281, refrigerated liquefied gas, would also apply.	
Explosives	—	A chemical compound, mixture or device, the primary or common purpose of which is to function by explosion. The term includes, but is not limited to, dynamite, black powder, pellet powder, initiating explosives, detonators, safety fuses, squibs, detonating cord, igniter cord and igniters. The term "Explosive" includes any material determined to be within the scope of USC Title 18: Ch. 40 and also includes any material classified as an explosive other than consumer fireworks, Division 1.4G Explosives, by the hazardous materials regulations of DOTn 49 CFR Parts 100–185.	An explosive substance (or mixture) is a solid or liquid substance (or mixture of substances) which is in itself capable by chemical reaction of producing gas at such a temperature and pressure and at such a speed as to cause damage to the surroundings. Pyrotechnic substances are included even when they do not evolve gases.	
Explosives	Unstable explosives		H200; Unstable explosive. Unstable explosives are those which are thermally unstable and/or too sensitive for normal handling, transport and use. Special precautions are necessary.	
Explosives	Division 1.1	A chemical or item that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Explosive (Division 1.1). Where the GHS category is not known, the following is acceptable for classification purposes: Explosives that have a mass explosion hazard. A mass explosion is one which affects almost the entire load instantaneously.	H201; Explosive; mass explosion hazard. Substances, mixtures and articles which have a mass explosion hazard (a mass explosion is one which affects almost the entire quantity present virtually instantaneously).	
Explosives	Division 1.2	A chemical or item that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Explosive (Division 1.2). Where the GHS category is not known, the following is acceptable for classification purposes: Explosives that have a projection hazard but not a mass explosion hazard.	H202; Explosive; severe projection hazard. Substances, mixtures and articles which have a projection hazard but not a mass explosion hazard.	
Explosives	Division 1.3	A chemical or item that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Explosive (Division 1.3). Where the GHS category is not known, the following is acceptable for classification purposes: Explosives that have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but not a mass explosion hazard.	H203; Explosive; fire, blast or projection hazard. Substances, mixtures and articles which have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but not a mass explosion hazard: 1. Combustion of which gives rise to considerable radiant heat; or 2. Which burn one after another, producing minor blast or projection effects or both.	
Explosives	Division 1.4	A chemical or item that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Explosive (Division 1.4). Where the GHS category is not known, the following is acceptable for classification purposes: Explosives that pose a minor explosion hazard. The explosive effects are largely confined to the package and no projection of fragments of appreciable size or range is to be expected. An external fire must not cause virtually instantaneous explosion of almost the entire contents of the package.	H204; Fire or projection hazard: Substances, mixtures and articles which present no significant hazard; substances, mixtures and articles which present only a small hazard in the event of ignition or initiation. The effects are largely confined to the package and no projection of fragments of appreciable size or range is to be expected. An external fire shall not cause virtually instantaneous explosion of almost the entire contents of the package.	
Explosives	Division 1.4G	Small fireworks devices containing restricted amounts of pyrotechnic composition designed primarily to produce visual or audible effects by combustion or deflagration that complies with the construction, chemical composition and labeling regulations of the DOTn for fireworks, UN No. 0336 and the US Consumer Product Safety Commission as set forth in CPSC 16 CFR Parts 1500 and 1507.	N/A	
Explosives	Division 1.5	A chemical or item that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Explosive (Division 1.5). Where the GHS category is not known, the following is acceptable for classification purposes: Very insensitive explosives. This division is comprised of substances that have a mass explosion hazard but which are so insensitive that there is very little probability of initiation or of transition from burning to detonation under normal conditions of transport.	H205; May mass explode in fire. Very insensitive substances or mixtures which have a mass explosion hazard: substances and mixtures which have a mass explosion hazard but are so insensitive that there is very little probability or initiation or of transition from burning to detonation under normal conditions.	
Explosives	Division 1.6	A chemical or item that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Explosive (Division 1.6). Where the GHS category is not known, the following is acceptable for classification purposes: Extremely insensitive articles that do not have a mass explosion hazard. This division is comprised of articles that contain only extremely insensitive detonating substances and that demonstrate a negligible probability of accidental initiation or propagation.	Extremely insensitive articles which do not have a mass explosion hazard: articles which predominantly contain extremely insensitive substances or mixtures and which demonstrate a negligible probability of accidental initiation or propagation.	

Flammable gas	Gaseous or Liquefied	A material that is a gas at 68°F (20°C) or less at 14.7 psia (101 kPa) of pressure [a material that has a boiling point of 68°F (20°C) or less at 14.7 psia (101 kPa)] subdivided as follows: ~~which:~~ 1. Category 1A. a gas that meets either of the following: 1.1 ~~A gas that is~~ Ignitable at 14.7 psia (101 kPa) when in a mixture of 13% or less by volume with air; or ~~2.~~ 1.2 ~~Has a~~A flammable range at 14.7 psia (101 kPa) with air of not less than 12%, regardless of the lower limit, unless data shows compliance with Category 1B. 2. Category 1B. A gas that meets the flammability criteria for Category 1A, is not pyrophoric or chemically unstable, and meets one of more of the following: 2.1. A lower flammability limit of more than 6 percent by volume of air. 2.2. A fundamental burning velocity of less than 3.9 inches/second (99 mm/s). The limits specified shall be determined at 14.7 psia (101 kPa) of pressure and a temperature of 68°F (20°C) in accordance with ASTM E681.Where not otherwise specified, the term "flammable gas" includes both Categories 1A and 1B. Under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS), Flammable Gases are categorized as a Flammable Gas (Category 1A or 1B).	A flammable gas is a gas having a flammable range with air at 20°C and a standard pressure of 101.3 kPa. H220, Category 1A; Extremely flammable gas. Gases, which at 20°C and a standard pressure of 101.3 kPa: 1. Are ignitable when in a mixture of 13% or less by volume in air; or 2. Have a flammable range with air of at least 12 percentage points regardless of the lower flammability limit unless data show they meet the criteria for Category 1B. Category 1A includes pyrophoric gases and chemically unstable gases. H220, Category 1B; Flammable gas. Gases which meet the flammability criteria for Category 1A, but which are not pyrophoric nor chemically unstable, and which have at least either: 1. A lower flammability limit of more than 6% by volume in air; or 2. A fundamental burning velocity of less than 10 cm/s. ~~H280, compressed gas, would also apply.~~	
Flammable liquid	—	A liquid having a closed cup flash point below 100°F (38°C). Flammable liquids are further categorized into a group known as Class I liquids. The Class I category is subdivided as follows:	A liquid having a flash point of not more than 93°C. A flammable liquid is classified in one of the four categories for this class.	
Flammable liquid	IA	A liquid that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as a Flammable Liquid (Category 1). Where the GHS category is not known, the following is acceptable for classification purposes: Liquids having a flash point below 73°F (23°C) and having a boiling point below 100°F (38°C).	H224, Category 1; Extremely flammable liquid and vapor. Flash point < 23°C and initial boiling point ≤ 35°C	
Flammable liquid	IB	A liquid that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as a Flammable Liquid (Category 2). Where the GHS category is not known, the following is acceptable for classification purposes: Liquids having a flash point below 73°F (23°C) and having a boiling point at or above 100°F (38°C).	H225, Category 2; Highly flammable liquid and vapor. Flash point < 23°C and initial boiling point > 35°C	
Flammable liquid	IC	A liquid that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as a Flammable Liquid (Category 3) and having a flashpoint below 100°F (38°C). Where the GHS category is not known, the following is acceptable for classification purposes: Liquids having a flash point at or above 73°F (23°C) and below 100°F (38°C).	H226, Category 3; Flammable liquid and vapor. Flash point ≥ 23°C and ≤ 60°C	
Flammable solid	—	A solid that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as a Flammable Solid (Category 1 or 2). Where the GHS category is not known, the following is acceptable for classification purposes: A solid, other than a blasting agent or explosive, that is capable of causing fire through friction, absorption of moisture, spontaneous chemical change or retaining heat from manufacturing or processing, or which has an ignition temperature below 212°F (100°C) or which burns so vigorously and persistently when ignited as to create a serious hazard. A chemical shall be considered a flammable solid, as determined in accordance with the test method of CPSC 16 CFR Part 1500.44, if it ignites and burns with a self-sustained flame at a rate greater than 0.0866 inch (2.2 mm) per second along its major axis.	A flammable solid is a solid which is readily combustible, or may cause or contribute to fire through friction. A flammable solid is classified in one of the two categories for this class using method N.1 as described in Part III, subsection 33.2.1 of the Manual of Tests and Criteria, according to: H228, Category 1; Flammable solid: Burning rate test: Substances or mixtures other than metal powders: 1. Wetted zone does not stop fire; and 2. Burning time < 45 s or burning rate > 2.2 mm/s. Metal powders: burning time ≤ 5 min H228, Category 2; Flammable solid: Burning rate test: Substances or mixtures other than metal powders: 1. Wetted zone stops the fire for at least 4 min; and 2. Burning time < 45 s or burning rate > 2.2 mm/s. Metal powders: burning time > 5 min and ≤ 10 min	

Highly toxic	—	A substance or mixture that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Acute Toxicity Oral Category 1 or 2, Dermal Category 1 or 2, Inhalation Gases Category 1, Inhalation Vapors Category 1, or Inhalation Dusts and Mists Category 1 or 2. Where the GHS category is not known, one of the following is acceptable for classification purposes: ~~A material that produces a lethal dose or lethal concentration that falls within any of the following categories:~~ 1. A chemical that has a median lethal dose (LD50) of 50 mg or less per kg of body weight when administered orally to albino rats weighing between 200 and 300 g each. 2. A chemical that has a medial lethal dose (LD50) of 200 mg or less per kg of body weight when administered by continuous contact for 24 hr (or less if death occurs within 24 hr) with the bare skin of albino rabbits weighing between 2 and 3 kg each. 3. A chemical that has a median lethal concentration (LC50) in air of 200 ppm by volume or less of gas or vapor, or 2 mg/l or less of mist~~, fume~~ or dust, when administered by continuous inhalation for 1 hr (or less if death occurs within 1 hr) to albino rats weighing between 200 and 300 g.	Acute toxicity refers to serious adverse health effects (i.e., lethality) occurring after a single or short-term oral, dermal or inhalation exposure to a substance or mixture. Oral H300, Category 1; Fatal if swallowed: LD50 ≤ 5 mg/kg bodyweight H300, Category 2; Fatal if swallowed: LD50 > 5 ≤ 50 mg/kg bodyweight Dermal H310, Category 1; Fatal in contact with skin: LD50 ≤ 50 mg/kg bodyweight H310, Category 2; Fatal in contact with skin: LD50 > 50 ≤ 200 mg/kg bodyweight Inhalation H330, Category 1; Fatal if inhaled. Gases: LC50 ≤ 100 ppm (4 hr) ≈ 200 ppm (1 hr) Vapors: LC50 ≤ 0.5 mg/l (4 hr) ≈ ~~2~~1 mg/l (1 hr) Dust/mist: LC50 ≤ 0.05 mg/l (4 hr) ≈ 0.2 mg/l (1 hr)	
Inert compressed gas	—	A compressed gas that is capable of reacting with other materials only under abnormal conditions such as high temperatures, pressures and similar extrinsic physical forces. Within the context of the code, inert compressed gases do not exhibit either physical or health hazard properties as defined (other than acting as a simple asphyxiant) or hazard properties other than those of a compressed gas. Some of the more common inert compressed gases include argon, helium, krypton, neon, nitrogen and xenon.	Gases under pressure are gases which are contained in receptacles at a pressure of 200 kPa (gauge) or more at 20° C or which are liquefied or liquefied and refrigerated. They comprise compressed gases, liquefied gases, dissolved gases and refrigerated liquefied gases. See the description of "Compressed gas."	
Organic peroxide	—	Liquid or solid ~~An~~ organic substances ~~compound~~ that contains the bivalent -O-O- structure and which may be considered to be a structural derivative of hydrogen peroxide where one or both of the hydrogen atoms have been replaced by ~~an~~ organic radicals. The term also includes organic peroxide formulations (mixtures). Organic peroxides ~~can present an explosion hazard (detonation or deflagration) or they can be shock sensitive. They can also decompose into various unstable compounds over an extended period of time.~~ are thermally unstable substances or mixtures, which may undergo exothermic self-accelerating decomposition. In addition, they may have one or more of the following properties: a. be liable to explosive decomposition; b. burn rapidly; c. be sensitive to impact or friction; d. react dangerously with other substances.	Organic peroxides are liquid or solid organic substances which contain the bivalent -O-O- structure and may be considered derivatives of hydrogen peroxide, where one or both of the hydrogen atoms have been replaced by organic radicals. The term also includes organic peroxide formulations (mixtures). Organic peroxides are thermally unstable substances or mixtures, which may undergo exothermic self-accelerating decomposition. In addition, they may have one or more of the following properties: 1. Be liable to explosive decomposition. 2. Burn rapidly. 3. Be sensitive to impact or friction. 4. React dangerously with other substances.	
Organic peroxide	UD	Any organic peroxide which, as packaged, is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as an Organic Peroxide (Type A). Type A Organic Peroxides are forbidden in transportation. Where the GHS Category is not known, the following is acceptable for classification purposes: Organic peroxides that are capable of *detonation*. These peroxides pose an extremely high-explosion hazard through rapid explosive decomposition.	H240, Organic peroxide, Type A; Heating may cause an explosion. Any organic peroxide which, as packaged, can detonate or deflagrate rapidly will be defined as organic peroxide Type A.	
Organic peroxide	I	Any organic peroxide which, as packaged, is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as an Organic Peroxide (Type B). Where the GHS Category is not known, the following is acceptable for classification purposes: ~~Describes t~~Those formulations that are capable of *deflagration* but not *detonation*.	H241, Organic peroxide, Type B; Heating may cause a fire or explosion. Any organic peroxide possessing explosive properties and which, as packaged, neither detonates nor deflagrates rapidly but is liable to undergo a thermal explosion in that package will be defined as organic peroxide Type B.	

Organic peroxide	II	Any organic peroxide which, as packaged, is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as an Organic Peroxide (Type C) or (Type D). Where the GHS Category is not known, the following is acceptable for classification purposes: ~~Describes t~~Those formulations that burn very rapidly and that pose a moderate reactivity hazard.	H242, Organic peroxide, Type C; Heating may cause a fire. Any organic peroxide possessing explosive properties when the substance or mixture as packaged cannot detonate or deflagrate rapidly or undergo a thermal explosion will be defined as organic peroxide Type C. H242, Organic peroxide, Type D; Heating may cause a fire. Any organic peroxide which in laboratory testing: Detonates partially, does not deflagrate rapidly and shows no violent effect when heated under confinement; or Does not detonate at all, deflagrates slowly and shows no violent effect when heated under confinement; or Does not detonate or deflagrate at all and shows a medium effect when heated under confinement; will be defined as organic peroxide Type D.	
Organic peroxide	III	Any organic peroxide which, as packaged, is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as an Organic Peroxide (Type E). Where the GHS Category is not known, the following is acceptable for classification purposes: ~~Describes t~~Those formulations that burn rapidly and that pose a moderate reactivity hazard.	H242, Organic peroxide, Type E; Heating may cause a fire. Any organic peroxide which, in laboratory testing, neither detonates nor deflagrates at all and shows low or no effect when heated under confinement will be defined as organic peroxide Type E.	
Organic peroxide	IV	Any organic peroxide which, as packaged, is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as an Organic Peroxide (Type F). Where the GHS Category is not known, the following is acceptable for classification purposes: ~~Describes t~~Those formulations that burn in the same manner as ordinary combustibles and that pose a minimal reactivity hazard.	H242, Organic peroxide, Type F; Heating may cause a fire. Any organic peroxide which, in laboratory testing, neither detonates in the cavitated state nor deflagrates at all and shows only a low or no effect when heated under confinement as well as low or no explosive power will be defined as organic peroxide Type F.	
Organic peroxide	V	Any organic peroxide which, as packaged, is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as an Organic Peroxide (Type G). Where the GHS Category is not known, the following is acceptable for classification purposes: ~~Describes t~~Those formulations that burn with less intensity than ordinary combustibles or do not sustain combustion and that pose no reactivity hazard.	Organic peroxide, Type G. Any organic peroxide which, in laboratory testing, neither detonates in the cavitated state nor deflagrates at all and shows no effect when heated under confinement nor any explosive power, provided that it is thermally stable (self-accelerating decomposition temperature is 60°C or higher for a 50 kg package), and for liquid mixtures, a diluent having a boiling point of not less than 150°C and used for desensitization will be defined as organic peroxide Type G. If the organic peroxide is not thermally stable or is a diluent having a boiling point less than 150°C and is used for desensitization, it shall be defined as organic peroxide Type F.	
Oxidizer	—	A material that readily yields oxygen or other oxidizing gas, or that readily reacts to promote or initiate combustion of combustible materials and, if heated or contaminated, can result in vigorous self-sustained decomposition.	An oxidizing solid is a solid which, while in itself is not necessarily combustible, may, generally by yielding oxygen, cause, or contribute to, the combustion of other material. An oxidizing liquid is a liquid which, while in itself not necessarily combustible, may, generally by yielding oxygen, cause, or contribute to, the combustion of other material.	
Oxidizer	4	A solid or liquid that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as either Oxidizing Solids (Category 1) or Oxidizing Liquids (Category 1) and which have evidence of explosive properties or are packaged for transport in Packing Group I. Where the GHS category is not known, the following is acceptable for classification purposes: An oxidizer that can undergo an explosive reaction due to contamination or exposure to a thermal or physical shock that causes a severe increase in the burning rate of combustible materials with which it comes into contact. Additionally, the oxidizer causes a severe increase in the burning rate and can cause spontaneous ignition of combustibles.	H271, Category 1; May cause fire or explosion; strong oxidizer. Criteria for solids (based on Test O.1 or O.3 in Part III of UN ST/SG/AC.10/11, *Manual of Tests and Criteria*): Test O.1—Any substance or mixture which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning time less than the mean burning time of a 3:2 mixture (by mass) of potassium bromate and cellulose. Test O.3—Any substance or mixture which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning rate greater than the mean burning rate of a 3:1 mixture (by mass) of calcium peroxide and cellulose. Criteria for liquids (based on Test O.2 in Part III of UN ST/SG/AC.10/11, *Manual of Tests and Criteria*): Any substance or mixture which, in the 1:1 mixture (by mass) of substance (or mixture) and cellulose tested, spontaneously ignites; or the mean pressure rise time of a 1:1 mixture (by mass) of substance and cellulose is less than that of a 1:1 mixture (by mass) of 50% perchloric acid and cellulose.	

Oxidizer	3	A solid or liquid that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as either Oxidizing Solids (Category 1) or Oxidizing Liquids (Category 1) and is not otherwise classified as Class 4. Where the GHS category is not known, the following is acceptable for classification purposes: An oxidizer that causes a severe increase in the burning rate of combustible materials with which it comes in contact.	H271, Category 1; May cause fire or explosion; strong oxidizer. Criteria for solids (based on Test O.1 or O.3 in Part III of UN ST/SG/AC.10/11, *Manual of Tests and Criteria*): Test O.1—Any substance or mixture which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning time less than the mean burning time of a 3:2 mixture (by mass) of potassium bromate and cellulose. Test O.3—Any substance or mixture which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning rate greater than the mean burning rate of a 3:1 mixture (by mass) of calcium peroxide and cellulose. Criteria for liquids (based on Test O.2 in Part III of UN ST/SG/AC.10/11, *Manual of Tests and Criteria*): Any substance or mixture which, in the 1:1 mixture (by mass) of substance (or mixture) and cellulose tested, spontaneously ignites; or the mean pressure rise time of a 1:1 mixture (by mass) of substance and cellulose is less than that of a 1:1 mixture (by mass) of 50% perchloric acid and cellulose.	
Oxidizer	2	A solid or liquid that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as either Oxidizing Solids (Category 2) or Oxidizing Liquids (Category 2). Where the GHS category is not known, the following is acceptable for classification purposes: An oxidizer that will cause a moderate increase in the burning rate of combustible materials with which it comes in contact.	H272, Category 2; May intensify fire; oxidizer. Criteria for solids (based on Test O.1 or O.3 in Part III of UN ST/SG/AC.10/11, *Manual of Tests and Criteria*): Test O.1—Any substance or mixture which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning time equal to or less than the mean burning time of a 2:3 mixture (by mass) of potassium bromate and cellulose and the criteria for Category 1 are not met. Test O.3—Any substance or mixture which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning rate equal to or greater than the mean burning rate of a 1:1 mixture (by mass) of calcium peroxide and cellulose and the criteria for Category 1 are not met. Criteria for liquids (based on Test O.2 in Part III of UN ST/SG/AC.10/11, *Manual of Tests and Criteria*): Any substance or mixture which, in the 1:1 mixture (by mass) of substance (or mixture) and cellulose tested, exhibits a mean pressure rise time less than or equal to the mean pressure rise time of a 1:1 mixture (by mass) of a 40% aqueous sodium chlorate solution and cellulose and the criteria for Category 1 are not met.	
Oxidizer	1	A solid or liquid that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as either Oxidizing Solids (Category 3) or Oxidizing Liquids (Category 3). Where the GHS category is not known, the following is acceptable for classification purposes: An oxidizer that does not moderately increase the burning rate of combustible materials.	H272, Category 3; May intensify fire; oxidizer: Criteria for solids (based on Test O.1 or O.3 in Part III of UN ST/SG/AC.10/11, *Manual of Tests and Criteria*): Test O.1—Any substance or mixture which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning time equal to or less than the mean burning time of a 3:7 mixture (by mass) of potassium bromate and cellulose and the criteria for Categories 1 and 2 are not met. Test O.3—Any substance or mixture which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning rate equal to or greater than the mean burning rate of a 1:2 mixture (by mass) of calcium peroxide and cellulose and the criteria for Categories 1 and 2 are not met. Criteria for liquids (based on Test O.2 in Part III of UN ST/SG/AC.10/11, *Manual of Tests and Criteria*): Any substance or mixture which, in the 1:1 mixture (by mass) of substance (or mixture) and cellulose tested, exhibits a mean pressure rise time less than or equal to the mean pressure rise time of a 1:1 mixture (by mass) of a 65% aqueous nitric acid solution and cellulose and the criteria for Categories 1 and 2 are not met.	
Oxidizing gas	Gaseous or Liquefied	A compressed gas that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as an Oxidizing Gas, Category 1. Where the GHS category is not known, the following is acceptable for classification purposes: A gas that can support and accelerate combustion of other materials more than air does.	Any gas which may, generally by providing oxygen, cause or contribute to the combustion of other material more than air does. H270, Category 1; May cause or intensify fire; oxidizer: Any gas which may, generally by providing oxygen, cause or contribute to the combustion of other material more than air does. ~~H280, compressed gas would also apply.~~	

Oxidizing gas	Liquified	An oxidizing gas that is liquefied [liquefied gases are gases that, in a packaging under the charged pressure, are partially liquid at 68° F (20° C)].	Any gas which may, generally by providing oxygen, cause or contribute to the combustion of other material more than air does. H270, Category 1; May cause or intensify fire; oxidizer. Any gas which may, generally by providing oxygen, cause or contribute to the combustion of other material more than air does. H280, liquefied gas, would also apply.	
Pyrophoric	—	A substance or mixture that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Pyrophoric Gas, Pyrophoric Solid (Category 1), or Pyrophoric Liquid (Category 1). Where the GHS category is not known, the following is acceptable for classification purposes: A chemical with an autoignition temperature in air, at or below a temperature of 130° F (54° C).	Separate definitions based on physical state; see each category of pyrophoric:	
Pyrophoric	Solid	A substance or mixture that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Pyrophoric Gas, Pyrophoric Solid (Category 1), or Pyrophoric Liquid (Category 1). Where the GHS category is not known, the following is acceptable for classification purposes: A solid with an autoignition temperature in air, at or below a temperature of 130° F (54° C).	H250, Category 1; Pyrophoric solid; Catches fire spontaneously if exposed to air. A pyrophoric solid is a solid which, even in small quantities, is liable to ignite within 5 minutes after coming into contact with air. Classification criteria: The solid ignites within 5 minutes of coming into contact with air.	
Pyrophoric	Liquid	A substance or mixture that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Pyrophoric Gas, Pyrophoric Solid (Category 1), or Pyrophoric Liquid (Category 1). Where the GHS category is not known, the following is acceptable for classification purposes: A liquid with an autoignition temperature in air, at or below a temperature of 130° F (54° C).	H250, Category 1; Pyrophoric liquid; Catches fire spontaneously if exposed to air: A pyrophoric liquid is a liquid which, even in small quantities, is liable to ignite within 5 minutes after coming into contact with air. Classification criteria: The liquid ignites within 5 minutes when added to an inert carrier and exposed to air, or it ignites or chars a filter paper on contact with air within 5 minutes. Testing is performed at 25 ±2° C and 50 ±5% relative humidity.	
Pyrophoric	Gas	A substance or mixture that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Pyrophoric Gas, Pyrophoric Solid (Category 1), or Pyrophoric Liquid (Category 1). Where the GHS category is not known, the following is acceptable for classification purposes: A gas with an autoignition temperature in air, at or below a temperature of 130° F (54° C).	H220, Category 1A~~; Extremely flammable~~, Pyrophoric gas. ~~May ignite spontaneously if exposed to air:~~ A pyrophoric gas is a flammable gas that is liable to ignite spontaneously in air at a temperature of 54° C or below. and H232; May ignite spontaneously if exposed to air ~~H280, compressed (or liquefied) gas, would also apply.~~	
Toxic	—	A substance or mixture that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Acute Toxicity Oral Category 3 or 4, Dermal Category 3, Inhalation Gases Category 2 or 3, Inhalation Vapors Category 2 or 3, or Inhalation Dusts and Mists Category 3 or 4. Where the GHS category is not known, one of the following is acceptable for classification purposes: ~~A chemical falling within any of the following categories:~~ 1. A chemical that has a median lethal dose (LD50) of more than 50 mg per kg, but not more than 500 mg per kg of body weight when administered orally to albino rats weighing between 200 and 300 g each. 2. A chemical that has a medial lethal dose (LD50) of more than 200 mg per kg but not more than 1,000 mg per kg of body weight when administered by continuous contact for 24 hr (or less if death occurs within 24 hr) with the bare skin of albino rabbits weighing between 2 and 3 kg each. 3. A chemical that has a median lethal concentration (LC50) in air of more than 200 ppm but not more than 2,000 ppm by volume or less of gas or vapor, or more than 2 mg/l but not more than 20 mg/l of mist~~, fume~~ or dust, when administered by continuous inhalation for 1 hr (or less if death occurs within 1 hr) to albino rats weighing between 200 and 300 g	Acute toxicity refers to serious adverse health effects (i.e., lethality) occurring after a single or short-term oral, dermal or inhalation exposure to a substance or mixture. Oral H301, Category 3; Toxic if swallowed: LD50 > 50 ≤ 300 mg/kg bodyweight H302, Category 4; Harmful if swallowed: LD50 > 300 ≤ 2,000 mg/kg bodyweight Dermal H311, Category 3, Toxic in contact with skin: LD50 > 200 ≤ 1,000 mg/kg bodyweight Inhalation H330, Category 2; Fatal if inhaled: Gases: LC50 > 100 ppm (4 hr) ≈ 200 ppm (1 hr) ≤ 500 ppm (4 hr) ≈ 1,000 ppm (1 hr) Vapours: LC50 > 0.5 mg/l (4 hr) ≈ ~~2~~1 mg/l (1 hr) ≤ 2 mg/l (4 hr) ≈ ~~8~~4 mg/l (1 hr) Dust/mist: LC50 > 0.05 mg/l (4 hr) ≈ 0.2 mg/l (1 hr) ≤ 0.5 mg/l (4 hr) ≈ 2 mg/l (1 hr) H331, Category 3; Toxic if inhaled: Gases: LC50 > 500 ppm (4 hr) ≈ 1,000 ppm (1 hr) ≤ 2,500 ppm (4 hr) ≈ 5,000 ppm (1 hr) Vapours: LC50 > 2 mg/l (4 hr) ≈ ~~8~~4 mg/l (1 hr) ≤ 10 mg/l (4 hr) ≈ ~~4~~20 mg/l (1 hr) Dust/mist: LC50 > 0.5 mg/l (4 hr) ≈ 2 mg/l (1 hr) ≤ 1 mg/l (4 hr) ≈ 4 mg/l (1 hr)	

Unstable (reactive)	—	A material, other than an explosive, which in the pure state or as commercially produced, will vigorously polymerize, decompose, condense or become self-reactive and undergo other violent chemical changes, including explosion, when exposed to heat, friction or shock, or in the absence of an inhibitor~~, or in the presence of contaminants, or in contact with incompatible materials.~~ Unstable (reactive) materials are subdivided as follows:	Self-reactive substances or mixtures are thermally unstable liquids or solid substances or mixtures liable to undergo a strongly exothermic decomposition even without participation of oxygen (air). This definition excludes substances and mixtures classified under the GHS as explosives, organic peroxides or as oxidizing. A self-reactive substance or mixture is regarded as possessing explosive properties when in laboratory testing the formulation is liable to detonate, to deflagrate rapidly or to show a violent effect when heated under confinement.	
Unstable (reactive)	4	Materials that in themselves are readily capable of detonation or of explosive decomposition or explosive reaction at normal temperatures and pressures. This class includes materials that are sensitive to mechanical or localized thermal shock at normal temperatures and pressures. This Class includes liquid or solid materials that are categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Self-Reactive (Category A) and can include compressed gases categorized as Chemically Unstable (Type A).	H240, Type A; Heating may cause an explosion. Any self-reactive substance or mixture which can detonate or deflagrate rapidly, as packaged, will be defined as self-reactive substance Type A.	
Unstable (reactive)	3	Materials that in themselves are capable of detonation or of explosive decomposition or explosive reaction but which require a strong initiating source or which must be heated under confinement before initiation. This class includes materials that are sensitive to thermal or mechanical shock at the elevated temperatures and pressures. This Class includes liquid or solid materials that are categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Self-Reactive (Category B) and can include compressed gases categorized as Chemically Unstable (Type B).	H241, Type B; Heating may cause a fire or explosion. Any self-reactive substance or mixture possessing explosive properties and which, as packaged, neither detonates nor deflagrates rapidly, but is liable to undergo a thermal explosion in that package will be defined as self-reactive substance Type B.	
Unstable (reactive)	2	Materials that in themselves are normally unstable and readily undergo violent chemical change but do not detonate. This class includes materials that can undergo chemical change with rapid release of energy at normal temperatures and pressures, and that can undergo violent chemical change at elevated temperatures and pressures. This Class includes liquid or solid materials that are categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Self-Reactive (Category C or D).	H242, Type C; Heating may cause a fire. Any self-reactive substance or mixture possessing explosive properties when the substance or mixture as packaged cannot detonate or deflagrate rapidly or undergo a thermal explosion will be defined as self-reactive substance Type C. H242, Type D; Heating may cause a fire. Any self-reactive substance or mixture which in laboratory testing: Detonates partially, does not deflagrate rapidly and shows no violent effect when heated under confinement; or Does not detonate at all, deflagrates slowly and shows no violent effect when heated under confinement; or Does not detonate or deflagrate at all and shows a medium effect when heated under confinement; will be defined as self-reactive substance Type D; Will be defined as self-reactive substance Type D.	
Unstable (reactive)	1	Materials that in themselves are normally stable but which can become unstable at elevated temperatures and pressures. This Class includes liquid or solid materials that are categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Self-Reactive (Category E or F).	H242, Type E; Heating may cause a fire. Any self-reactive substance or mixture which, in laboratory testing, neither detonates nor deflagrates at all and shows low or no effect when heated under confinement will be defined as self-reactive substance Type E. H242, Type F; Heating may cause a fire. Any self-reactive substance or mixture which, in laboratory testing, neither detonates in the cavitated state nor deflagrates at all and shows only a low or no effect when heated under confinement as well as low or no explosive power will be defined as self-reactive substance Type F. Any self-reactive substance or mixture which, in laboratory testing, neither detonates in the cavitated state nor deflagrates at all and shows no effect when heated under confinement nor any explosive power, provided that it is thermally stable (self-accelerating decomposition temperature is 60° C to 75° C for a 50 kg package), and for liquid mixtures, a diluent having a boiling point greater than or equal to 150° C and used for desensitization will be defined as self-reactive substance Type G. If the mixture is not thermally stable or is a diluent having a boiling point less than 150° C and is used for desensitization, the mixture shall be defined as self-reactive substance Type F.	

Unstable (reactive) gas	Gaseous		A chemically unstable gas is a flammable gas that is able to react explosively even in the absence of air or oxygen. H220, Category 1A, Chemically Unstable, Category A; Extremely flammable gas~~; May react explosively even in the absence of air.~~: Flammable gases which are chemically unstable at 20° C and a standard pressure of 101.3 kPa. and H230: May react explosively even in the absence of air or H220, Category 1A, Chemically Unstable, Category B; Extremely flammable gas~~; May react explosively even in the absence of air at elevated pressure and/or temperature.~~: Flammable gases which are chemically unstable at a temperature greater than 20° C and/or a standard pressure greater than 101.3 kPa. and H231: May react explosively even in the absence of air at elevated pressure and/or temperature ~~H280, compressed gas, would also apply.~~	
Water reactive	3	Materials that react explosively with water without requiring heat or confinement. Under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS), these are classified as substances or mixtures which, in contact with water, emit flammable gases (Category 1).	H260, Category 1; Contact with water releases flammable gases which may ignite spontaneously. Any substance or mixture which reacts vigorously with water at ambient temperatures and demonstrates generally a tendency for the gas produced to ignite spontaneously, or which reacts readily with water at ambient temperatures such that the rate of evolution of flammable gas is equal to or greater than 10 liters per kilogram of substance over any 1 minute. (UN/DOT test methods: Test N.5, Part III, subsection 33.4.1.4)	
Water reactive	2	Materials that react violently with water or have the ability to boil water. Materials that produce flammable, toxic or other hazardous gases, or evolve enough heat to cause autoignition of combustibles upon exposure to water or moisture. Under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS), these are classified as substances or mixtures which, in contact with water, emit flammable gases (Category 2).	H261, Category 2; Contact with water releases flammable gas. Any substance or mixture which reacts readily with water at ambient temperatures such that the maximum rate of evolution of flammable gas is equal to or greater than 20 liters per kilogram of substance per hour, and which does not meet the criteria for Category 1.	
Water reactive	1	Materials that react with water with some release of energy, but not violently. Under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS), these are classified as substances or mixtures which, in contact with water, emit flammable gases (Category 3).	H261, Category 3; Contact with water releases flammable gas. Any substance or mixture which reacts slowly with water at ambient temperatures such that the maximum rate of evolution of flammable gas is equal to or greater than 1 liter per kilogram of substance per hour, and which does not meet the criteria for Categories 1 and 2.	

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a. The table illustrates that there is not perfect alignment between the IFC and GHS definitions and provides information on similarities and difference between the two classification systems.

E104.2 GHS hazardous materials definitions comparison table.

Table E104.2 provides a tabular presentation of the various definitions published within the *International Fire Code*. In addition, the table presents corresponding definitions, where available, from the ~~2012 edition of~~ DOL 29 CFR 1910.1200 along with applicable hazard statement codes. DOL 29 CFR 1910.1200 aligns with the UN's *Globally Harmonized System of Classification and Labelling of Chemicals (GHS)*. The table is not meant to imply perfect alignment between IFC and GHS definitions.

E104.1 Hazardous materials definitions.

The categorization and classification of hazardous materials enables the code user to determine the applicability of requirements based on hazard category and class related to the physical and health hazards of materials. The ~~current~~ definitions found in Chapter 2 have been developed using criteria found in NFPA codes and standards, model fire prevention codes, NIOSH, and requirements of the US Department of Transportation (DOTn 49 CFR) and US Department of Labor (DOL 49 CFR 1910).

The chemical industry has grown substantially since the inception of the IFC hazard definitions. Large-scale global production and distribution of common and specialty chemicals has become mainstream. In the 1990s, the United Nations (UN) developed the *Globally Harmonized System of Classification and Labelling of Chemicals (GHS)* to create international congruency among chemical suppliers.

The GHS is an internationally agreed upon standard of classification and labeling that utilizes prescriptive, standardized testing procedures and criteria to classify hazardous materials.

The DOL ~~published a~~ revised the *Hazard Communication Standard*(DOL 29 CFR 1910.1200) to align with the GHS ~~in March 2012. It became effective in May 2012.~~ All manufacturers selling, producing or transporting chemicals in the United States are ~~now~~ required to comply with the GHS and provide ~~this~~ standardized hazard information on all Safety Data Sheets (SDS).

SDS are a primary source of information for identifying hazards for chemicals and mixtures containing hazardous materials. It can be helpful for fire code officials to become familiar with the GHS definitions and how they relate to IFC hazard definitions.

Reason:

Fire Code officials must enforce the hazardous materials provisions of the International Fire Code (IFC) and the International Building Code (IBC) to ensure that people and property in our communities are safe. While code officials need to verify and validate the hazards of materials, classifying hazardous materials in accordance with definitions and hazard classes in the I-codes is the responsibility of facility owners which continues to be a challenge. Consequences of missing or incorrect classification include increased fire and life safety risk and can lead to misclassification of an occupancy.

Due to the expansion of international chemical trade, the United Nations (UN) developed a Globally Harmonized System (GHS) of classification of hazardous materials. The GHS is an internationally agreed upon standard of classification and labeling that in most cases utilizes prescriptive, standardized testing procedures and criteria to classify hazardous materials. Federal law (29 CFR 1910.1200 (OSHA) and 49 CFR 173.127 (DOT)) mandates that manufacturers selling, producing or transporting chemicals in the United States classify chemicals according to the GHS system and make the information readily available in product Safety Data Sheets (SDSs).

This proposal aims to incorporate the readily available GHS (Revision 7) classifications into the I-code definitions to better align with federal standards for hazardous materials classification. Proper identification of multiple hazards and the degree of hazard are likely outcomes of utilizing the GHS.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the FCAC Website

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is meant to provide correlation with the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) which is used globally and by OSHA. This comparison will make compliance more straightforward. In some cases, utilizing GHS definitions may more heavily regulate additional materials for new buildings; conversely, in other cases GHS definitions will result in reduced classification of materials. However, any differences are balanced out by the coordination and ease of enforcement that comes with being aligned with GHS and OSHA. US manufacturers and distributors of hazardous materials have been required to use the GHS classification system to communicate the hazards of materials in Safety Data Sheets (SDS) since 2012.

F276-24

F277-24

IFC: FIGURE H101.1

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Fire Code

Delete and substitute as follows:

1. Business Name:_______________ Phone:_______________
   Address:_______________

2. Person Responsible for the Business
   Name: Title: Phone:

3. Emergency Contacts:
   Name: Title: Home Number: Work Number:

4. Person Responsible for the Application/Principal Contact:
   Name: Title: Phone:

5. Principal Business Activity:

6. Number of Employees:_______

7. Number of Shifts:_______
   a. Number of Employees per Shift:

8. Hours of Operation: _______

~~**FIGURE H101.1 HAZARDOUS MATERIALS MANAGEMENT PLAN SECTION I: FACILITY DESCRIPTION**~~

1. Business Name:____ Phone:________________
   Address:____

2. Person Responsible for the Business
   Name: ______________________ Title: ______________________ Phone: ______________________

3. Emergency Contacts:

Name:	Title:	Primary Number: ~~Home Number:~~	Emergency Number: ~~Work Number:~~

4. Person Responsible for the Application/Principal Contact:
   Name: ______________________ Title: ______________________ Phone: ______________________

5. Principal Business Activity:
   ____
   ____
   ____

6. Number of Employees:_________

7. Number of Shifts: _____________
   a. Number of Employees per Shift:
   ____
   ____
   ____

8. Hours of Operation: ___________

FIGURE H101.1 HAZARDOUS MATERIALS MANAGEMENT PLAN SECTION I: FACILITY DESCRIPTION

FIGURE H101.1 HAZARDOUS MATERIALS MANAGEMENT PLAN SECTION I: FACILITY DESCRIPTION

Reason: Update the language on the form to reflect the widespread use of mobile phones in lieu of land lines.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The changing of the naming convention for the required phone numbers has no associated cost.

F277-24

F278-24

IFC: L101.1, L101.2 (New), L102.1, SECTION 202 (New), SECTION 202, L104.5, L104.5.1, L104.5.2, L104.7, L104.13, L104.13.1, L104.13.2, L104.14, L104.14.1, L105.1

Proponents: Mark Fessenden, Johnson Controls, Firefighter Air Coalition

2024 International Fire Code

Revise as follows:

L101.1 Scope.
Firefighter air replenishment systems (FARS) shall be provided in accordance with this appendix. The adopting ordinance shall specify building characteristics or special hazards that establish thresholds triggering a requirement for the installation of a FARS. The requirement shall be based on the fire department's capability of replenishing firefighter breathing air during sustained emergency operations. Considerations shall include:

1. Building characteristics, such as number of stories above or below *grade plane*, floor area, type of construction and fire-resistance of the primary structural *frame* to allow sustained firefighting operations based on a rating of not less than 2 hours.
2. Special hazards, other than buildings, that require unique accommodations to allow the fire department to replenish firefighter breathing air.
3. Fire department staffing level.
4. Availability of a fire department ~~breathing replenishment vehicle~~mobile air unit.

Add new text as follows:

L101.2 Where required. A fire fighter air replenishment systems (FARS) shall be installed in the following buildings:

1. High-rise buildings where the floor of an occupiable story is greater than 75 feet (22 860 mm) above the lowest level of fire department vehicle access.
2. Underground structures that are three or more floors below grade with an area greater than 20 000 square feet (1858 m2).
3. Large area structures with an area greater than 200 000 square feet (18 580 m2) and where the travel distance from the building centerline to the closest exit is greater than 500 feet (152 m), such as warehouses, manufacturing complexes, malls, or convention centers.
4. Underground transportation or pedestrian tunnels exceeding 500 feet (152 m) in length.

L102.1 Definitions. For the purpose of this appendix, certain terms are defined as follows:

Add new definition as follows:

EXTERIOR MOBILE BREATHING AIR FILL CONNECTION. A permanently installed external connection where a mobile air unit can supply the FARS breathing air standpipe.

FIREFIGHTER AIR REPLENISHMENT SYSTEM (FARS). A permanently installed arrangement of piping, valves, fittings and equipment to facilitate the replenishment of breathing air in self-contained breathing apparatus (SCBA) for firefighters engaged in emergency operations.

Add new definition as follows:

INTERIOR CYLINDER FILL PANELS. Lockable interior panels that provide firefighters the ability to regulate breathing air pressure and refill self-contained breathing apparatus (SCBA) cylinders.

INTERIOR CYLINDER FILL STATIONS AND ENCLOSURES. Freestanding fill containment stations that provide firefighters the ability to regulate breathing air pressure and refill self-contained breathing apparatus (SCBA) cylinders.

SELF-CONTAINED BREATHING APPARATUS (SCBA). An atmosphere-supplying respirator that supplies a respirable air atmosphere to the user from a breathing air source that is independent of the ambient environment and designed to be carried by the user.

Revise as follows:

L104.5 Breathing air supply.
~~Where a fire department mobile air unit is available, the~~The FARS breathing air standpipe shall be supplied by an external mobile breathing air fill connection in accordance with Section L104.14. Where a fire department mobile air unit is not available, a stored pressure air supply shall be provided in accordance with Section L104.5.1. A stored pressure air supply shall be permitted to be added to a system supplied by an external mobile breathing air fill connection provided that a means to bypass the stored pressure air supply is located at the external mobile breathing air fill connection.

L104.5.1 Stored pressure air supply.
A stored pressure air supply shall be designed based on Chapter 24 of NFPA 1901 except that provisions applicable only to mobile apparatus or not applicable to system design shall not apply. A stored pressure air supply shall be capable of refilling not less than 50 empty 45 cu ft.(1274 L) breathing air cylinders~~ of a size and pressure used by the fire department~~.

L104.5.2 Retrofit of external mobile breathing air fill connection. A FARS not initially provided with an external mobile breathing air fill connection due to the lack of a mobile air unit shall be retrofitted with an external mobile breathing air fill connection where a mobile air unit becomes available. Where an external mobile breathing air fill connection is provided, a means to bypass the stored pressure air supply shall be located at the external mobile breathing air fill connection. The retrofit shall be completed not more than 12 months after notification by the *fire code official*.

L104.7 Pressure relief valve.
~~Pressure relief valves shall be installed at each point of supply and at the top or end of every riser. The relief valve shall meet the requirements of CGA S-1.3 and shall not be field adjustable. Pressure relief valves shall discharge in a manner that does not endanger personnel who are in the area. Valves, plugs or caps shall not be installed in the discharge of a pressure relief valve. Where discharge piping is used the end shall not be threaded.~~Pressure-relief valves shall be installed downstream of the pressure regulator inlet. The relief valve shall meet the requirements of CGA S-1.3 and shall not be field adjustable. The relief valve shall have a set-to-open pressure not exceeding 1.1 times the design pressure of the system. Pressure-relief valve discharge shall terminate so that the exhaust air stream cannot impinge upon personnel in the area. Valves, plugs, or caps shall not be installed in the discharge of a pressure-relief valve. Where discharge piping is used, the end shall not be threaded.

L104.13 Fill ~~stations~~panels.
Firefighter air replenishment fill ~~stations~~panels shall comply with Section L104.13.1 through L104.13.3.

L104.13.1 Location. Interior cylinder fill panels ~~Fill stations~~ for refilling breathing air cylinders shall be located as follows:

1. In high-rise buildings an interior cylinder fill panel or station shall be installed commencing on the third floor and every third floor thereafter above grade.
2. Underground floors in buildings with more than five underground floors, an interior cylinder fill panel or station shall be installed commencing on the third floor below grade and every three floors below grade thereafter, except for the bottom-most floor.
3. In large area structures the specific location or locations on each floor shall be approved by the *fire code official*.

~~1. Fill stations shall be provided at the fifth floor above and below the ground level floor and every third floor level thereafter.~~

~~2. On floor levels requiring fill stations, one fill station shall be provided adjacent to a required exit stair at a location designated by the *fire code official*. In buildings required to have three or more exit stairs, additional fill stations shall be provided at a ratio of one fill station for every three *stairways*.~~

L104.13.2 Design. Fill ~~stations~~panels for breathing air cylinders shall be designed to meet the following requirements:

1. A pressure gauge and pressure-regulating devices and controls shall be provided to allow the operator to control the fill pressure and fill rate on each cylinder fill hose.
2. Valves controlling cylinder fill hoses shall be slow-operating valves.
3. A separate flow restriction device shall be provided on each fill hose.
4. A method shall be provided to bleed each cylinder fill hose.
5. The <u>interior cylinder</u> fill ~~station~~ <u>stations and enclosures</u> shall be designed to provide a containment area that fully encloses any cylinder being filled and flexible cylinder fill hoses, and directs the energy from a failure away from personnel. Fill stations shall be designed to prohibit filling of cylinders that are not enclosed within the containment area.

   Exception: Where required or *approved* by the <u>*fire code official* in consultation with the</u> *fire chief*, fill ~~stations~~ <u>panels</u> providing for the direct refilling of the firefighters' breathing air cylinders using Rapid Intervention Crew/Company Universal Air Connection (RIC/UAC) fittings shall be used in lieu of cylinder fill ~~stations~~<u>panels</u> that utilize containment areas.

L104.14 External mobile <u>breathing</u> air <u>fill</u> connection.
An external mobile <u>breathing</u> air <u>fill</u> connection shall be provided for fire department mobile air ~~apparatus~~<u>units</u> where required by Section L104.5 to supply the system with breathing air.

L104.14.1 Location. The location of the external mobile <u>breathing</u> air <u>fill</u> connection shall have access for mobile air ~~apparatus~~<u>units</u> and *approved* by the *fire code official*.

L105.1 Acceptance tests.
Upon completion of the installation, a FARS shall be acceptance tested to verify compliance with equipment manufacturers' instructions and design documents. Oversight of the acceptance tests shall be provided by a *registered design professional*. Acceptance testing shall include all of the following:

1. A pneumatic test in accordance with ASME B31.3 of the complete system at a minimum test pressure of 110 percent of the system design pressure using oil free dry air, nitrogen or argon shall be conducted. Test pressure shall be maintained for not less than 24 hours. During this test, all fittings, joints and system components shall be inspected for leaks. Defects in the system or leaks detected shall be documented and repaired.
2. A cylinder-filling performance test shall be conducted to verify compliance with the required breathing air cylinder refill rate from the exterior mobile air connection and, where provided, a stored air pressure supply system.
3. The air quality monitoring system shall be tested to verify both of the following conditions:
   3.1. Visual indicators required by Section L104.15.1 function properly.
   3.2. Supervisory signals are transmitted as required by Section L104.15.2 for each sensor based on a sensor function test.
4. Connections intended for fire department use shall be confirmed as compatible with the fire department's mobile air unit, SCBA cylinders and, where provided, RIC/UAC connections.
5. Air samples shall be taken from not less than two fill ~~stations~~<u>panels</u> and submitted to an *approved* gas analysis laboratory to verify compliance with NFPA 1989. The FARS shall not be placed into service until a written report verifying compliance with NFPA 1989 has been provided to the *fire code official*.

Reason: The attached revisions to Appendix L create consistency in the in the guidance provided in the appendix, NFPA 1 Appendix D, and the UPC Appendix F. the changes include guidance on thresholds for NFPA 1 and the UPC, consistency in definitions, guidance on cascade system volume where provided, and consistency in relief valve use.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The changes are being made to an optional adoptable appendix.

F279-24

IFC: APPENDIX N, SECTION N101, N101.1, N101.1.1, N101.1.2, N101.2, N101.3, SECTION N102, N102.1, SECTION 202, SECTION N103, N103.1, N103.2, N103.3, SECTION N104, N104.1, N104.2, SECTION N105, N105.1, N105.2, N105.3, N105.4, N105.5, N105.6, SECTION N106, N106.1, N106.2, SECTION N107, N107.1, N107.1.1, N107.2, N107.3, N107.3.1, N107.3.2, N107.3.2.1, N107.3.2.2, N107.3.2.3, N107.3.2.4, N107.3.3, N107.3.4, N107.3.4.1, N107.3.4.2, N107.3.4.3, N107.3.5, N107.4, N107.5, N107.5.1, N107.5.2, N107.5.3, N107.5.4, N107.5.5, N107.6, SECTION N108, N108.1, N108.2, N108.3, SECTION N109, N109.1, TABLE N109.1

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Fire Code

Delete without substitution:

~~APPENDIX N INDOOR TRADE SHOWS AND EXHIBITIONS~~

~~SECTION N101~~
~~GENERAL~~

~~**N101.1 Scope.**~~
~~Indoor trade shows and exhibitions with temporary vendor displays or booths within any indoor occupancy classification shall be in accordance with this appendix and all other applicable requirements of this code.~~
~~Compliance with this appendix is not required where Section N101.1.1 or N101.1.2 is applicable.~~

~~**N101.1.1 Nonsprinklered buildings.**~~
~~In a building that is not equipped throughout with an *automatic sprinkler system*, the aggregate exhibit area must be less than 1,500 square feet (139 m^2) of floor area and meet both of the following conditions:~~

1. ~~The exhibit area does not include any covered or multiple-level exhibits or booths.~~
2. ~~Not fewer than two remote *exits* or *exit access* doors in compliance with Chapter 10 are provided.~~

~~**N101.1.2 Sprinklered buildings.**~~
~~In a building that is equipped throughout with an *automatic sprinkler system* with a minimum design density of ordinary hazard Group 1, the aggregate exhibit area must be less than 4,500 square feet (418 m^2) of floor area and meet both of the following conditions:~~

1. ~~The exhibit area does not include any covered or multiple-level exhibits or booths.~~
2. ~~Not fewer than two remote *exits* or *exit access* doors in compliance with Chapter 10 are provided.~~

~~**N101.2 Permit required.**~~
~~An operational permit for trade shows and exhibitions shall be required as set forth in Section 105.5.15.~~

~~**N101.3 Application.** A permit application for a trade show or exhibition shall be submitted to the *fire code official* prior to the start of the event in a time frame established by the jurisdiction. The application shall include documentation that identifies all of the following:~~

1. ~~The *means of egress*.~~
2. ~~The locations and widths of *exits* and *aisles*.~~
3. ~~The locations of *exit* signs.~~
4. ~~The total square footage (square meters) of spaces.~~

~~5. The location and arrangement of all booths and cooking equipment.~~

~~6. The location of all fire protection equipment.~~

~~7. The type and location of any heating and electrical equipment, where applicable.~~

~~8. The location of any covered or multiple-level booths.~~

~~9. *Construction documents* for any covered or multiple-level booths.~~

~~10. The storage locations and quantities of any highly combustible goods.~~

~~11. The location and type of any vehicle displays, where applicable.~~

~~SECTION N102~~
~~DEFINITIONS~~

~~**N102.1 Definitions.** For the purpose of this appendix, certain terms are defined as follows:~~

~~**COOKING.** Heating food products to a temperature of 145°F (63°C) or higher by baking, braising, boiling, frying or grilling.~~

~~**COVERED BOOTH.** An exhibit that has an obstruction placed over the exhibit above floor level that resembles a roof, canopy, tent or other obstruction, other than vertical signs or banners.~~

~~**MULTIPLE-LEVEL BOOTH.** An exhibit that has a second level or tier constructed on top of the exhibit or portion of the exhibit that is open to the public, or includes a live load above the exhibit area floor level.~~

~~SECTION N103~~
~~PUBLIC SAFETY FOR EVENTS~~

~~**N103.1 Fire safety and evacuation plan.** A fire safety and evacuation plan shall be provided in accordance with Section 404.2.~~

~~**Exception:** Where the *fire code official* determines that the nature of the exhibition, display or the activities therein does not pose an increased hazard to public safety.~~

~~**N103.2 Fire watch personnel.**~~

~~Where, in the opinion of the *fire code official*, it is essential for public safety in a trade show or exhibition, either because of the number or persons present or because of the nature of the performance, exhibition, display or activity, the *owner* or *owner's* authorized agent shall provide one or more *fire watch* personnel in accordance with Section 403.11.1.~~

~~**N103.3 Crowd managers.**~~

~~Where events involve a gathering of more than 1,000 people, trained crowd managers shall be provided in accordance with Section 403.11.3.~~

~~SECTION N104~~
~~INTERIOR FINISH AND DECORATIVE MATERIALS~~

~~**N104.1 General.**~~

~~Interior finish, interior trim, furniture, furnishings and decorative materials, including decorative vegetation, used in exhibition areas shall comply with the requirements of this section and Chapter 8.~~

~~**N104.2 Interior wall and ceiling finish.**~~

~~The materials used for interior wall and ceiling finish of exhibit booths and displays in exhibition areas shall comply with one of the following:~~

1. ~~Where the building is not equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1, the wall and ceiling finish materials are required to be Class A in accordance with Section 803.~~
2. ~~Where the building is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1, the wall and ceiling finish materials are required to be not less than Class B in accordance with Section 803.~~

~~SECTION N105~~
~~MULTIPLE-LEVEL BOOTHS~~

~~**N105.1 Construction documents.** *Construction documents* for all multiple-level booths shall be stamped by a *registered design professional* and shall be submitted with the permit application to the *fire code official* or the *building code official*, as appropriate.~~

~~**N105.2 Structural design.**~~

~~Multiple-level booths shall be designed and constructed in accordance with Chapter 16 of the International Building Code.~~

~~**N105.3 Means of egress.**~~

~~Upper levels of multiple-level booths with an *occupant load* greater than 10 persons shall have not fewer than two *exits* or *exit access* that are separated in accordance with Section 1007.1.1.~~

~~**N105.4 Automatic sprinkler systems.** An *approved automatic sprinkler system* in accordance with Section 903.3.1.1 shall be provided in multiple-level booths exceeding 400 square feet (37.2 m²) in floor area per level.~~

~~**N105.5 Inspection.** Inspection to verify that multiple-level booths are constructed in accordance with the *construction documents* and structural design details required by this section shall be *approved* by the *building code official*.~~

~~**N105.6 Fire alarm and detection.**~~

~~Each multiple-level booth with a floor area exceeding 120 square feet (11.1 m²) on any level shall be provided with an *approved fire alarm system* in accordance with Section 907.2.~~

~~SECTION N106~~
~~COVERED BOOTHS~~

~~**N106.1 Automatic sprinkler systems.** An *approved automatic sprinkler system* in accordance with Section 903.3.1.1 shall be provided in covered booths exceeding 100 square feet (9.3 m²) in floor area per level.~~

~~**N106.2 Fire alarm and detection.** Each covered booth with a floor area exceeding 120 square feet (11.1 m²) on any level shall be provided with an *approved fire alarm system* in accordance with Section 907.2.~~

~~SECTION N107~~
~~DISPLAY AND STORAGE OF HAZARDOUS AND COMBUSTIBLE~~

~~MATERIALS~~

~~N107.1 Hazardous materials~~.

~~The display of hazardous materials shall comply with Section 314 and Chapters 50 through 67. The storage of hazardous materials in indoor trade shows and exhibition areas shall be prohibited.~~

~~N107.1.1 Display near exit.~~ ~~The display of hazardous materials within 5 feet (1524 mm) of an *exit* shall be prohibited.~~

~~N107.2 Storage of combustible materials~~.

~~Storage of combustible materials shall comply with Section 315.~~

~~N107.3 Vehicles~~.

~~The display of liquid- or gas-fueled vehicles, boats or other motor craft in indoor trade shows and exhibition areas shall comply with Sections 314.4 and N107.3.1 through N107.3.3.~~

~~N107.3.1 Batteries in vehicles.~~ ~~Vehicle batteries shall be rendered inoperable. Batteries in liquid- and gas-fueled vehicles shall be disconnected. Batteries in electric vehicles shall be rendered inoperable by the removal of fuses or other *approved* methods but shall not be required to be disconnected.~~

~~N107.3.2 Vehicle fuel~~.

~~Vehicle fuel shall comply with Sections N107.3.2.1 through N107.3.2.4.~~

~~N107.3.2.1 Fueling within the structure.~~ ~~Vehicles shall not be fueled or defueled within the structure.~~

~~N107.3.2.2 Vehicle fuel tanks~~. ~~Vehicle fuel tanks shall contain not more than one quarter of the tank capacity or 5 gallons (18.93 L) of fuel, whichever is less.~~

~~N107.3.2.3 Vehicle fuel systems~~. ~~Vehicle fuel systems shall be inspected for leaks prior to the vehicle being brought into the structure.~~

~~N107.3.2.4 Vehicle fuel tank openings.~~ ~~Vehicle fuel tank openings shall be locked and sealed to prevent the escape of vapors.~~

~~N107.3.3 Obstruction by vehicles.~~ ~~Vehicles shall not be located in such a manner that they obstruct a *means of egress.*~~

~~N107.3.4 Gas-powered vehicles~~.

~~Compressed natural gas (CNG), liquefied petroleum gas (LPG) or hydrogen-powered vehicles present in indoor trade shows and exhibition areas shall comply with Sections N107.3.4.1 through N107.3.4.3.~~

~~N107.3.4.1 Shutoff valves.~~ ~~Shutoff valves shall be closed and the engine shall be operated until it stops. Valves shall remain closed until the vehicle is removed.~~

~~N107.3.4.2 Battery hot lead.~~ ~~The hot lead of the battery shall be disconnected.~~

~~N107.3.4.3 Dual-fuel vehicles equipped to operate on gasoline.~~

~~Dual-fuel vehicles equipped to operate on gasoline as well as on CNG, LPG or hydrogen shall comply with Section 3108.14.~~

~~**N107.3.5 Competitions or demonstrations**~~**.**

~~Competitions or demonstrations using any type of vehicle shall comply with Section 3108.14.5.~~

~~**N107.4 Fueled equipment other than vehicles**~~**.**

~~Fueled equipment other than vehicles shall comply with Section 313.~~

~~**N107.5 LP-gas containers**~~**.**

~~Liquefied petroleum (LP) gas containers shall comply with Sections N107.5.1 through N107.5.5 and Chapter 61.~~

~~**N107.5.1 LP-gas containers exceeding 12 pounds (5 kg) of water capacity.**~~ ~~The use of LP-gas containers exceeding 12 pounds (5 kg) of water capacity shall be prohibited.~~

~~**N107.5.2 Where more than one LP-gas container is present in the same area.**~~ ~~Where more than one LP-gas container is present in the same area, cylinders shall be separated from each other by a minimum of 20 feet (6096 mm).~~

~~**N107.5.3 Equipment for LP-gas containers**~~**.**

~~Equipment for LP-gas containers, including tanks, piping, hoses, fittings, valves, tubing and other related components, shall be *approved* and shall comply with Chapter 61 and with the applicable requirements of the International Fuel Gas Code.~~

~~**N107.5.4 Securing of LP-gas containers**~~**.** ~~Portable LP-gas containers shall be securely fastened in place to prevent unauthorized movement.~~

~~**N107.5.5 Spare LP-gas containers**~~**.** ~~Spare LP-gas containers not connected to an *approved* appliance shall be stored in a location and manner *approved* by the *fire code official*~~.

~~**N107.6 Cooking and open-flame devices**~~**.**

~~All cooking equipment and any open-flame devices shall comply with the requirements of Section 308 of this code and with Chapter 5 of the International Mechanical Code. Cooking equipment shall be separated from combustible material display or storage by a horizontal distance of not less than 5 feet (1524 mm).~~

~~SECTION N108~~
~~MEANS OF EGRESS~~

~~**N108.1 Means of egress from the indoor trade show or exhibition area**~~**.**

~~*Means of egress* from the indoor trade show or exhibition area shall comply with Chapter 10 and with Sections N108.2 and N108.3.~~

~~**N108.2 Design of means of egress**~~**.** ~~The design of *means of egress* shall take into consideration the exhibit layout and the anticipated crowd movement during the event.~~

~~**N108.3 Aisles and corridors**~~**.** ~~*Aisles* and *corridors* within the exhibit area shall be kept free of obstructions when the public is present. Storage of any kind in *aisles* or *corridors* within the exhibit area is not permitted.~~

~~SECTION N109~~
~~REFERENCED STANDARDS~~

~~**N109.1 General.**~~

~~See Table N109.1 for standards that are referenced in various sections of this appendix. Standards are listed by the standard identification with the effective date, standard title, and the section or sections of this appendix that reference the standard.~~

~~**TABLE N109.1 REFERENCED STANDARDS**~~

STANDARD ACRONYM	STANDARD NAME	SECTIONS HEREIN REFERENCED
IBC—24	*International Building Code*	N105.2
IFGC—24	*International Fuel Gas Code*	N107.5.3
IMC—24	*International Mechanical Code*	N107.6

Reason: Many of the provisions in Appendix N already exist in the body of the IFC. No fire loss data exists to support many of the other provisions in Appendix N. As Appendix N is currently drafted it contains numerous sections that are difficult to effectively and consistently enforce. Last cycle the FCAC proposed moving Appendix N to the body of the IFC. However, that was disapproved in part due to testimony regarding difficulties in attempting to adopt and enforce provisions of the Appendix encountered by a major jurisdiction that hosts large indoor trade shows. The testimony indicated that as written it could not be enforced. Currently no jurisdiction is enforcing the appendix as written. Loss data does not support moving to the body of the code or retaining this Appendix.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0.00

Estimated Immediate Cost Impact Justification (methodology and variables):

Enforcing this Appendix if adopted is not related to construction costs. The deletion will avoid unnecessary costs in enforcement. As noted this appendix has been seen as problematic for enforcement.

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IFC: APPENDIX P (New), (New), SECTION P101 (New), P101.1 (New), P101.2 (New), SECTION 202 (New), P101.3 (New), SECTION P102 (New), P102.1 (New), P102.2 (New), P102.3 (New), P102.3.1 (New), P102.3.2 (New), P102.4 (New), P102.5 (New), P102.6 (New), P102.7 (New), P102.8 (New), P102.9 (New), P102.10 (New), SECTION P103 (New), P103.1 (New), P103.2 (New), SECTION P104 (New), P104.1 (New), P104.2 (New), P104.3 (New), P104.4 (New), SECTION P105 (New), P105.1 (New), P105.2 (New), P105.3 (New), SECTION P106 (New), P106.1 (New), P106.1.1 (New), P106.2 (New), SECTION P107 (New), P107.1 (New), SECTION P108 (New), E108.1 (New), TABLE P108.1 (New)

Proponents: Jeffrey Shapiro, International Code Consultants, Lake Travis Fire Rescue (jshapiro@LTFR.org)

2024 International Fire Code

Add new text as follows:

APPENDIX P
SHORT-TERM RESIDENTIAL RENTAL SAFETY PROGRAM

. *The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance or legislation of the jurisdiction.*

About this appendix: This appendix prescribes minimum safeguards for life-safety to protect *transient* occupants of a s*hort-term rental property.* It is intended for distribution to a *responsible party* to highlight select requirements of the International Fire Code and International Property Maintenance Code plus prescribe additional requirements that are uniquely applicable to *short-term rental properties.*

-

SECTION P101
GENERAL

P101.1 Scope. *Dwelling units*, *sleeping units*, and portions thereof classified as a *short-term rental property* shall comply with this appendix.

P101.2 Definitions. For the purpose of this appendix, certain terms are defined as follows:

Add new definition as follows:

RESPONSIBLE PARTY. An *owner* or manager operating a *short-term rental* property.

SHORT-TERM RENTAL PROPERTY.
A *dwelling unit*, *sleeping unit*, or portion thereof providing one or more *sleeping spaces*, made available for temporary occupancy, whether rented or swapped, for a period of 30 days or less.

SLEEPING SPACE.
A bedroom or other location intended to provide sleeping accommodations.

Add new text as follows:

P101.3 Permit. A permit shall be required for each short-term rental property. Where two or more sleeping rooms are available for separate rental or exchange in a single *dwelling unit* or *sleeping unit*, only one permit for the *dwelling unit* or *sleeping unit* shall be required. A permit application shall be accompanied by a floor plan that identifies every *sleeping space* and a copy of the safety plan required by this appendix.

SECTION P102
GENERAL SAFETY FEATURES AND PRECAUTIONS

P102.1 General. *Short-term rental properties* shall comply with Sections P102.2 through P102.10.

P102.2 Permissible locations. *Short-term rental properties* shall be located in buildings that were constructed with an *approved* building code and are maintained in accordance with the International Property Maintenance Code.

Exception: The *fire code official* is authorized to accept *short-term rental properties* of a different type where justified in accordance with Section 104.2.3 or 104.2.4.

P102.3 Smoke alarms. *Smoke alarms* shall be installed and maintained in accordance with Section 907.2.11.

P102.3.1 Additional smoke alarms. Where a *sleeping space* would otherwise not require a *smoke alarm* based on the requirements of 907.2.11, a *smoke alarm* shall be installed in such space.

P102.3.2 Replacement. If a smoke alarm stops functioning or is more than 10-years old, based on the date marked on the back of the device, or if there is no marked date, such smoke alarm shall be replaced.

P102.4 Carbon monoxide alarms. Carbon monoxide alarms shall be provided and maintained in accordance with Section 915.

P102.5 Portable Fire extinguishers. A minimum of one portable fire extinguisher with a minimum rating of 2-A:10-B:C shall be provided on each story of a *short-term rental unit*, secured on a mounting bracket in a conspicuous and unobstructed location along a normal path of travel.

P102.6 Fire protection system maintenance. *Fire alarm systems* and *automatic sprinkler systems*, where provided, shall be inspected, tested, and maintained operational in accordance with this code.

P102.7 Electrical safety. Use of current taps, relocatable power taps and extension cords shall be in a safe manner and that complies with Sections 603.5 and 603.6.

P102.8 Portable heater safety. Portable heaters shall be listed and labeled and shall be located not less than 3 feet (914 mm) from any combustible material. Portable electric heaters shall be plugged directly into a permanent receptacle. Portable fuel-fired heaters shall not be placed in a *sleeping space* or within 5 feet (1524 mm) of an exit.

P102.9 Outdoor cooking. Outdoor cooking shall not be conducted on combustible balconies or decks or within 10 feet (3048 mm) of combustible construction.

P102.10 Clothes dryer maintenance. The lint trap, mechanical and heating components, and the exhaust duct system of clothes dryers shall be maintained free of lint accumulation.

SECTION P103
OCCUPANCY AND USE LIMITS

P103.1 Overcrowding. The number of occupants in a *short-term rental property* shall not exceed the limits established by Section 404 of the International Property Maintenance Code.

P103.2 Prohibited sleeping spaces. Kitchens and non-habitable spaces shall not be used as *sleeping spaces*.

SECTION P104
MEANS OF EGRESS AND ESCAPE

P104.1 Minimum access. Where more than one *sleeping space* is located in a *dwelling unit* or *sleeping unit*, a *sleeping space* shall not constitute the only means of access to other *sleeping spaces* or *habitable spaces* and shall not serve as the only means of egress from other *habitable spaces*.

P104.2 Exit identification. Where the egress path to an exit is not readily apparent, photoluminescent exit signs shall be installed to clearly mark the egress path.

P104.3 Emergency escape and rescue opening. Each *sleeping space* shall have an *emergency escape and rescue opening* that complies with the code that was in effect at the time of construction, and openings shall be maintained such that they are operational from the inside without the use of keys or tools. Where bars, grilles, grates or similar devices are placed over an *emergency escape and rescue opening*, the minimum net clear opening size that complies with the code that was in effect at the time of construction shall be maintained.

P104.4 Escape ladders. Where a *sleeping space* is located more than one *story* above *grade plane*, an emergency escape ladder complying with ASTM F2175 shall be provided at not less than one *emergency escape and rescue opening* on each such story.

SECTION P105
SAFETY PLAN

P105.1 General. The *responsible party* shall prepare, implement, and maintain a written safety plan for each *short-term rental property*.

P105.2 Approval. The safety plan shall be submitted to the *Fire Code Official* and *approved* before a permit is issued.

P105.3 Safety plan elements. *Short-term rental property* safety plans shall include the following:

1. Name and contact information of *responsible party*.
2. The procedure for a transient occupant to report an emergency and the means of communicating that procedure to transient occupants.
3. A graphic illustration of the full floor plan of the *dwelling unit* or *sleeping unit* with a *short-term rental property* that includes the following:
   - 3.1. The location of each *sleeping space*.
   - 3.2. Two escape paths for each *sleeping space*, including the path to the nearest outside exit door and to a designated *emergency escape and rescue opening* for the *sleeping space*.
   - 3.3. The location of *portable fire extinguishers*, *smoke alarms*, *carbon monoxide alarms*, and emergency escape ladders if provided.
4. Safety equipment records, including the following:
   - 4.1. Location and manufacturing date of each *smoke alarm*, as marked on the back of the alarm.
   - 4.2. Location and manufacturing date of each *carbon monoxide alarm*, as marked on the back of the alarm.
5. Location of fuel-fired equipment and *appliances*.

SECTION P106
FIRE SAFETY INSPECTIONS

P106.1 Responsible party inspections. The *responsible party* shall complete a monthly fire safety inspection of the *short-term rental property* to verify compliance with this appendix. All indoor and outdoor areas associated with the *short-term rental property* shall be inspected.

P106.1.1 Inspection of automatic sprinkler systems. Inspection of automatic sprinkler systems, where provided, shall include the following on a monthly basis unless otherwise indicated:

1. Control valves shall be verified as being in the open position.
2. Leaking, damaged, corroded, or painted sprinklers shall be replaced.
3. Decorations or other materials obstructing sprinkler discharge or attached to sprinklers shall be removed.
4. Water tanks or other stored water sources, if present, shall be verified as full.
5. Instruction signs and tags shall be installed near the main valve.
6. The owner's manual for the system shall be onsite.
7. Water pumps, if present, shall be tested annually to confirm proper operation.
8. Waterflow devices that initiate alarms, if present, shall be tested annually to confirm proper operation.

P106.2 Official inspections. Where required by the *fire code official*, an annual inspection by the *fire code official* or an approved third-party inspector shall be conducted at the *responsible party's* expense to verify compliance with this appendix. The results of each inspection shall be documented and maintained at the *short-term rental property* in a conspicuous location for transient occupants to review.

SECTION P107 VIOLATIONS

P107.1 General. Failure to comply with this appendix shall constitute an unlawful act in accordance with Section 113.1 and shall result in the issuance of a notice of violation to the short-term rental owner in accordance with Section 113.3.

SECTION P108 REFERENCED STANDARDS

E108.1 General. See Table P108.1 for standards that are referenced in various sections of this appendix. Standards are listed by the standard identification with the effective date, standard title, and the section or sections of this appendix that reference the standard.

TABLE P108.1 REFERENCED STANDARDS

STANDARD ACRONYM	STANDARD NAME	SECTIONS HEREIN REFERENCED
ASTM F2175-2015	Standard Specification for Portable and Permanent Emergency Escape Ladders for Residential Use	P104.4

Staff Analysis: A review of the standard proposed for inclusion in the code, ***Standard Specification for Portable and Permanent Emergency Escape Ladders for Residential Use (ASTM F2175-2015)***, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: Regulation of short-term rental (STR) properties is largely done by a patchwork of jurisdiction-by-jurisdiction requirements with little consistency from what I've found. My focus in submitting this proposal is gaining a level of consistency and education of STR owners and operators via a understandable consolidation of the "most important" safety requirements in ICC codes. Although the ICC codes, such as the IFC and IEBC, include a large number of safety-related provisions that are applicable to STRs (and served as the basis for much of the appendix content), they are currently dispersed in a way that does not promote understanding or compliance by people who don't live in the code world. "Most important" reflects my personal opinion of code requirements that I felt were appropriate to include/duplicate/reference in the new appendix to have the greatest impact on improving safety (primarily fire safety) if understood and followed by responsible parties. Certainly, others may have different perspectives, and hopefully the framework provided by the proposed appendix can be further populated as needed to address considerations raised by others during the code development process.

Some additional requirements, that are not otherwise provided for by current codes and seem appropriate for regulation of STRs, are also included in the proposal. These include, among others, as escape ladders for second story sleeping areas, declaration of sleeping spaces, and requiring that sleeping spaces are treated as bedrooms even though such spaces in a STR might be repurposed common areas that wouldn't have previously been considered or regulated as a bedroom.

It's important to note that while fires are not known to be frequent in STRs, they have resulted in significant life loss. Also note that the content of this appendix deliberately sidesteps some of the most controversial issues surrounding regulation of STRs by a jurisdiction, particularly nuisance complaints related to noise, parking and trash; neighborhood STR density limits; licensing; and collection of fees/lodging taxes.

Although I serve as a consultant to the National Fire Sprinkler Association, and while this proposal includes regulations that affect sprinklers, this proposal was not reviewed or endorsed by NFSA. And, I am not representing NFSA on this issue.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Actually, the proposal is not entirely editorial, but it should have no impact on the cost of construction because, for the most part, it simply consolidates/duplicates a selection of existing ICC code requirements into a single location. That's not to say that there wouldn't be costs associated with upgrading an otherwise non-compliant STR property or the required administrative oversight or safety feature additions, but these are not construction costs.

F280-24

2024 GROUP A – PROPOSED CHANGES TO THE INTERNATIONAL FUEL GAS CODE

FUEL GAS CODE COMMITTEE

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TENTATIVE ORDER OF DISCUSSION
2024 PROPOSED CHANGES TO THE
INTERNATIONAL FUEL GAS CODE

The following is the tentative order in which the proposed changes to the code will be discussed at the public hearings. Proposed changes which impact the same subject have been grouped to permit consideration in consecutive changes.

Proposed change numbers that are indented are those which are being heard out of numerical order. Indentation does not necessarily indicate that one change is related to another. Proposed changes may be grouped for purposes of discussion at the hearing at the discretion of the chair. Note that some FG code change proposals may not be included on this list, as they are being heard by another committee.

FG1-24
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FG11-24 Part I
    ADM1-24

FG1-24

IFGC: 303.3

Proponents: Guy McMann, Jefferson County Colorado, Colorado Association of Plumbing and Mechanical Officials (CAPMO) (gmcmann@jeffco.us)

2024 International Fuel Gas Code

Revise as follows:

303.3 Prohibited locations.
Appliances shall not be located in ~~sleeping rooms~~, bedrooms, bathrooms, toilet rooms, storage closets or surgical rooms, or in a space that opens only into such rooms or spaces, except where the installation complies with one of the following:

1. The *appliance* is a direct-vent *appliance* installed in accordance with the conditions of the listing and the manufacturer's instructions.
2. Vented room heaters, wall furnaces, vented decorative *appliances*, vented gas fireplaces, vented gas *fireplace* heaters and decorative *appliances* for installation in vented solid fuel-burning fireplaces are installed in rooms that meet the required volume criteria of Section 304.5.
3. A single wall-mounted unvented room heater is installed in a bathroom and such unvented room heater is equipped as specified in Section 621.6 and has an input rating not greater than 6,000 Btu/h (1.76 kW). The bathroom shall meet the required volume criteria of Section 304.5.
4. A single wall-mounted unvented room heater is installed in a bedroom and such unvented room heater is equipped as specified in Section 621.6 and has an input rating not greater than 10,000 Btu/h (2.93 kW). The bedroom shall meet the required volume criteria of Section 304.5.
5. The *appliance* is installed in a room or space that opens only into a bedroom or bathroom, and such room or space is used for no other purpose and is provided with a solid weather-stripped door equipped with an *approved* self-closing device. *Combustion air* shall be taken directly from the outdoors in accordance with Section 304.6.
6. A clothes dryer is installed in a residential bathroom or toilet room having a permanent opening with an area of not less than 100 square inches (0.06 m^2) that communicates with a space outside of a bedroom, bathroom, toilet room or storage closet.

Reason: 1. Replacing the words sleeping room with bedroom in the first paragraph of the code will align it with the exceptions. Nowhere in the exceptions is sleeping room used.

2. The question is, what is the difference between a sleeping room and a bedroom? The Miriam Webster dictionary defines a bedroom as: a room furnished with a bed and intended primarily for sleeping. There is no definition in Miriam Webster for sleeping room. A definition of sleeping area can be found in the Collins dictionary where a sleeping area is defined as: an area in a room or house where people can sleep but there is no definition of sleeping room. Law Insider has multiple citations for sleeping room from many different municipalities across the country. Most of the citations have differing opinions of what a sleeping room is or is not. In Chapter 2 of the IFGC, IMC, IBC or IRC sleeping room is not defined so anyone using the International Codes is left to figure out on their own what the term sleeping room encompasses. In summation, the words sleeping room are too vague for proper interpretation of what the code is trying to describe.

3. Sleeping room is a holdover from the 2003 IFGC Section 303.3 Prohibited locations code. There is no definition for sleeping room in Chapter 2 of the 2003 IFGC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

There is no cost as this is editorial in nature.

FG2-24

IFGC: 303.3

Proponents: Guy McMann, Jefferson County Colorado, Colorado Association of Plumbing and Mechanical Officials (CAPMO) (gmcmann@jeffco.us)

2024 International Fuel Gas Code

Revise as follows:

303.3 Prohibited locations.
Appliances shall not be located in sleeping rooms, bathrooms, toilet rooms, storage closets or surgical rooms, or in a space that opens only into such rooms or spaces, except where the installation complies with one of the following:

1. The *appliance* is a direct-vent *appliance* installed in accordance with the conditions of the listing and the manufacturer's instructions.
2. Vented room heaters, wall furnaces, vented decorative *appliances*, vented gas fireplaces, vented gas *fireplace* heaters and decorative *appliances* for installation in vented solid fuel-burning fireplaces are installed in rooms that meet the required volume criteria of Section 304.5.
3. A single wall-mounted unvented room heater is installed in a bathroom and such unvented room heater is equipped as specified in Section 621.6 and has an input rating not greater than 6,000 Btu/h (1.76 kW). The bathroom shall meet the required volume criteria of Section 304.5.
4. A single wall-mounted unvented room heater is installed in a bedroom and such unvented room heater is equipped as specified in Section 621.6 and has an input rating not greater than 10,000 Btu/h (2.93 kW). The bedroom shall meet the required volume criteria of Section 304.5.
5. The *appliance* is installed in a room or space that opens only into a bedroom or bathroom, and such room or space is used for no other purpose and is provided with a solid weather-stripped door equipped with an *approved* self-closing device. *Combustion air* shall be taken directly from the outdoors in accordance with Section 304.6, <u>or obtained from any adjacent space or spaces outside of a bedroom, bathroom, toilet room, storage closet or surgical room. Sizing for indoor combustion air volume shall be in accordance with Section 304.5. Sizing and location of the openings used to connect the indoor spaces shall be in accordance with Section 304.5.3.</u>
6. A clothes dryer is installed in a residential bathroom or toilet room having a permanent opening with an area of not less than 100 square inches (0.06 m^2) that communicates with a space outside of a sleeping room, bathroom, toilet room or storage closet.

Reason: As written, when appliances are located in a room or space that opens only in a bedroom or bathroom there is only one option for obtaining combustion air for the appliances located in the space, bring it into the room or space from the outside. There are situations where this is not a feasible or a cost effective solution. For example, the room may not be located near an outside wall making it difficult to get the combustion air duct/ducts into the room or space. The total BTU load in the room may require very large combustion air duct/ducts to be installed. Bringing outside combustion air into a room located within the building envelope does not consider all the insulation requirements of IECC R402.4.4 (Rooms containing fuel-burning appliances).

benefits

1. Having this second option for obtaining combustion air for appliances located in a room or space accessed through a bedroom will allow the homeowner or contractor to safely provide combustion air to the appliance using IFGC 304.5 (Indoor combustion air) and 304.5.3 (Indoor opening size and location).

2. Combustion air requirements for the appliances can be met even if the room or space is not located on an outside wall.

3. Using indoor combustion air is more energy efficient than bringing in cold or hot outside combustion air into the room or space located within the building envelope.

4. Combustion air ducts can be, and sometimes are, plugged by the homeowner to prevent cold air from entering into the mechanical room during the winter months. High/low grilles are rarely intentionally blocked off.

5. Installing grilles is more cost effective than installing combustion air duct/ducts especially when the prohibited location is not adjacent to an outside wall.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

There will be no added cost to industry. There could be savings to the industry. Grilles are relatively inexpensive to purchase especially when compared to the price of sheet metal and fabrication of ducts. Cutting holes in an interior wall and installing grilles is less labor intensive than cutting a hole/holes in an outside wall and installing combustion air duct/ducts.

Estimated Immediate Cost Impact Justification (methodology and variables):

The savings could range from $0 to $500 based on not having to spend labor dollars drilling holes and by not having to insulate the room to meet Energy code requirements.

FG2-24

FG3-24

IFGC: 303.7

Proponents: Guy McMann, Jefferson County Colorado, CAPMO (gmcmann@jeffco.us)

2024 International Fuel Gas Code

Revise as follows:

303.7 Pit locations. *Appliances* installed in pits or excavations shall not come in direct contact with the surrounding soil. The sides of the pit or excavation shall be held back not less than 12 inches (305 mm) from the *appliance*. Where the depth exceeds 12 inches (305 mm) below adjoining grade, the walls of the pit or excavation shall be lined with concrete or masonry, such concrete or masonry shall extend not less than 4 inches (102 mm) above adjoining grade and shall have sufficient lateral load-bearing capacity to resist collapse. <u>Excavation on the control side of the appliance shall extend horizontally not less than 30 inches (762 mm).</u> The *appliance* shall be protected from flooding in an *approved* manner.

Reason: This text is extracted from IRC Section1305.1.3.2 and makes the IFGC consistent with the IRC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

It is important to the installer to have this information in order to make adjustments if necessary to the install thus saving time at a later date.

FG3-24

FG4-24

IFGC: SECTION 202, SECTION 315 (New), 315.1 (New), 315.1.2 (New)

Proponents: Marcelo Hirschler, GBH International, GBH International (mmh@gbhint.com)

2024 International Fuel Gas Code

Delete without substitution:

~~**[M] NONCOMBUSTIBLE MATERIALS.** Materials that, where tested in accordance with ASTM E136, have not fewer than three of four specimens tested meeting all of the following criteria:~~

1. ~~The recorded temperature of the surface and interior thermocouples shall not at any time during the test rise more than 54ºF (30ºC) above the furnace temperature at the beginning of the test.~~
2. ~~There shall not be flaming from the specimen after the first 30 seconds.~~
3. ~~If the weight loss of the specimen during testing exceeds 50 percent, the recorded temperature of the surface and interior thermocouples shall not at any time during the test rise above the furnace air temperature at the beginning of the test, and there shall not be flaming of the specimen.~~

Add new text as follows:

SECTION 315
NONCOMBUSTIBLE MATERIALS

315.1 Testing. Noncombustible materials shall be those materials that comply with Section 703.3.1 of the International Building Code.

315.1.2 Inherently noncombustible materials. Inherently noncombustible materials, such as concrete and steel, shall not be required to be tested to be acceptable as noncombustible materials.

Reason: The so-called definition contained in the 2024 IFGC is said to be under the jurisdiction of the IMC (in accordance with the [M] in front of it). In fact it is not identical to the definition in the IMC, which reads: "Noncombustible material: a material that passes ASTM E136." Furthermore, the present definition in the IFGC is no longer consistent with the language contained in ASTM E136 and also addresses only one of the two options included in ASTM E136 for a material to be considered noncombustible. Finally, the "definition" in the IFGC is actually a "requirement" since it requires materials to meet certain criteria to be classified as a noncombustible material. ICC definitions should not contain requirements.

In the area of material regulation, materials that pass ASTM E136 have long been considered to be those that are noncombustible materials, and that concept is consistent with the flawed "definition" in the IFGC.

This proposal recommends including a correct requirement for what materials shall be considered noncombustible materials and it is to comply with the IBC section 703.3.1. A second proposed section states that a requirement for what is a noncombustible material does not mean that clearly noncombustible materials, such as steel, concrete, or masonry, need to be tested, for example to ASTM E136.

Note that ASTM E136 is one of the very few ASTM fire test standards that has acceptance criteria. The acceptance criteria are different from the theoretical definition of a noncombustible material.

If no requirement exists for what is a noncombustible material, experience indicates that some material manufacturers have claimed that their material is noncombustible when it simply exhibits improved fire performance. When searching the internet, multiple web sites offer materials or products that are alleged to be noncombustible when that claim is incorrect. There is often confusion in the public mind between how to consider a material that performs better than typical combustible materials, but is not enough for the material to be considered noncombustible.

This proposal recommends including a correct requirement for what materials shall be considered noncombustible materials and that is that they need to comply with the IBC section 703.3.1. A second section states that a requirement for what is a noncombustible material does not mean that clearly noncombustible materials, such as steel, concrete, or masonry, need to be tested, for example to ASTM E136.

Equivalent proposals are being submitted to the IFC (by FCAC), the IPC, and the IMC, all of which use noncombustible materials.

Another proposal revises the definitions of "combustible material" in the IMC and IFGC to clarify that the whether a material is or is not noncombustible is the result of a classification. The IBC does not "define" a noncombustible material but contains requirements for such materials.

The language in section 703.3.1 of the IBC reads as follows:*703.3.1 Noncombustible materials. Materials required to be noncombustible shall be tested in accordance with ASTM E136. Alternately, materials required to be noncombustible shall be tested in accordance with ASTM E2652 using the acceptance criteria prescribed by ASTM E136.*

Exception: Materials having a structural base of noncombustible material as determined in accordance with ASTM E136, or with ASTM E2652 using the acceptance criteria prescribed by ASTM E136, with a surfacing of not more than 0.125 inch (3.18 mm) in thickness having a flame spread index not greater than 50 when tested in accordance with ASTM E84 or UL 723 shall be acceptable as noncombustible.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal simply moves a requirement (that is not consistent with the present edition of ASTM E136) into a place where the requirement can be enforced.

FG4-24

FG5-24

IFGC: 404.11.2

Proponents: Jonathan Sargeant, OmegaFlex, OmegaFlex (jonathan.sargeant@omegaflex.com)

2024 International Fuel Gas Code

Revise as follows:

404.11.2 Protection methods.
Underground *piping* shall comply with one or more of the following:

1. The *piping* shall be made of corrosion-resistant material that is suitable for the environment in which it will be installed.
2. Pipe shall have a factory-applied, electrically-insulating coating. Fittings and joints between sections of coated pipe shall be coated in accordance with the coating manufacturer's instructions.
3. The *piping* shall have a cathodic protection system installed and the system shall be monitored and maintained in accordance with an *approved* program.
4. The piping shall employ an encasement system listed for underground installation.

Reason: The proposal adds listed encasement systems currently permitted in 404.14 for installation underground beneath buildings. Listed encasement systems have a long history of successful use below grade both within and outside of the building footprint.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

The material cost for a 20 foot run of 1" piping installed below grade:

Polyethylene with tracer wire and two risers: $217.44

Listed encasement system with two end fittings: $178.84

Savings for listed encasement system: $38.60

Estimated Immediate Cost Impact Justification (methodology and variables):

The proposal permits a manufactured listed encasement system for gas lines below grade outside the building. The most common, and least expensive, material used for this application is polyethylene. Polyethylene on a per foot material is less expensive than a listed encasement system but polyethylene requires a tracer wire and risers where they penetrate grade which is not required for a metallic listed encasement system. Because of the additional requirements, a metallic listed encasement system is often less expensive for shorter piping runs. This estimate assumes a twenty foot run of 1" piping. For longer runs, polyethylene, with the added requirements, would be less expensive to install and the proposal leaves that option intact for the contractor should he choose that alternative.

Estimated Life Cycle Cost Impact:

The proposal has no additional impact on the life cycle of the project.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

The only protection method that would have life cycle costs would be cathodic protection. However, the anode replacement schedule is highly variable (dependent on the corrosiveness of the environment). The length of the replacement schedule coupled with the minimal cost of replacement anodes would make the life cycle cost of the activity trivial.

FG5-24

FG6-24

IFGC: 407.2

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Fuel Gas Code

Revise as follows:

407.2 Design and installation.
Piping shall be supported with metal pipe hooks, metal pipe straps, metal bands, metal brackets, hangers or building structural components, suitable for the size of *piping*, of adequate strength and quality, and located at intervals so as to prevent or damp out excessive vibration. *Piping* shall be anchored to prevent undue strains on connected *appliances* and shall not be supported by other *piping.* Pipe hangers and supports shall conform to the requirements of MSS SP-58 and shall be spaced in accordance with Section 415. Supports, hangers and anchors shall be installed so as not to interfere with the free expansion and contraction of the *piping* between anchors. The components of the supporting *equipment* shall be designed and installed so that they will not be disengaged by movement of the supported *piping*.

Reason: The standards ANSI Z223 and NFPA 54 require metal support hardware. This proposal reverses the action of FG3-21 and aligns with IFGC with those standards.

This proposal is submitted by the ICC Plumbing Mechanical Gas Code Action Committee (PMGCAC)

PMGCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 PMGCAC has held 26 virtual meetings open to any interested party. In addition, there were several virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the PMGCAC website at PMGCAC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Support hardware for any gas piping project is a minimal cost as compared to the entire job. The difference between lowest cost support hardware and metal hardware is insignificant in the big picture.

FG6-24

FG7-24

IFGC: 410.2

Proponents: Jonathan Sargeant, OmegaFlex, OmegaFlex (jonathan.sargeant@omegaflex.com)

2024 International Fuel Gas Code

Revise as follows:

410.2 MP regulators.
MP *pressure regulators* shall comply with the following:

1. The MP regulator shall be *approved* and shall be suitable for the inlet and outlet gas pressures for the application.
2. The MP regulator shall maintain a reduced outlet pressure under lock-up (no-flow) conditions.
3. The capacity of the MP regulator, determined by published ratings of its manufacturer, shall be adequate to supply the *appliances* served.
4. The MP *pressure regulator* shall be provided with *access.* Where located indoors, the regulator shall be vented to the outdoors or shall be equipped with a leak-limiting device, in either case complying with Section 410.3.
5. A tee fitting with one opening capped or plugged shall be installed between the MP regulator and its upstream shutoff valve. Such tee fitting shall be positioned to allow connection of a pressure-measuring instrument and to serve as a sediment trap.
6. ~~A tee fitting with one opening capped or plugged shall be installed not less than 10 pipe diameters downstream of the MP regulator outlet. Such tee fitting shall be positioned to allow connection of a pressure-measuring instrument. The tee fitting is not required where the MP regulator serves an *appliance* that has a pressure test port on the gas control inlet side and the *appliance* is located in the same room as the MP regulator.~~ Means shall be provided downstream of, and in the same room as, the MP regulator for the connection of a pressure measuring instrument. Such means shall be a dedicated test port on a regulator, appliance gas control, or manifold, a plugged tee fitting or a plugged manifold port.
7. Where connected to rigid *piping*, a union shall be installed within 1 foot (304 mm) of either side of the MP regulator.

Reason: This proposal expands the list of acceptable pressure test ports beyond a simple tee fitting by recognizing that regulator, appliance gas control, and pre-fabricated manifold manufacturers often provide integral test ports in their devices that meet the intent of the code. The proposal eliminates the requirement that the test port be 10 pipe diameters downstream of the MP regulator because this requirement is overly restrictive and provides no real world advantage. Bench testing reveals that, at maximum flow, the pressure differential between the regulator test port and a test port located 10 pipe diameters downstream of the regulator is within 1/4 inch water column of each other. This proposal eliminates unnecessary fittings, joints, and potential leak paths in the gas piping system and, in so doing, reduces installation cost while also increasing safety.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

This proposal reduces costs by eliminating the requirement that the plumber install additional fittings to fabricate a test port downstream of the regulator. The eliminated test port assembly is estimated to save roughly $49.46 - $50.77 for a typical installation.

Estimated Immediate Cost Impact Justification (methodology and variables):

Estimated savings reflects the cost of a Tee fitting, pipe nipple and end cap needed to fabricate a test port in from malleable iron but does not reflect the cost of pipe dope or thread tape. A labor rate of $100 per hour was used and assembly time was estimated at 20 minutes. The cost for fabricating the test port out of 1/2" malleable iron is estimated to be $49.46 and the cost of fabricating it out of 3/4 malleable iron is estimated to be $50.77. Variables include fluctuations in material costs and differential labor rates.

Estimated Life Cycle Cost Impact:

There would be no life cycle cost impact.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

N/A

FG7-24

FG8-24

IFGC: 502.1

2024 International Fuel Gas Code

Revise as follows:

502.1 General.
Vents, except as provided in Section 503.7, shall be *listed* and *labeled*. Type B and BW vents shall be tested in accordance with UL 441. Type L vents shall be tested in accordance with UL 641. Vents for Category II ~~and~~, III, and IV *appliances* shall be tested in accordance with UL 1738. ~~Plastic vents for Category IV *appliances* shall not be required to be *listed* and *labeled* where such vents are as specified by the *appliance* manufacturer and are installed in accordance with the *appliance* manufacturer's instructions~~.

Reason: The current venting standard, UL 1738, should be designated as the exclusive standard for listing and labeling combustion gas venting products within the International Fuel Gas Code (IFGC). The current language allows appliance manufacturers to determine what materials can be used for the venting of their appliances, as long as said materials are listed to a testing standard. This has led to the common practice of using PVCs listed to ASTM D1785. The problem associated with this is that this standard is a plumbing standard without provisions for the application of flue gas venting. The first page of ASTM D1785 states:

"NOTE 2: This standard specifies dimensional, performance and test requirements for plumbing and fluid handling applications only. It does not include provisions for the use of these products for venting of combustion gases. UL 1738 is a standard that does include specific testing and marking requirements for flue gas venting products, including PVC."

The current code is both allowing the application of a plumbing standard to the venting of combustion gases and also allowing the application of a standard to be used for a purpose which it explicitly states it is not to be used for. ASTM even goes as far as citing the correct standard (UL 1738) to use in these applications. CPVC, which is also commonly used in these applications, suffers from the same issue with its plumbing standard, ASTM F441. The misapplication of materials and testing standards poses a significant safety hazard, necessitating urgent attention and rectification within the code.

Additionally, the ASTM plumbing standards do not test several critical conditions that venting materials experience, such as elevated and low-temperatures, UV exposure, and elbow load. These conditions, commonplace in vent systems, demand a standard that comprehensively evaluates them.

UL 1738 also incorporates provisions to ensure uniformity in material throughout the entire venting system, emphasizing the need for consistency in properties like expansion/contraction rates. Such considerations as these are unique to flue gas venting systems, further emphasizing the importance of specifying a universal venting standard for these applications.

Numerous countries and municipalities have already established a single standard to which venting products must adhere, such as Canada requiring the ULC S636 standard nationwide in 2007, and NYC recently accepting UL 1738 listing for the venting of Category IV appliances.

The IFGC commentary even supports a robust stance, clarifying that un-listed plastic pipes like PVC, ABS, and CPVC are not included in the definition of "vent" and should not be used for the venting of appliances; see below excerpt from section 503.4.1 of the 2018 IFGC Code Commentary:

"… The definition of 'Vent' does not include plastic pipe, such as PVC, ABS, and CPVC, because such pipes are not currently listed as factory-built venting systems… The PVC, ABS, and CPVC pipe manufacturers do not recommend that their pipes be used for appliance venting because such products are not currently listed for such applications. There are polypropylene and possibly other types of plastic venting systems on the market that are listed to UL 1738 as appliance venting systems, and they would fall under the definition of 'Vent'."

Considering all these factors, it is evident that UL 1738 should be mandated as the required testing standard for any material used in the venting of combustion gases. This is paramount for enhancing installation safety and mitigating the potential risks associated with improper installations that can ultimately jeopardize lives.

Bibliography: 1. ASTM D1785-21a, Scope Section, NOTE 2.
2. 2018 IFGC Code Commentary, Section 503.4.1.
3. Canadian adds 2007 Supplement to Natural Gas & Propane Installation Code (CSA B149-1S1-07), requiring all plastic vent piping to

be certified to ULC S636. https://www.achrnews.com/articles/topic/2670-canada?page=32

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

UL systems are already installed on a daily occurrence, these edits clarify the listing standards that flue gas venting fall under.

FG8-24

FG9-24

IFGC: [M] 614.9.6

Proponents: Jonathan Roberts, UL Solutions, UL Solutions (jonathan.roberts@ul.com)

THIS PROPOSAL WILL BE HEARD BY THE MECHANICAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEE.

2024 International Fuel Gas Code

Revise as follows:

[M] 614.9.6 Exhaust duct required. Where space for a gas-fired clothes dryer is provided, an exhaust duct system shall be installed. Where the clothes dryer is not installed at the time of occupancy, the exhaust duct shall be capped at the location of the future dryer.

~~**Exception:** Where a *listed* condensing clothes dryer is installed prior to occupancy of the structure.~~

Reason: Clarifies that these provisions in the IFGC and Fuel Gas Chapter 24 of the IRC only apply to cases where provisions for a gas clothes dryer have been provided. These provisions would be identified by the presence of a gas outlet in the laundry area. Because condensing-type and heat pump clothes dryers (which do not require exhaust ducts) would not coincide with provisions for a gas outlet in new construction, then the exception is not needed.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

These comments are editorial clarifications for code usability and do not change the substantive requirements.

FG9-24

FG10-24

IFGC: 704.1.2.4

Proponents: Christopher Adam Smith, Viega, LLC, Codes and Standards Manager for Viega, LLC

2024 International Fuel Gas Code

Revise as follows:

704.1.2.4 Joints.
Joints in *piping* and tubing in hydrogen service shall be *listed* as complying with ASME B31.3 to include the use of welded, brazed, flared, socket, press-connect, and slip and compression fittings. Gaskets and sealants used in hydrogen service shall be *listed* as complying with ASME B31.12. Threaded and flanged connections shall not be used in areas other than hydrogen cutoff rooms and outdoors.

Reason: When approved by the manufacturer and meeting all of the required standards, press-connect technology is an acceptable joining method for hydrogen piping that provides a joint that is equal to or better than traditional pipe joining methods. The addition of this joining method to the list of approved joints will allow for more options available to the installer.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The addition of joint type does not increase the cost of construction. The additional joint type allows for a wider selection of materials but does not make their use mandatory. By including this additional joint type in the code, the options for installers will increase while the cost of construction should stay the same or even decrease.

FG10-24

FG11-24 Part I

IFGC: SECTION 202, SECTION 202 (New), 301.3.1 (New), 301.3.2 (New), 301.5, 634.1, 701.1, 705.5.4

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE FUEL GAS CODE COMMITTEE. PART II WILL BE HEARD BY THE IFC CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Fuel Gas Code

Revise as follows:

FUEL GAS. A natural gas, manufactured gas, liquefied petroleum gas or mixtures of these gases including up to 5-percent hydrogen gas by volume.

Add new definition as follows:

HYDROGEN ADMIXTURE.
Fuel gas to which hydrogen is blended or mixed by the fuel supplier or at the point of delivery greater than 5% and less than 95%.

Add new text as follows:

301.3.1 Appliances and equipment listed and labeled for use with hydrogen admixture. Appliances and equipment operating on hydrogen admixtures shall be listed and labeled for operation on the hydrogen admixture limits defined under Section 101.2.1.1.

301.3.2 Piping systems listed and labeled for use with hydrogen admixture. Piping systems and fuel gas system components shall be listed and labeled for the applicable hydrogen admixture limits.

Revise as follows:

301.5 Label information. A permanent factory-applied nameplate(s) shall be affixed to *appliances* on which shall appear in legible lettering, the manufacturer's name or trademark, the model number, serial number and, for *listed appliances*, the seal or mark of the testing agency. A label shall include the hourly rating in British thermal units per hour (Btu/h) (W); the type of fuel gas *approved* for use with the *appliance*; and the minimum *clearance* requirements.

634.1 Installation.
The installation of gaseous hydrogen systems shall be in accordance with ~~the applicable requirements~~ Chapter 7 of this code, the *International Fire Code* ~~and~~ the *International Building Code* and NFPA 2.

701.1 Scope.
The installation of *gaseous hydrogen systems* shall comply with this chapter, ~~and~~ Chapters 53 and 58 of the International Fire Code and NFPA 2. Compressed gases shall also comply with Chapter 50 of the International Fire Code for general requirements.

705.5.4 Placing equipment in operation.
After the *piping* has been placed in operation, all *equipment* shall be purged in accordance with ~~Section 707.2~~ NFPA 2 and then placed in operation, as necessary.

Reason: FUEL GAS

Natural gas utilities are implementing projects to blend gaseous hydrogen into natural gas to reduce their systems and consumers' "carbon footprints." Hydrogen admixtures have raised questions of compatibility of these blends with existing appliances, equipment, and piping systems and components.

Following the submission of a request for interpretation, CSA Group standards Technical Committees were provided access to a range of test data from a variety of sources, and upon careful review and analysis, agree that natural gas containing up to and including 5% of

Hydrogen is covered by testing with Test Gas A. The Request for Interpretation (RFI), and the position of the Technical Committees, have been published here:https://www.csagroup.org/documents/Formal_Interpretations.pdf

As a result, PMG CAC sees no reason to add specifications for such blends in ANSI accredited standards. However, code officials using the ICC Codes would be aided in understanding through the definition of ‘fuel gas’ that such blends are covered through the revised definition.

HYDROGEN ADMIXTURE

The proposed definition is to address Hydrogen Admixtures in the IFGC. Currently provisions do not exist to address Hydrogen Admixtures and their ranges when introduced to natural gas. Chapter 7 of the IFGC regulates Gaseous Hydrogen Systems which are defined as being 95% or higher GH2. This definition will help address ranges of hydrogen admixtures from 6%-94%.

Section 301.3.1

This is one of several proposals that address the potential for hydrogen admixtures. This specific proposal is designed to clarify that Appliances which operate on hydrogen admixtures are treated the same way all other fuel burning appliances are considered. They need to be listed and labeled for the specific fuel mixture that is supplied. This section is applicable to the IRC Chapter 24 as well as the IFGC.

Section 301.3.2

This is one of several proposals that address the potential for hydrogen admixtures. This specific proposal is designed to clarify that all piping and components which are intended to carry hydrogen admixtures are treated the same way all other piping and system components are considered. They need to be listed and labeled for the specific fuel mixture that is being transported. This section is applicable to the IRC Chapter 24 as well as the IFGC.

Section 301.5This proposal updates the current word fuel to fuel gas to ensure correlation to the revised definition for fuel gas that includes up to 5% hydrogen admixture by volume. All other fuels in accordance with Section 301.1.1 shall be regulated by the International Mechanical Code.

Section [A]101.2.1 scopes gaseous hydrogen systems directly to Chapter 7 which is complete for the for the piping system. A direct link to NFPA 2 has been provided for additional provisions that standard provides for.

Section 701.1

Once the user gets to the IFC references they find pointers to NFPA 2. This provides for a direct linkage which is important for those jurisdictions that do not use the IFC for construction purposes.Section 705.5.4

The IFC relies on NFPA 2 for this requirement and this change provides for consistency, Section 707.2 is proposed to be modified to point to NFPA 2.

This proposal is submitted by the ICC Plumbing Mechanical Gas Code Action Committee (PMGCAC)

PMGCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 PMGCAC has held 26 virtual meetings open to any interested party. In addition, there were several virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the PMGCAC website at PMGCAC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is a clarification of different fuel types to address the trend towards blended fuels.

FG11-24 Part I

FG11-24 Part II

IFGC: [F] 633.1, [F] 703.4, [F] 706.1, [F] 707.1, [F] 707.2, [F] 708.1

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Fuel Gas Code

Revise as follows:

[F] 633.1 General. Stationary fuel-cell power systems having a power output not exceeding 10 MW shall be ~~tested~~ listed in accordance with ANSI/CSA FC 1 and shall be installed in accordance with the manufacturer's instructions, NFPA 853, the *International Building Code* and the *International Fire Code* . Hydrogen fuel cell power systems shall also comply with Chapter 7 of this code and NFPA 2.

[F] 703.4 Venting.
Relief device vents shall be terminated in an *approved* location in accordance with ~~Section 2309 of the International Fire Code~~ NFPA 2.

[F] 706.1 General.
The location and installation of *gaseous hydrogen systems* shall be in accordance with Sections 706.2 and 706.3.

~~**Exception:** Stationary fuel-cell power plants in accordance with Section 633.~~

[F] 707.1 Maintenance.
Gaseous hydrogen systems and detection devices shall be maintained in accordance with the *International Fire Code*, ~~and~~ the manufacturer's installation instructions and NFPA 2.

[F] 707.2 Purging.
Purging of *gaseous hydrogen systems*, other than *piping* systems purged in accordance with Section 705.5, shall be in accordance ~~with Sections 2309.6 and 2309.6.1 of the International Fire Code or in accordance~~ with the system manufacturer's instructions and NFPA 2.

[F] 708.1 General.
The design of liquefied hydrogen systems shall comply with Chapters 55 and 58 of the International Fire Code and NFPA 2.

Reason: .

Section [F] 633.1

The word "tested" has been changed to "listed", FC1 is a listing standard. A general reference to NFPA 2 has been added for linkage without having to traverse through the IFC.

Section [F] 703.4

The IFC does not contain the vent termination requirements, that is contained in NFPA 2. Plus, the IFC section pointed to only applies to motor vehicle fueling and repair activities.

Section [F] 706.1

The exception should be deleted, gaseous hydrogen piping systems associated with fuel cell power plants need to be installed in accordance with Chapter 7.

Section [F] 706.2

The IFC has requirements and should be linked here, the "or "should be a "and".

Section [F] 706.3

Section 2309.3.1.1 is the incorrect reference; it only applies to motor fueling. The correct references are Chapters 55 and 58 of the IFC along with NFPA 2.

Section [F] 707.1

NFPA 2 is an important reference, particularly where the IFC is not utilized.

Section [F] 707.2

The IFC relies on NFPA 2 for purging and the IFC sections referenced are limited to motor vehicle fueling.

Section [F]708.1Chapter 58 of the IFC should have been included as the flammable gas chapter. The bulk of the requirements for these systems are found in NFPA 2.

This proposal is submitted by the ICC Plumbing Mechanical Gas Code Action Committee (PMGCAC)

PMGCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 PMGCAC has held 26 virtual meetings open to any interested party. In addition, there were several virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the PMGCAC website at PMGCAC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is a clarification of different fuel types to address the trend towards blended fuels.

FG11-24 Part II

2024 GROUP A – PROPOSED CHANGES TO THE INTERNATIONAL MECHANICAL CODE

MECHANICAL CODE COMMITTEE

Janine Snyder, *Chair*
Rep: Pool and Tub Alliance
Building Official
Teller County Community Development Department
Woodland Park, CO

Donald H. Chaisson, LEED AP, *Vice Chair*
Senior Field Technical Representative
APA HVAC Technologies
South Lancaster, MA

Gregory Beck
Pipefitter Training Instructor
Steamfitter Local Union 420
Philadelphia, PA

Donald Berger, CWI
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National Inspection Testing Certification Corporation
Metairie, LA

Carl Chretien
Rep: National Association of Home Builders
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Chretien Construction Inc.
Saco, ME

Kevin Departhy, PE
Senior Engineering Consultant
Engineering Systems Inc.
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Jay Dufour, AIA, LEED AP
Chief Building Official
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Pikes Regional Building Department
Monument, CO

Staff Secretariat:
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Technical Staff
International Code Council
Central Regional Office
Country Club Hills, IL

TENTATIVE ORDER OF DISCUSSION
2024 PROPOSED CHANGES TO THE
INTERNATIONAL MECHANICAL CODE

The following is the tentative order in which the proposed changes to the code will be discussed at the public hearings. Proposed changes which impact the same subject have been grouped to permit consideration in consecutive changes.

Proposed change numbers that are indented are those which are being heard out of numerical order. Indentation does not necessarily indicate that one change is related to another. Proposed changes may be grouped for purposes of discussion at the hearing at the discretion of the chair. Note that some M code change proposals may not be included on this list, as they are being heard by another committee.

- E1-24 Part IV
- G1-24 Part VII
- G12-24 Part III
- G12-24 Part IV
- G8-24 Part II

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M54-24 Part I
M55-24
M56-24
M57-24 Part I
M58-24
M59-24 Part I
M60-24 Part I
M61-24
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- P13-24

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M87-24
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- P159-24

M1-24

IMC®: SECTION 202

Proponents: Kevin Gebke, DuctSox, DuctSox/Engineering Manager (kgebke@ductsox.com)

2024 International Mechanical Code

Revise as follows:

AIR DISPERSION SYSTEM. Any diffuser system designed to both convey air within a room, space or area and diffuse air into or out of that space while operating under positive or negative pressure. Systems are commonly constructed of, but not limited to, fabric or plastic film.

Reason: UL 2518 Standard for Air Dispersion Systems was updated and published on April 6, 2023. The update recognized that Air Dispersion Systems can be operated in both positive and negative pressure modes if the correct products are specified. This proposal looks to align the IMC and the UL 2518 standard.

Bibliography: UL 2518 Standard for Air Dispersion Systems - April 6, 2023

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal simply aligns the UL 2518 standard and the IMC and has no impact on cost of construction.

M1-24

M2-24

IMC®: CHAPTER 2, SECTION 202, CHAPTER 4, SECTION 403, 403.3.2, 403.3.2.1, 403.3.2.3, TABLE 403.3.2.3

Proponents: Gayathri Vijayakumar, Steven Winter Associates, Inc., Steven Winter Associates, Inc. (gayathri@swinter.com); Dylan Martello, Steven Winter Associates, Inc., Steven Winter Associates, Inc. (dmartello@swinter.com)

2024 International Mechanical Code

CHAPTER 2 DEFINITIONS

SECTION 202 GENERAL DEFINITIONS

BALANCED VENTILATION SYSTEM. A ventilation system that simultaneously supplies outdoor air to and exhausts air from a space, where the mechanical supply airflow rate and the mechanical exhaust airflow rate are each within 10 percent of the average of the two airflow rates.

CHAPTER 4 VENTILATION

SECTION 403 MECHANICAL VENTILATION

403.3.2 Group R-2, R-3 and R-4 occupancies. The design of local exhaust systems and ventilation systems for outdoor air in Group R-2, R-3 and R-4 *occupancies* shall comply with Sections 403.3.2.1 through 403.3.2.5.

403.3.2.1 Outdoor air for dwelling units. An outdoor air ventilation system consisting of a mechanical exhaust system, supply system or combination thereof shall be installed for each *dwelling unit*. Local exhaust or supply systems, including outdoor air ducts connected to the return side of an air handler, are permitted to serve as such a system. The outdoor air ventilation system shall be designed to provide the required rate of outdoor air continuously during the period that the *building* is occupied. The minimum continuous outdoor airflow rate shall be determined in accordance with Equation 4-9.

$$Q_{OA} = 0.03A_{floor} + 7.5(N_{br} + 1) \quad \textbf{(Equation 4-9)}$$

where:

Q_{OA} = outdoor airflow rate, cfm

A_{floor} = conditioned floor area, ft^2

N_{br} = number of bedrooms; not to be less than one

Exceptions:

1. The outdoor air ventilation system is not required to operate continuously where the system has controls that enable operation for not less than 1 hour of each 4-hour period. The average outdoor airflow rate over the 4-hour period shall be not less than that prescribed by Equation 4-9.
2. The minimum mechanical ventilation rate determined in accordance with Equation 4-9 shall be reduced by 30 percent provided that both of the following conditions apply:
   2.1. A ducted system supplies *ventilation air* directly to each bedroom and to one or more of the following rooms:
      2.1.1. Living room.
      2.1.2. Dining room.
      2.1.3. Kitchen.
   2.2. The whole-house ventilation system is a *balanced ventilation system*.

Revise as follows:

403.3.2.3 Local exhaust. Local exhaust systems shall be provided in kitchens, bathrooms and toilet rooms and shall have the capacity to exhaust the minimum airflow rate determined in accordance with Table 403.3.2.3.

Exception: Where the outdoor air ventilation system is a *balanced ventilation system*, the minimum continuous kitchen exhaust rate shall be reduced to 25 cfm and the minimum continuous bathroom exhaust rate shall be reduced to 20 cfm.

TABLE 403.3.2.3 MINIMUM REQUIRED LOCAL EXHAUST RATES FOR GROUP R-2, R-3 AND R-4 OCCUPANCIES

AREA TO BE EXHAUSTED	EXHAUST RATE CAPACITY
Kitchens	100 cfm intermittent or 50 cfm continuous
Bathrooms and toilet rooms	50 cfm intermittent or 25 cfm continuous

For SI: 1 cubic foot per minute = 0.0004719 m^3/s.

Attached Files

- **2027 IMC balanced dwelling unit ventilation examples.xlsx**
  https://www.cdpaccess.com/proposal/10566/30527/files/download/4344/

Reason: There is an exception 2.2 allowed in 403.3.2.1 which is impractical for use since there isn't a corresponding exception in 403.3.2.3. In a balanced system, if you reduce the supply air, you must also allow for a reduction in the exhaust air flows. This proposal creates that needed exception. The attached excel file demonstrates that these lower proposed continuous exhaust values (25cfm/kitchen and 20 cfm/bath) make the exception 2.2 more feasible.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

There is no expected change in cost - maybe a cost decrease since it could reduce the capacity needed for the balanced ventilation system.

M2-24

M3-24

IMC®: SECTION 202 (New), CHAPTER 4, SECTION 405, 405.1, 405.2 (New)

Proponents: Jonathan Flannery, Pandemic Task Force Code Development Working Group, PTF CDWG (jflannery@aha.org)

2024 International Mechanical Code

Add new definition as follows:

BUILDING READINESS PLAN. A plan that documents the engineering controls that the facility mechanical systems will use for the facility to achieve its goals in non-normal mode.

CHAPTER 4 VENTILATION

SECTION 405
SYSTEMS CONTROL

405.1 General. Mechanical ventilation systems shall be provided with manual or automatic controls that will operate such systems whenever the spaces are occupied. Air-conditioning systems that supply required *ventilation air* shall be provided with controls designed to automatically maintain the required outdoor air supply rate during occupancy.

Add new text as follows:

405.2 Alternate Operation Capabilities. Where facilities are designed to operate in various modes in response to natural or manmade threat to/exposure of the building, the following shall be documented through an approved Building Readiness Plan (BRP). The BRP shall include the operations and maintenance (O&M) procedures involved in this operating mode, the mechanical equipment affected, final design drawings, critical asset inventory management plan, maintenance schedules, the maintenance requirements, frequencies, and establish a return to normal mode review period.

Reason: The Pandemic has demonstrated that it may be required to change operating mode of building mechanical ventilation systems under certain circumstances. These circumstances may include natural disasters such as forest fire, hurricane, pandemic, etc. or manmade such as terrorism, civil unrest, etc.

Building mechanical ventilation systems are now being built with different operating modes to reduce economic impact on the building and its occupant activities.

When such mode is created, they shall be documented for building operator to be aware of the capabilities available to operate the building.

The code does not mandate the need for alternative operating mode.

The ICC/NEHA Pandemic Task Force (PTF) was organized and tasked with researching the effects of the COVID-19 pandemic on the built environment and developing a roadmap and proposing needed resources – including guidelines, recommended practices, publications and updates to the International Codes® (I-Codes®) – that are necessary to overcome the numerous challenges that may be faced during future pandemics and to construct and manage safe, sustainable and affordable occupancy of the built environment. The ICC Pandemic Task Force Code Development Work Group (PTF CDWG) has conducted a comprehensive review of current code requirements as they relate to the prevention of the transmission of diseases and other serious health concerns and suggested revisions to current code requirements based on this assessment.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal documents alternate operational capabilities and does not impact construction.

M4-24

IMC®: SECTION 202

Proponents: Emily Toto, ASHRAE, ASHRAE (etoto@ashrae.org)

2024 International Mechanical Code

Revise as follows:

~~BRAZED~~ JOINT, BRAZED. A gastight joint obtained by the joining of metal parts with metallic mixtures or alloys that melt at a liquidus temperature above ~~1,000~~ 840°F (~~538~~ 450°C), but lower than the melting solidus ~~temperature~~ temperatures of the parts to be joined.

JOINT, SOLDERED. A gastight joint obtained by the joining of metal parts with metallic mixtures of alloys that melt at liquidus temperatures between 400°F (~~204~~ 205°C) and ~~1,000~~ 840°F (~~538~~ 450°C).

Reason: The updated definitions are better aligned with ASHRAE 15 and standards for welding. The previous temperature values would lead to a "dead zone" in the weld.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This change only impacts welding settings; it does not change requirements related to construction costs.

M4-24

M5-24

IMC®: SECTION 202

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Mechanical Code

Revise as follows:

BOILER.
A closed heating *appliance* intended to supply *hot water* or steam for space heating, processing or power purposes. Low-pressure boilers operate at pressures less than or equal to 15 pounds per square inch (psi) (103 kPa) for steam and 160 psi (1103 kPa) for water. High-pressure boilers operate at pressures exceeding those pressures. Multipurpose or combination boilers indirectly heat potable water through a heat exchanger.

WATER HEATER.
Any heating *appliance* or *equipment* other than a *boiler* that heats potable water and supplies such water to the potable *hot water* distribution system. Water heaters operate at pressures less than or equal to 150 pounds per square inch (psi) (1035 kPa) and 210°F (99°C). Multipurpose or combination water heaters provide space heating using the *hot water* supplied.

Reason: Clarify distinction between boilers and water heaters. Align with IMC 1002.2.2 which permits dual purpose water heaters using potable water hot water system, and IPC 608.17.3 which permits indirect heating of potable water by boilers.

The addition of water heater operating parameters provides distinction with the boiler definition which provides analogous parameters and aligns with the values in IPC 504.5.

These definitions are based on the appliance function which correlates to the standard(s) to which the appliance is listed. It is not uncommon for an appliance to be dual listed to as complying with more than one standard, and to be able to be configured for different uses. As an example, a commercial appliance may be simultaneously listed as conforming to a water heater standard, a boiler standard, and a pool and spa heater standard. The definition of this example appliance when installed would depend on how it is configured and utilized within the mechanical and plumbing system.

While some jurisdictions require compliance with ASME BPVC above certain vessel sizes and input capacities (e.g. 200,000 BTU/H input capacity and 120 gallon tank size), the distinction between a water heater and boiler is not dependent upon these parameters. The scope and requirements of the applicable product standards do not make these distinctions, and the function and requirements of the appliance within the mechanical and plumbing systems under scope of the IMC and IPC do not change based on these parameters.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal only clarifies the distinction between boilers and WHs .

M5-24

M6-24

IMC®: SECTION 202 (New), 313.1 (New)

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Mechanical Code

Add new definition as follows:

CARBON DIOXIDE ENRICHMENT SYSTEM.
A system where carbon dioxide gas is intentionally introduced into an indoor environment, typically for the purpose of stimulating plant growth.

Add new text as follows:

313.1 Bulk CO2 Storage and Piping Systems. Bulk CO2 storage and piping systems containing more than 100 pounds which are serving carbon dioxide enrichment systems for plant growthand carbonated beverage systems shall be designed and installed in accordance with the provisions of Chapter 53 of the *International Fire Code.*

Reason: The recent popularity of indoor plant growing facilities across the country has led to a marked increase in the employment of compressed gasses for the enrichment of air within the growing area, with carbon dioxide in various types of indoor growing rooms. While CO2 exposure is vital to plant growth, in the wrong concentration, it can be lethal for an individual occupying the growing room space.

Inconsistent and unclear direction has led to a lack of uniform enforcement regarding these installations. Although Section 102.9 of the International Mechanical Code provides the code official with latitude to make decisions, which is not expressly covered in the code, this pointer would offer a clear path to a definitive procedure for compliance with a safe methodology.Some jurisdictions may utilize the Fire Service, Mechanical, Plumbing, or Building Inspectors for review and inspection of these systems. The IMC currently does not provide a clear procedure or reference to a standard by which such a piping and storage system is to be installed and tested. However, Chapter 53 of the International Fire Code provides such direction. The objective of this new section is to create a pointer to the International Fire Code for the installation of these systems.

This proposal is submitted by the ICC Plumbing Mechanical Gas Code Action Committee (PMGCAC)

PMGCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 PMGCAC has held 26 virtual meetings open to any interested party. In addition, there were several virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the PMGCAC website at PMGCAC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is simply a correlation between codes.

M6-24

M7-24

IMC®: SECTION 202; IFGC: SECTION 202

Proponents: Marcelo Hirschler, GBH International, GBH International (mmh@gbhint.com)

2024 International Mechanical Code

Revise as follows:

COMBUSTIBLE MATERIAL. Any material not classified as a noncombustible material. ~~defined as noncombustible~~.

2024 International Fuel Gas Code

Revise as follows:

[M] COMBUSTIBLE MATERIAL. Any material not classified as a noncombustible material ~~defined as noncombustible~~.

Reason: ICC definitions should not contain requirements. The present IMC definition of "noncombustible material" does actually contain the requirement that the material passes ASTM E136. Therefore, this proposal recommends a change in language so that a combustible material is one that is not "classified" (rather than "defined") as a noncombustible material.

Section 703.3.1 of the IBC determines how to classify a material as noncombustible. If a material does not comply with those requirements it is not noncombustible. However,. the IBC does not define a material as noncombustible. This proposal addresses both the IMC and the IFGC definitions because the IFGC definition is shown as being under the responsibility of the IMC (as it is preceded by [M]).

Alternate proposals recommend that the IMC and IFGC replace their definitions of a noncombustible material by referencing section 703.3.1 of the IBC, and moving the requirements to be placed in Chapter 3, on general requirements.

IBC language:

703.3.1 Noncombustible materials. Materials required to be noncombustible shall be tested in accordance with ASTM E136. Alternately, materials required to be noncombustible shall be tested in accordance with ASTM E2652 using the acceptance criteria prescribed by ASTM E136.

Exception: Materials having a structural base of noncombustible material as determined in accordance with ASTM E136, or with ASTM E2652 using the acceptance criteria prescribed by ASTM E136, with a surfacing of not more than 0.125 inch (3.18 mm) in thickness having a flame spread index not greater than 50 when tested in accordance with ASTM E84 or UL 723 shall be acceptable as noncombustible.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This simply changes a definition.

M7-24

M8-24

IMC®: SECTION 202 (New), 403.1, 403.3.2.1

Proponents: Emily Toto, ASHRAE, ASHRAE (etoto@ashrae.org)

2024 International Mechanical Code

Add new definition as follows:

CORRIDOR. An enclosed *exit access* component that defines and provides a path of egress travel.

Revise as follows:

403.1 Ventilation system. Mechanical ventilation shall be provided by a method of supply air and return or *exhaust air*. ~~except that mechanical *ventilation air* requirements for Group R-2, R-3 and R-4 *occupancies* shall be provided by an exhaust system, supply system or combination thereof.~~The amount of supply air shall be approximately equal to the amount of return and *exhaust air*. The system shall not be prohibited from producing negative or positive pressure. The system to convey *ventilation air* shall be designed and installed in accordance with Chapter 6.
Exception: Systems that are designed and installed in accordance with Section 403.3.2.1 and Chapter 6.

403.3.2.1 Outdoor air for dwelling units. Where a *dwelling unit* of new construction opens to a corridor, *outdoor air* shall be mechanically supplied directly to the *dwelling unit*. For other *dwelling units*,~~An~~ outdoor air ~~ventilation system consisting of a~~shall be provided using a ~~mechanical exhaust system,~~ mechanical exhaust system, mechanical supply system or combination thereof~~ shall be installed for each *dwelling unit*~~. Local exhaust or supply systems, including outdoor air ducts connected to the return side of an air handler, are permitted to serve as components of such a system.
403.3.2.2 *Outdoor air* rate for *dwelling units.*

The *dwelling unit's* outdoor air ventilation system shall be designed to provide the required rate of outdoor air continuously during the period that the *building* is occupied. The minimum continuous outdoor air~~flow~~ rate shall be determined in accordance with Equation 4-9.

$$Q_{OA} = 0.03A_{floor} + 7.5(N_{br} + 1) \qquad \textbf{(Equation 4-9)}$$

where:
Q_{OA} = outdoor air~~flow~~ rate, cfm
A_{floor} = conditioned floor area, ft^2
N_{br} = number of bedrooms; not to be less than one

Exceptions:

1. The outdoor air ventilation system is not required to operate continuously where the system has controls that enable operation for not less than 1 hour of each 4-hour period. The average outdoor air~~flow~~ rate over the 4-hour period shall be not less than that prescribed by Equation 4-9.
2. The minimum ~~mechanical ventilation~~*outdoor air* rate determined in accordance with Equation 4-9 shall be reduced by 30 percent provided that both of the following conditions apply:
   2.1. A ducted system supplies ~~*ventilation*~~*outdoor air* directly to each bedroom and to one or more of the following rooms:
      2.1.1. Living room.
      2.1.2. Dining room.
      2.1.3. Kitchen.
   2.2. The ~~whole-house ventilation~~*outdoor air* ventilation system is a *balanced ventilation system*.

Reason: Both ASHRAE 62.2 and the IMC require outdoor air to be provided to dwelling units. Research has demonstrated that a large percentage of the leakage area for attached dwelling units opening to enclosed corridors occurs across the corridor wall.[1] If an exhaust-only system is used to provide outdoor air for such units, we cannot realistically expect one unit of exhaust air to provide one unit of outdoor air. Increasing the exhaust airflow could potentially overcome the deficit, but this would also be expected to draw more air from the enclosed corridor, which is not permitted by IBC Section 1020.5 and IMC Section 601.2 (i.e., “Corridors shall not serve as supply, return, exhaust, relief or ventilation air ducts.”). To ensure that outdoor air is provided directly to dwelling units opening to corridors, 62.2 was recently amended to prohibit exhaust-only ventilation systems from providing the outdoor air required by the standard. Increasing the exhaust airflow rate could also draw more air from adjacent units. This proposal will align the IMC’s requirements for ventilation of dwelling units that open to a corridor with the requirements of ASHRAE 62.2. For clarity, this proposal cross-walks the IBC definition for corridor to the IMC. There is no need to reference an “enclosed corridor” because the enclosed nature is part of the proposed definition of corridor.

Bibliography: 1. Bohac D., and Sweeney L. 2020. Energy Code Field Studies: Low-Rise Multifamily Air Leakage Testing. Prepared by the Center for Energy and Environment, Ecotope, and The Energy Conservatory. Prepared for the U.S. Department of Energy Office of Energy Efficiency & Renewable Energy.
https://www.energycodes.gov/sites/default/files/documents/LRMF_AirLeakageTesting_FinalReport_2020-07-06.pdf. [See Table 45, which shows average leakage to “common” area of 42% for 211 tightly- constructed dwelling units in 20 buildings of new construction located in 6 states. The report also notes, “for buildings in this study, “common areas” are made up almost completely of corridors and a few small rooms such as mechanical closets and elevator rooms. The 42% leakage did not include leakage around the door separating a dwelling unit from the corridor, which would have further increased this value.]

Cost Impact: Increase

Estimated Immediate Cost Impact:

$513

Estimated Immediate Cost Impact Justification (methodology and variables):

An entry-level supply fan serving a single unit would cost about $240 (retail pricing as of May 22, 2023 through www.supplyhouse.com). According to Gordian Mechanical Costs with RSMeans data, 6” insulated flex duct would cost about $10.29/linear foot (line 233346101940; price includes installed cost for material and labor with contractor O&P and builder markup of 10%). For 20 feet of duct (to carry the supply air from an exterior wall to a supply register above the dwelling unit entryway), the ductwork is estimated at $10.29*20 = $206. A supply register is $67: $33 for the part and $34 for labor, based on an average of two HVAC contractor estimates. This provides the combined cost of $240+$206+$67 = $513.

Estimated Life Cycle Cost Impact:

$961

Estimated Life Cycle Cost Impact Justification (methodology and variables):

Assumes the supply fan is replaced after 15 years and a discount factor of 3% for a net present value of $154, but the ductwork and register do not need to be replaced. Assumes filter replacement twice per year at $15 each, for a net present value of $294. Combining the immediate cost and replacement cost: $513 + $154+$294 = $961

Note, however, that IMC Section 601.2 prohibits corridors from serving as “ventilation air ducts.” Because the corridor is not permitted to provide the required volume of outdoor air to the dwelling unit, it is incumbent on the designer to demonstrate that an exhaust-only system has been engineered to deliver the volume of outdoor air required. The additional system components needed to do so (e.g., dedicated outdoor air inlets, exhaust fan with higher ventilation capacity and larger ducting, improved air sealing of the dwelling unit to the corridor, etc.) and associated energy costs to operate them, would help to offset the incremental cost incurred for the supply system. For example, a study (2025-T24-Final-CASE-Report-MF-IAQ.pdf (title24stakeholders.com)) found that compartmentalizing dwelling units to 0.3 cfm50/sf was approximately $450 and to 0.23 cfm50/sf was approximately $900, for an incremental sealing cost of $450 to reach the tightness required for exhaust-only systems to pull air through passive vents. (Although 0.23 cfm50/sf may not be tight enough, as discussed in Copy-of-Passive-vent-calculator-to-post-to-CARB-siteMACRO.xlsm (live.com). Assuming four passive vents at $50 each ($25 per vent, $25 for labor), an exhaust-only system has an immediate cost of approximately $450 + 4 x $50 = $650, similar to the supply-only system. Furthermore, exhaust-only systems introduce unfiltered particulate matter which can worsen IAQ, and drafts which cause discomfort to occupants.

M9-24

IMC®: SECTION 202 (New), 1104.2, 1106.3, 1106.4

Proponents: Emily Toto, ASHRAE, ASHRAE (etoto@ashrae.org)

2024 International Mechanical Code

Add new definition as follows:

EFFECTIVE DISPERSAL VOLUME.
The volume of a space or connected spaces in which leaked *refrigerant* will disperse.

EFFECTIVE DISPERSAL VOLUME CHARGE (EDVC).
The maximum *refrigerant* charge permitted for an *effective dispersal volume.*

Revise as follows:

1104.2 Machinery room. Except as provided in Sections 1104.2.1 and 1104.2.2, all components containing the refrigerant shall be located either outdoors or in a *machinery room* where the quantity of refrigerant in an independent circuit of a *refrigeration system* exceeds both of the following:

1. T~~t~~he amounts shown in Table 1103.1, and
2. The effective dispersal volume charge as calculated in accordance with ASHRAE 15.

For refrigerant blends not listed in Table 1103.1, the same requirement shall apply ~~where the amount for any blend component exceeds that indicated in Table 1103.1~~ for each~~that~~ component. ~~This~~These requirements shall also apply where the combined amount of the blend components exceeds a limit of 69,100 parts per million (ppm) by volume. *Machinery rooms* required by this section and containing only Group A1 or B1 refrigerants shall be constructed and maintained in accordance with Section 1105. ~~for Group A1 and B1 refrigerants and in accordance with Sections 1105 and 1106 for Group A2, B2, A3 and B3 refrigerants.~~ *Machinery rooms* required by this section and containing any Group A2, B2, A3, or B3 flammable refrigerants shall be constructed and maintained in accordance with Sections 1105 and 1106. *Machinery rooms* required by this section, containing any Group A2L or B2L flammable refrigerants and containing no Group A2, B2, A3, or B3 flammable refrigerants, shall be constructed and maintained in accordance with Section 1105 and Section 1106.4.1 through 1106.4.3.

Exceptions:

1. *Machinery rooms* are not required for *listed equipment* and *appliances* containing not more than 6.6 pounds (3 kg) of refrigerant, regardless of the refrigerant's safety classification, where installed in accordance with the *equipment's* or *appliance's* listing and the *equipment* or *appliance* manufacturer's installation instructions.
2. Piping in compliance with Section 1107 is allowed in other locations to connect components installed in a *machinery room* with those installed outdoors.

1106.3 Class 2 and 3 refrigerants. Where any flammable refrigerants of Groups A2, A3, B2 and B3 are used, the *machinery room* shall conform to the Class I, Division 2, *hazardous location* classification requirements of NFPA 70.

1106.4 Group A2L and B2L refrigerants. *Machinery rooms* ~~for~~containing any Group A2L ~~and~~or B2L refrigerants and containing no refrigerants of Group A2, A3, B2, or B3 shall comply with Sections 1106.4.1 through 1106.4.3.

Reason: This proposal harmonizes with Addendum q to ASHRAE 15-2019. The latest published language of ASHRAE 15-2022 was used as the basis for this update. The revisions clarify which requirements apply in cases where a machinery room contains refrigerants from multiple safety groups. The revisions also refer to ASHRAE 15 for EDVC calculations, with the updated requirements for refrigerant charge quantity limits, for determination of when a machinery room is required.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal will have no impact on the cost of construction. These changes for clarity are largely editorial in nature to better align the IMC with ASHRAE 15.

M9-24

M10-24

IMC®: CHAPTER 2, SECTION 202, CHAPTER 4, SECTION 401, 401.4, CHAPTER 5, SECTION 501, 501.3, 501.3.1

Proponents: Gayathri Vijayakumar, Steven Winter Associates, Inc., Steven Winter Associates, Inc. (gayathri@swinter.com)

2024 International Mechanical Code

CHAPTER 2 DEFINITIONS

SECTION 202
GENERAL DEFINITIONS

ENVIRONMENTAL AIR. Air that is conveyed to or from occupied areas through ducts that are not part of the heating or air-conditioning system, such as ventilation for human usage, domestic kitchen range exhaust, bathroom exhaust, domestic clothes dryer exhaust and parking garage exhaust.

CHAPTER 4 VENTILATION

SECTION 401
GENERAL

401.4 Intake opening location.
Air intake openings shall comply with all of the following:

1. Intake openings shall be located not less than 10 feet (3048 mm) from lot lines or buildings on the same lot.
2. Mechanical and gravity outdoor air intake openings shall be located not less than 10 feet (3048 mm) horizontally from any hazardous or noxious contaminant source, such as vents, streets, alleys, parking lots and loading docks, except as specified in Item 3 or Section 501.3.1. Outdoor air intake openings shall be permitted to be located less than 10 feet (3048 mm) horizontally from streets, alleys, parking lots and loading docks provided that the openings are located not less than 25 feet (7620 mm) vertically above such locations. Where openings front on a street or public way, the distance shall be measured from the closest edge of the street or public way.
3. Intake openings shall be located not less than 3 feet (914 mm) below contaminant sources where such sources are located within 10 feet (3048 mm) of the opening. Separation is not required between intake air openings and living space *exhaust air* openings of an individual *dwelling unit* or *sleeping unit* where a factory-built intake/exhaust combination termination fitting is used to separate the air streams in accordance with the fan manufacturer's instructions.
4. Intake openings on structures in flood hazard areas shall be at or above the elevation required by Section 1612 of the International Building Code for utilities and attendant equipment.

CHAPTER 5 EXHAUST SYSTEMS

SECTION 501
GENERAL

501.3 Exhaust discharge. The air removed by every mechanical exhaust system shall be discharged outdoors at a point where it will not cause a public nuisance and not less than the distances specified in Section 501.3.1. The air shall be discharged to a location from which it cannot again be readily drawn in by a ventilating system. Air shall not be exhausted into an attic or crawl space, or be directed onto walkways.

Exceptions:

1. Whole-house ventilation-type attic fans shall be permitted to discharge into the attic space of *dwelling units* having private attics.
2. Commercial cooking recirculating systems.
3. Where installed in accordance with the manufacturer's instructions and where mechanical or *natural ventilation* is otherwise provided in accordance with Chapter 4, *listed* and *labeled* domestic ductless range hoods shall not be required to discharge to the outdoors.

Revise as follows:

501.3.1 Location of exhaust outlets. The termination point of exhaust outlets and ducts discharging to the outdoors shall be located with the following minimum distances:

1. For ducts conveying explosive or flammable vapors, fumes or dusts: 30 feet (9144 mm) from property lines; 10 feet (3048 mm) from operable openings into buildings; 6 feet (1829 mm) from exterior walls and roofs; 30 feet (9144 mm) from combustible walls and operable openings into buildings that are in the direction of the exhaust discharge; 10 feet (3048 mm) above adjoining grade.
2. For other product-conveying outlets: 10 feet (3048 mm) from the property lines; 3 feet (914 mm) from exterior walls and roofs; 10 feet (3048 mm) from operable openings into buildings; 10 feet (3048 mm) above adjoining grade.
3. For all *environmental air* exhaust: 3 feet (914 mm) from property lines; 3 feet (914 mm) from operable openings, except where the exhaust opening is located not less than 1 foot (305 mm) above the gravity air intake opening into buildings for all *occupancies* other than Group U; and <u>not less than 3 feet (914 mm) above mechanical air intakes where such intakes are located within </u>10 feet (3048 mm) <u>of the exhaust termination </u>~~from mechanical air intakes~~. Such exhaust shall not be considered hazardous or noxious. Separation is not required between intake air openings and living space *exhaust air* openings of an individual *dwelling unit* or *sleeping unit* where a factory-built intake/exhaust combination termination fitting is used to separate the air streams in accordance with the fan manufacturer's instructions.
4. Exhaust outlets serving structures in flood hazard areas shall be installed at or above the elevation required by Section 1612 of the International Building Code for utilities and attendant equipment.
5. For specific systems, see the following sections:
   - 5.1. Clothes dryer exhaust, Section 504.4.
   - 5.2. Kitchen hoods and other kitchen exhaust *equipment*, Sections 506.3.13, 506.4 and 506.5.
   - 5.3. Dust, stock and refuse conveying systems, Section 510.2.
   - 5.4. Subslab soil exhaust systems, Section 511.4.
   - 5.5. Smoke control systems, Section 512.10.3.
   - 5.6. Refrigerant discharge, Section 1105.7.
   - 5.7. *Machinery room* discharge, Section 1105.6.1.

Reason: This proposal seeks to align requirements in Chapter 4 and 5 for the minimum distance required between outdoor air intakes and terminations of environmental exhaust air. Specifically for dwelling units in multifamily, it seems the intent of the requirements is to maintain either 10 ft separation OR a minimum of 3 ft vertical distance between the dwelling unit exhaust from bathrooms and kitchens and their outdoor air intakes. The proposed edit in Chapter 5 uses language from Chapter 4 to create consistency.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

There is no cost impact since the requirement in Chapter 5 is being revised to be consistent with the requirement in Chapter 4.

M10-24

M11-24

IMC®: SECTION 202 (New), 1104.5 (New)

Proponents: Emily Toto, ASHRAE, ASHRAE (etoto@ashrae.org)

2024 International Mechanical Code

Add new definition as follows:

GROUP CONTROLLER.
An electrical or electronic control system that monitors and responds to multiple distinct inputs from two or more appliances or refrigeration machinery units.

Add new text as follows:

1104.5 Group Controller Requirements. Utilization of a group controller for multiple refrigeration systems serving the same space or connected spaces shall comply with the following:

1. The refrigerant detection system for each refrigeration system shall provide a signal to notify the group controller when mitigation actions are required in accordance with ASHRAE 15.
2. Where a group controller determines that a signal comes from one or more specific refrigeration systems, it shall be permitted for the group controller to specify which refrigeration systems activate or deactivate mitigation actions in accordance with ASHRAE 15. Where a group controller cannot determine the specific source of a signal, the group controller shall require all of the refrigeration systems serving the same space or connected spaces to activate mitigation actions in accordance with ASHRAE 15.

Reason: This code change proposal is for correlation with proposed revisions within Addendum t, ASHRAE 15-2022. Addendum t has undergone three Publication Public Reviews (PPRs) and is expected to be published in advance of the Technical Committee meetings. The requirements around group controllers contained within Addendum t are vital for data center applications, and detail how group controllers interact with refrigeration system mitigation strategies.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

These changes will have no impact on the cost of construction. Use of a group controller is optional for refrigeration systems.

M11-24

M12-24

IMC®: SECTION 202

Proponents: Emily Toto, ASHRAE, ASHRAE (etoto@ashrae.org)

2024 International Mechanical Code

Revise as follows:

MACHINERY ROOM. ~~An enclosed space that is required by Chapter 11 to contain refrigeration *equipment* and to comply with Sections 1105 and 1106.~~
A designated space meeting the requirements of Sections 1105 and 1106 that contains one or more refrigerating systems or portions thereof.

Reason: The proposed change creates better language for a definition to avoid creating what looks like a requirement (to be enclosed), as that is better to do in the main text of Chapter 11.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Editorial only. We consider it editorial because the original takes information from 1105 and 1106 and includes it in the definition. We are not saying this information no longer applies, but that it's not appropriate for a definition. In other words, the definition should not say when a space is to be enclosed; that should be determined between 1105 and 1106.
"Enclosed space" is now a designated space that meets 1105 and 1106 (same compliance is expected as before).

"Contain refrigerant equipment" means to contain one or more refrigerating systems or portions thereof (same meaning but probably less possibility for gaming).

M12-24

M13-24

IMC®: SECTION 202, 202

Proponents: Lance MacNevin, Director of Engineering, The Plastics Pipe Institute, The Plastics Pipe Institute (lmacnevin@plasticpipe.org)

2024 International Mechanical Code

PIPING. Where used in this code, “piping” refers to either pipe or tubing, or both.

Revise as follows:

Pipe. A rigid conduit of iron, steel, copper, copper-alloy, ~~or~~ plastic or multilayer composite. .

Tubing. Semirigid conduit of copper, copper-alloy, aluminum, plastic or steel.

Reason: Table 1202.4 of the IMC allows the use of multilayer composite pipes, such as those produced according to ASTM F1281 or F1282, or CSA B137.9 or B137.10, yet these types of approved piping materials are not included in the definition for pipe. Therefore, this code change will improve the definition for "pipe" to clarify that approved pipe materials produced using multilayer composite are included.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Table 1202.4 of the IMC allows the use of multilayer composite pipes, such as those produced according to ASTM F1281 or F1282, or CSA B137.9 or B137.10, yet these types of approved piping materials are not included in the definition for "pipe". Therefore, this proposal will improve the definition of "pipe" to clarify that approved pipe materials produced using multilayer composite are included.

M13-24

M14-24

IMC®: SECTION 202 (New), TABLE 403.3.1.1

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Mechanical Code

Add new definition as follows:

PRIVATE GARAGE.
A building or portion of a building in which motor vehicles used by the *owner* or tenants of the building or buildings on the premises are stored or kept, without provisions for repairing or servicing such vehicles for profit.

Revise as follows:

TABLE 403.3.1.1 MINIMUM VENTILATION RATES

Portions of table not shown remain unchanged.

OCCUPANCY CLASSIFICATION	OCCUPANT DENSITY #/1000 FT^2 [a]	PEOPLE OUTDOOR AIRFLOW RATE IN BREATHING ZONE, R_p CFM/PERSON	AREA OUTDOOR AIRFLOW RATE IN BREATHING ZONE, R_a CFM/FT^2 [a]	EXHAUST AIRFLOW RATE CFM/FT^2 [a]
Private dwellings, single and multiple				
Private garages ~~Garages, common for~~ serving multiple units[b]	—	—	—	0.75

For SI: 1 cubic foot per minute = 0.0004719 m^3/s, 1 ton = 908 kg, 1 cubic foot per minute per square foot = 0.00508 $m^3/(s \times m^2)$, °C = [(°F) – 32]/1.8, 1 square foot = 0.0929 m^2.

a. Based on net occupiable floor area.

b. Mechanical exhaust required and the recirculation of air from such spaces is prohibited. Recirculation of air that is contained completely within such spaces shall not be prohibited (see Section 403.2.1, Item 3).

c. Spaces unheated or maintained below 50°F are not covered by these requirements unless the occupancy is continuous.

d. Ventilation systems in enclosed parking garages shall comply with Section 404.

e. Rates are per water closet, urinal or adult changing station. The higher rate shall be provided where the exhaust system is designed to operate intermittently. The lower rate shall be permitted only where the exhaust system is designed to operate continuously while occupied.

f. Rates are per room unless otherwise indicated. The higher rate shall be provided where the exhaust system is designed to operate intermittently. The lower rate shall be permitted only where the exhaust system is designed to operate continuously while occupied.

g. Mechanical exhaust is required and recirculation from such spaces is prohibited. For occupancies other than science laboratories, where there is a wheel-type energy recovery ventilation (ERV) unit in the exhaust system design, the volume of air leaked from the exhaust airstream into the outdoor airstream within the ERV shall be less than 10 percent of the outdoor air volume. Recirculation of air that is contained completely within such spaces shall not be prohibited (see Section 403.2.1, Items 2 and 4).

h. For nail salons, each manicure and pedicure station shall be provided with a source capture system capable of exhausting not less than 50 cfm per station. Exhaust inlets shall be located in accordance with Section 502.20. Where one or more required source capture systems operate continuously during occupancy, the exhaust rate from such systems shall be permitted to be applied to the exhaust flow rate required by Table 403.3.1.1 for the nail salon.

i. Outpatient facilities to which the rates apply are freestanding birth centers, urgent care centers, neighborhood clinics and physicians' offices, Class 1 imaging facilities, outpatient psychiatric facilities, outpatient rehabilitation facilities and outpatient dental facilities.

j. The requirements of this table provide for acceptable IAQ. The requirements of this table do not address the airborne transmission of airborne viruses, bacteria and other infectious contagions.

k. These rates are intended only for outpatient dental clinics where the amount of nitrous oxide is limited. They are not intended for dental operatories in institutional buildings where nitrous oxide is piped.

l. The occupiable floor area in warehouses shall not include the floor area of self-storage units, floor areas under rack storage or designated palletized storage floor areas.

Reason: There have been numerous instances where users of the code did not understand the existing language. A private garage serving a single unit does not require exhaust. However, where a private garage serves multiple units, exhaust is required.

The Private Garage definition comes from the IBC and is being added to the IMC to increase clarity of the term used in Table 403.3.1.1. The definition is intended to have a BG scoping.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Just to correlate the two codes.

M14-24

M15-24

IMC®: SECTION 202 (New), 917.3 (New), UL Chapter 15 (New)

Proponents: Jonathan Roberts, UL Solutions, UL Solutions (jonathan.roberts@ul.com)

2024 International Mechanical Code

Add new definition as follows:

ROBOTIC COMMERICIAL KITCHEN EQUIPMENT. Cooking equipment with robotic or automatic systems intended to be used in lieu of, or in collaboration with, skilled commercial kitchen staff to perform cooking and /or motor-operated food preparing operations in commercial kitchens where they are not ordinarily accessed by the general public.

Add new text as follows:

917.3 Robotic Commercial Kitchen Equipment. *Robotic commercial kitchen equipment* shall be *listed* and *labeled* in accordance with UL 3320 and installed in accordance with the manufacturer's instructions.

Add new standard(s) as follows:

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062-2096

3320-2023 Outline of Investigation for Robotic Commercial Kitchen Equipment

Reason: Robotic kitchen equipment for commercial applications is an emerging technology. This proposal identifies UL 3320 as the standard requirements used for third party certification (listed and labeled) of robotic commercial kitchen equipment.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The cost for obtaining listed robotic kitchen equipment may or may not represent increased product costs over obtaining non-listed produc

Obtaining and maintaining a listing for listed robotic kitchen equipment involves both product investigation costs and costs for periodic ins

M15-24

M16-24

IMC®: 306.5

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Mechanical Code

Revise as follows:

306.5 Equipment or appliances on roofs or elevated structures. Where *equipment* requiring access or *appliances* are located on an elevated structure or the roof of a building such that personnel will have to climb higher than 16 feet (4877 mm) above grade to access such *equipment* or *appliances*, an interior or exterior means of access shall be provided.<u>In buildings three or fewer stories above grade plane, the clear access opening dimensions for roof access shall be not less than 20 inches x 30 inches. In buildings four or more stories above grade plane, interior roof access openings and roof access hatches shall be sized and installed in accordance with the *International Building Code*.</u>Such access shall not require climbing over obstructions greater than 30 inches (762 mm) in height or walking on roofs having a slope greater than 4 units vertical in 12 units horizontal (33-percent slope). Such access shall not require the use of portable ladders. Where access involves climbing over parapet walls, the height shall be measured to the top of the parapet wall.Permanent ladders installed to provide the required access shall comply with the following minimum design criteria:

1. The side railing shall extend above the parapet or roof edge or landing platform not less than 42 inches (1067 mm). .
2. Ladders shall have rung spacing not less than 10 inches (254 mm) and not to exceed 14 inches (356 mm) on center. The uppermost rung shall be not greater than 24 inches (610 mm) below the upper edge of the roof hatch, roof or parapet, as applicable.
3. Ladders shall have a toe spacing not less than 7 inches (178 mm) and not more than 12 inches (305 mm) deep.
4. There shall be not less than 16 inches (406 mm) between rails.
5. Rungs shall have a diameter not less than 0.75-inch (19.1 mm) and be capable of withstanding a 300-pound (136 kg) load.
6. Ladders over 30 feet (9144 mm) in height shall be provided with offset sections and landings capable of withstanding 100 pounds per square foot (488 kg/m^2). Landing dimensions shall be not less than 18 inches (457 mm) and not less than the width of the ladder served. A guard rail shall be provided on all open sides of the landing.
7. Climbing clearance. The distance from the centerline of the rungs to the nearest permanent object on the climbing side of the ladder shall be not less than 30 inches (762 mm) measured perpendicular to the rungs. This distance shall be maintained from the point of ladder access to the bottom of the roof hatch. A minimum clear width of 15 inches (381 mm) shall be provided on both sides of the ladder measured from the midpoint of and parallel with the rungs except where cages or wells are installed.
8. Landing required. The ladder shall be provided with a clear and unobstructed bottom landing area having a minimum dimension of 30 inches (762 mm) by 30 inches (762 mm) centered in front of the ladder.
9. Ladders shall be protected against corrosion by *approved* means.
10. Access to ladders shall be provided at all times.
11. Top landing required. The ladder shall be provided with a clear and unobstructed landing on the exit side of the roof hatch, having a minimum space of 30 inches (762 mm) deep and being the same width as the hatch.

Catwalks installed to provide the required access shall be not less than 24 inches (610 mm) wide and shall have railings as required for service platforms.

Exception: This section shall not apply to Group R-3 *occupancies*.

Reason: This clarifies the minimum size required for roof hatch openings. The proposed text replicates the minimum size requirements already identified in the IMC for attic access (IMC 306.3). The IBC already contains the provisions in relation to minimum size roof hatches for buildings 4 stories and more. These openings often impact service and access to the HVAC installations. This is merely a pointer to assist the mechanical/building designers and installers as to what is required if a roof hatch is utilized to access appliances and equipment.

This proposal is submitted by the ICC Plumbing Mechanical Gas Code Action Committee (PMGCAC)

PMGCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 PMGCAC has held 26 virtual meetings open to any interested party. In addition, there were several virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the PMGCAC website at PMGCAC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The IMC covers roof access for where personnel will have to climb higher than 16 feet.
The IBC covers roof access where buildings are four or more stories above grade plane and a stairway is required (see IBC code sections below.)

2024 IBC

1011.12 Stairway to roof.

In *buildings* four or more *stories above grade plane*, one *stairway* shall extend to the roof surface unless the roof has a slope steeper than four units vertical in 12 units horizontal (33-percent slope).

> **Exception:** Other than where required by Section 1011.12.1, in *buildings* without an *occupiable roof* access to the roof from the top *story* shall be permitted to be by an *alternating tread device*, a ship's ladder or a permanent ladder.

1011.12.1 Stairway to elevator equipment.

Roofs and *penthouses* containing elevator equipment that must be accessed for maintenance are required to be accessed by a *stairway*.

1011.12.2 Roof access.

Where a *stairway* is provided to a roof, access to the roof shall be provided through a *penthouse* complying with Section 1511.2.

> **Exception:** In *buildings* without an *occupiable roof*, access to the roof shall be permitted to be a roof hatch or trap door not less than 16 square feet (1.5 m^2) in area and having a minimum dimension of 2 feet (610 mm).

M16-24

M17-24

IMC®: 306.5, DOL (New)

Proponents: MICHELE ORAS, LadderTech LLC DBA LadderPort, LadderTech LLC DBA LadderPort (michele@ladderport.com)

2024 International Mechanical Code

Revise as follows:

306.5 Equipment or appliances on roofs or elevated structures.
Where *equipment* requiring access or *appliances* are located on an elevated structure or the roof of a building such that personnel will have to climb higher than 16 feet (4877 mm) above grade to access such *equipment* or *appliances*, an interior or exterior means of access shall be provided. Such access shall not require climbing over obstructions greater than 30 inches (762 mm) in height or walking on roofs having a slope greater than 4 units vertical in 12 units horizontal (33-percent slope). Such access shall not require the use of portable ladders. Where access involves climbing over parapet walls, the height shall be measured to the top of the parapet wall. Permanent ladders installed to provide the required access shall comply with the following minimum design criteria:

1. The side railing shall extend above the parapet or roof edge or landing platform not less than 42 inches (1067 mm). .
2. Ladders shall have rung spacing not less than 10 inches (254 mm) and not to exceed 14 inches (356 mm) on center. The uppermost rung shall be not greater than 24 inches (610 mm) below the upper edge of the roof hatch, roof or parapet, as applicable.
3. Ladders shall have a toe spacing not less than 7 inches (178 mm) and not more than 12 inches (305 mm) deep.
4. There shall be not less than 16 inches (406 mm) between rails.
5. Rungs shall have a diameter not less than 0.75-inch (19.1 mm) and be capable of withstanding a 300-pound (136 kg) load.
6. Ladders over 30 feet (9144 mm) in height shall be provided with offset sections and landings capable of withstanding 100 pounds per square foot (488 kg/m^2). Landing dimensions shall be not less than 18 inches (457 mm) and not less than the width of the ladder served. A guard rail shall be provided on all open sides of the landing.
7. Climbing clearance. The distance from the centerline of the rungs to the nearest permanent object on the climbing side of the ladder shall be not less than 30 inches (762 mm) measured perpendicular to the rungs. This distance shall be maintained from the point of ladder access to the bottom of the roof hatch. A minimum clear width of 15 inches (381 mm) shall be provided on both sides of the ladder measured from the midpoint of and parallel with the rungs except where cages or wells are installed.
8. Landing required. The ladder shall be provided with a clear and unobstructed bottom landing area having a minimum dimension of 30 inches (762 mm) by 30 inches (762 mm) centered in front of the ladder.
9. Ladders shall be protected against corrosion by *approved* means.
10. Access to ladders shall be provided at all times.
11. Top landing required. The ladder shall be provided with a clear and unobstructed landing on the exit side of the roof hatch, having a minimum space of 30 inches (762 mm) deep and being the same width as the hatch.

Catwalks installed to provide the required access shall be not less than 24 inches (610 mm) wide and shall have railings as required for service platforms.

~~Exception~~ <u>Exceptions</u>:

1. This section shall not apply to Group R-3 *occupancies*.
2. <u>An approved, permanent building-mounted ladder receiver which prevents the ladder from sliding sideways off the building or slipping backward and meets the ladder safety standard of OSHA regulation 29 CFR 1926.1053 (b)(1) shall be permitted as an interior or exterior means of access on buildings under 24 ft (7315 mm) in height above grade to access such equipment or appliances.</u>

Add new standard(s) as follows:

DOL

U.S. Department of Labor
Occupational Safety and Health Administration c/o Superintendent of Documents U.S. Government Printing Office
Washington
, DC 20210

29 CFR Part 1926.1053(b)(1) (2023) Ladders

Staff Analysis: New Referenced A review of the standard proposed for inclusion in the code, DOL CFR Part 1926.1053(b)(1)Ladders, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Attached Files

- **Ladder receiver power point.pdf**
  https://www.cdpaccess.com/proposal/9086/28211/files/download/3887/
- **TOC ITEMS 1-6.pdf**
  https://www.cdpaccess.com/proposal/9086/28211/files/download/3886/

Reason: Currently Section 306.5 of the code requires a permanent means of access when accessing a roof over 16'. "Where equipment requiring access or appliances are located on an elevated structure or the roof of a building such that personnel will have to climb higher than 16 feet (4877 mm) above grade to access such equipment or appliances, an interior or exterior means of access shall be provided". **LadderTech is requesting the following exception:**

An approved, permanent building-mounted ladder receiver which prevents the ladder from sliding sideways off the building or slipping backward and meets the ladder safety standard of OSHA regulations (Standard - 29 CFR) Ladders - 1926.1053 (b)(1) is acceptable as an interior or exterior means of access on buildings under 24' in height above grade to access such equipment or appliances.

In 2012, the Michigan Mechanical Code Council added the above exception for buildings up to 20'. **Amended in 2022 to include buildings less than 24'.**

An approved ladder receiver holding an extension ladder in place is safer to climb than a permanent vertical ladder, as your body leans forward.

An approved ladder receiver allows for ladder removal for greater building security.

In 2015, Hartland Deerfield Fire Marshal wrote a similar ordinance for all new unsprinkled buildings in the city 30' or under. In their jurisdiction, an authorized ladder receiver must be installed even if another means of access is present. Other fire departments in Michigan have followed suit. It is the opinion of the fire departments that authorized ladder receivers provide safer access to fire fighters and allow them to concentrate on fighting fires rather than holding ladders. They based this determination on the following:

Vertical ladders are difficult to climb with the amount and weight of the equipment fire fighters must wear and/or carry.

Ladder receivers negate the need for TWO fire fighters to hold the ladder in place while a third climbs to the roof, leaving two additional fire fighters to actually fight the fire.

Authorized Ladder Receiver Description

A permanently building mounted ladder receiver that securely holds an extension ladder in place, even when ice, wind or uneven ground is present. The side plates and hooks keep the ladder from falling to either side. Hooks are curved for easy ladder placement yet hold the ladder firmly in place. Grab bars with hand stops extend above the roof per OSHA requirements providing secure walk-through access on/off the roof, eliminating the dangerous transition around the ladder. An angled extension ladder held securely in place is much safer than a vertical ladder especially when carrying parts or tools to the roof. Several different models are available to accommodate multiple building facades. The different models are detailed in attached documentation.

Advantages of authorized ladder receivers vs permanent mount ladders:

P= Problem **S= Solution**

P: Permanent Mount Vertical Ladders make it almost impossible to safely carry items to the roof as one's body naturally falls away from the ladder.**S: A ladder receiver secures the extension ladder at the proper safe angle allowing for the natural tendency of one's body to lean toward the ladder.**

P: Permanent ladders provide roof access to anyone including children, vandals, and thieves. Even when gated, permanent ladders are scalable.**S: Ladder receivers can only be accessed with an extension ladder. When done remove the extension ladder and there is no easy access. Schools especially appreciate this as it removes the temptation for students to access the roof.**

P: OSHA requires a ladder tie-off, many buildings fail to provide any means to properly tie-off.

S: No need to tie-off with an authorized ladder receiver as the rungs and side plates prevent the ladder from moving.

P: An extension ladder must extend 36" above the roof line creating the dangerous "walk around the ladder to access the roof" routine.

S: Authorized ladder receivers provide comfortable, secure grab bars with hand stops, meeting OSHA requirements with a safe walk-through directly from the ladder to the roof, where many ladder fall accidents occur.

P: Ladders damage gutters and building facade.

S: Authorized ladder receivers protect building gutters and finishes while keeping ladders in assigned location away from pedestrian traffic for greater public safety and preventing costly repairs.

Additional Advantages:

Authorized ladder receivers are independently tested to meet the OSHA pull rate standard and comply with other OSHA regulations.

Authorized ladder receivers are Installed throughout the United States and Canada and are well field tested to rave reviews.

The current code is shown as an exception in the Michigan Mechanical Code Book for buildings up to 20' - the new exception for 24' is approved but the new book is not yet published.

Cost Impact: The code change proposal will decrease the cost of construction

The code change generally will lower the cost of the installation both in material costs and installation costs. In most cases the LadderPort ladder receiver is less expensive than a permanent mount vertical ladder, especially if a gate is required on the permanent ladder. Additionally, it is less expensive to install the LadderPort ladder receiver.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

The cost impact will vary based as vertical ladders with security gates have a wide price range. Vertical ladders can range in price from $ 700 ish to $ 5000+ based on many variables. Ladder receivers currently do not exceed

$ 1000, based on variables, and average $ 739 give or take.

The request for this exception does not remove the need for safe access from the ground up rather allows an additional approved method for this access,. which means the cost impact difference is solely based on which model vertical ladder is purchased. Again, vertical ladders tend to be higher in price than a ladder receiver.

Attached are examples of the cost of a ladder receiver vs. a vertical ladder of similar attributes.

Estimated Immediate Cost Impact Justification (methodology and variables):

Ladder Receiver Example (See attached doc for links to pricing)

Ladder Receiver $ 739

Total $ 739

Vertical Ladder w/ Security Gate Example (See attached doc for links to pricing)

16' Vertical Ladder $ 761.99

Security Gate $ 485.95

Total **$ 1,247.94**

Estimated Life Cycle Cost Impact:

Life cycle of both the ladder receiver and vertical ladder is approximately the same amount as they are both made of steel and should have same life cycle.

The impact of the life cycle cost for a ladder receiver lies in its increased safety and deterent to vandals and theives, which cannot easily be put into a dollar amount.

A ladder receiver has the following benefits over a vertical ladder:

1. It is safer to climb an extension ladder held by a ladder receiver as the body leans forward vs. the backward tendency of a body climbing a vertical ladder.

2. OSHA requires 7" mounting extensions on vertical ladders, even with a security gate vandals can climb the vertical ladder using those extensions.

3. A security gate can be vandalized and removed leaving a vertical ladder to climb - vandals can take advantage of that. Once a person is finished using the ladder receiver the extension ladder is removed, leaving no easy roof access.

4. Security gates are often left unlocked due to employee error. When using a ladder receiver there is no worry about leaving a gate unlocked.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

Since both items are made of steel they require the same maintenance and have the same life time cycle.

If both the ladder receiver and the vertical ladder are coated in the same material (i.e. galvanized or powder coated) the life cycle should be identical.

M17-24

M18-24

IMC®: 307.2.1.1; IPC: [M] 314.2.1.1

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov)

2024 International Mechanical Code

Revise as follows:

307.2.1.1 Condensate discharge. Condensate drains shall not directly connect to any plumbing drain, waste or vent pipe. Condensate drains shall not discharge into a plumbing fixture other than a floor sink, floor drain, trench drain, mop sink, hub drain, standpipe, utility sink or laundry sink. ~~Condensate drain connections to a lavatory wye branch tailpiece or to a bathtub overflow pipe shall not be considered as discharging to a plumbing fixture.~~ <u>Condensate drains shall be installed in accordance with Section 802.1.5 of the International Plumbing Code.</u> Except where discharging to grade outdoors, the point of discharge of condensate drains shall be located within the same occupancy, tenant space or dwelling unit as the source of the condensate.

2024 International Plumbing Code

Revise as follows:

[M] 314.2.1.1 Condensate discharge.
Condensate drains shall not directly connect to any plumbing drain, waste or vent pipe. Condensate drains shall not discharge into a plumbing fixture other than a floor sink, floor drain, trench drain, mop sink, hub drain, standpipe, utility sink or laundry sink. ~~Condensate drain connections to a lavatory wye branch tailpiece or to a bathtub overflow pipe shall not be considered as discharging to a plumbing fixture.~~ <u>Condensate drains shall be installed in accordance with Section 802.1.5.</u>Except where discharging to grade outdoors, the point of discharge of condensate drains shall be located within the same occupancy, tenant space or dwelling unit as the source of the condensate.

Reason: This proposal is intended to correct an issue that was created by an approved proposal in the IMC. The IMC should never dictate what fixtures are permitted to receive waste or to supersede requirements already in place in the IPC. The allowance by the IMC to connect condensate discharge to a lavatory tailpiece or a bathtub overflow, this proposal was intended to get around requirements in the IPC. The IPC provides all direction necessary to deal with waste discharge including condensate. The stricken language allows for condensate discharge to connect to lavatory tailpiece as well as bathtub overflow connections, these are the two primary fixture to experience blockages due to hair clogs. Striking the language will prevent unintended flooding that would result from such a clog. A blockage wouldn't need to be a complete blockage, it would only need to be sufficient to keep the drain from keeping up with the4 condensate discharge produced by the equipment. Adding "**Condensate drains shall be installed in accordance with IPC 802.1.5."** provides a more correct path for compliance with the requirements in the IPC.

Bibliography: See reason statement.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Condensate disposal is already required, if anything this proposal will eliminate potential costs associated to damage that could be the result of the portion removed.

M18-24

M19-24

IMC®: 307.2.2

Proponents: Robert Sterling, Robert, Robert Sterling

2024 International Mechanical Code

Revise as follows:

307.2.2 Drain pipe materials and sizes.
Components of the condensate disposal system shall be ABS, cast iron, copper and copper alloy, CPVC, cross-linked polyethylene, galvanized steel, stainless steel, PE-RT, polyethylene, polypropylene, PVC or PVDF pipe or tubing. Components shall be selected for the pressure and temperature rating of the installation. Joints and connections shall be made in accordance with the applicable provisions of Chapter 7 of the International Plumbing Code relative to the material type. Condensate waste and drain line size shall be not less than $^{3}/_{4}$-inch pipe size and shall not decrease in size from the drain pan connection to the place of condensate disposal. Where the drain pipes from more than one unit are manifolded together for condensate drainage, the pipe or tubing shall be sized in accordance with Table 307.2.2.

Reason: 307.2.2 of the 2024 edition of the International Mechanical Code allows specific materials for condensate drains, but overlooks Stainless Steel as an allowable material even though this is required in many food and pharma processing applications. This proposal seeks to add "stainless steel" after the words "galvanized steel" in section 307.2.2 to ensure that the use of stainless steel is permitted.

Bibliography: International Mechanical Code, 2024 Edition, Paragraph 307.2.2

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The choice of drain material remains in the hands of the designer. The change proposal seeks to expand the allowable materials, and does not force the use of any one material.

M19-24

M20-24

IMC®: TABLE 308.4.2

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Mechanical Code

Revise as follows:

TABLE 308.4.2 CLEARANCE REDUCTION METHODS[a, b, c]

TYPE OF PROTECTIVE ASSEMBLY[~~a~~b]	REDUCED CLEARANCE WITH PROTECTION (inches)[~~a~~b]							
	Horizontal combustible assemblies located above the heat source				Horizontal combustible assemblies located beneath the heat source and all vertical combustible assemblies			
	Required clearance to combustibles without protection (inches)[~~a~~b]				Required clearance to combustibles without protection (inches)			
	36	**18**	**9**	**6**	**36**	**18**	**9**	**6**
Galvanized sheet steel, having a minimum thickness of 0.0236 inch (No. 24 gage), mounted on 1-inch glass fiber or mineral wool batt reinforced with wire on the back, 1 inch off the combustible assembly	18	9	5	3	12	6	3	3
Galvanized sheet steel, having a minimum thickness of 0.0236 inch (No. 24 gage), spaced 1 inch off the combustible assembly	18	9	5	3	12	6	3	2
Two layers of galvanized sheet steel, having a minimum thickness of 0.0236 inch (No. 24 gage), having a 1-inch airspace between layers, spaced 1 inch off the combustible assembly	18	9	5	3	12	6	3	3
Two layers of galvanized sheet steel, having a minimum thickness of 0.0236 inch (No. 24 gage), having 1 inch of fiberglass insulation between layers, spaced 1 inch off the combustible assembly	18	9	5	3	12	6	3	3
0.5-inch inorganic insulating board, over 1 inch of fiberglass or mineral wool batt, against the combustible assembly	24	12	6	4	18	9	5	3
$3^1/_2$-inch brick wall, spaced 1 inch off the combustible wall	—	—	—	—	12	6	6	6
$3^1/_2$-inch brick wall, against the combustible wall	—	—	—	—	24	12	6	5

For SI: 1 inch = 25.4 mm, °C = [(°F) – 32]/1.8, 1 pound per cubic foot = 16.02 kg/m^3, 1.0 Btu × in/(ft^2 × h × °F) = 0.144 W/m^2 × K.

a. Reduction of clearances from *combustible materials* shall not interfere with *combustion air*, draft hood clearance and relief, and accessibility of servicing.

~~a~~ b. Mineral wool and glass fiber batts (blanket or board) shall have a minimum density of 8 pounds per cubic foot and a minimum melting point of 1,500°F. Insulation material utilized as part of a clearance reduction system shall have a thermal conductivity of 1.0 Btu × in/(ft^2 × h × °F) or less. Insulation board shall be formed of noncombustible material.

~~b~~ c. For limitations on clearance reduction for solid fuel-burning appliances, masonry chimneys, connector pass-throughs, masonry fireplaces and kitchen ducts, see Sections 308.4.2.1 through 308.4.2.5.

Reason: The reduction of clearance tables in the IFGC (Table 308.2) and in the IRC (Tables M1306.2 and G2409.2) contain the footnote that the reduction of clearances shall not interfere with combustion air, draft hood clearance and relief, and accessibility of servicing. This footnote should also apply to the same table in the mechanical code.

This proposal is submitted by the ICC Plumbing Mechanical Gas Code Action Committee (PMGCAC)

PMGCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 PMGCAC has held 26 virtual meetings open to any interested party. In addition, there were several virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the PMGCAC website at PMGCAC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Clarifies requirements and aligns with the other reduction of clearance tables in the IRC (Mechanical and Fuel Gas) and IFGC.

M20-24

M21-24

IMC®: SECTION 202, SECTION 313 (New), 313.1 (New), 313.2 (New)

Proponents: Marcelo Hirschler, GBH International, GBH International (mmh@gbhint.com)

2024 International Mechanical Code

Delete without substitution:

~~**NONCOMBUSTIBLE MATERIAL.** A material that passes ASTM E136.~~

Add new text as follows:

SECTION 313 NONCOMBUSTIBLE MATERIALS

313.1 Testing. Noncombustible materials shall be those materials that comply with Section 703.3.1 of the International Building Code.

313.2 Inherently noncombustible materials. Inherently noncombustible materials, such as concrete and steel, shall not be required to be tested to be acceptable as noncombustible materials.

Reason: The definition contained in the 2024 IMC is actually a requirement rather than a definition and ICC definitions should not contain requirements.

In the area of material regulation, materials that pass ASTM E136 have long been considered to be those that are noncombustible materials, and that concept is consistent with the definition presently in the IMC but that "definition" is actually a requirement, which should be moved out of Chapter 2. Chapter 3 is the chapter for general requirements.

Note that ASTM E136 is one of the very few ASTM fire test standards that has acceptance criteria. The acceptance criteria are different from the theoretical definition of a noncombustible material.

Unless a requirement exists, experience indicates that some material manufacturers have claimed that their material is noncombustible when it simply exhibits improved fire performance. When searching the internet, multiple web sites offer materials or products that are alleged to be noncombustible when that claim is incorrect. There is often a confusion in the public mind when considering a material that performs better than typical combustible materials, but should not be considered noncombustible.

This proposal recommends including a correct requirement for what materials shall be considered noncombustible materials and it is to comply with the IBC section 703.3.1. A second section states that a requirement for what is a noncombustible material does not mean that clearly noncombustible materials, such as steel, concrete, or masonry, need to be tested, for example to ASTM E136.

Equivalent proposals are being submitted to the IFC (by FCAC), the IPC, and the IFGC, all of which use noncombustible materials.

Another proposal revises the definitions of "combustible material" in the IMC and IFGC to clarify that the whether a material is or is not noncombustible is the result of a classification. The IBC does not "define" a noncombustible material but contains requirements for such materials.

The language in section 703.3.1 of the IBC reads as follows:

703.3.1 Noncombustible materials. Materials required to be noncombustible shall be tested in accordance with ASTM E136. Alternately, materials required to be noncombustible shall be tested in accordance with ASTM E2652 using the acceptance criteria prescribed by ASTM E136.

Exception: Materials having a structural base of noncombustible material as determined in accordance with ASTM E136, or with ASTM E2652 using the acceptance criteria prescribed by ASTM E136, with a surfacing of not more than 0.125 inch (3.18 mm) in thickness having a flame spread index not greater than 50 when tested in accordance with ASTM E84 or UL 723 shall be acceptable as *noncombustible.*

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This simply moves a requirement from a definition into a section where it can be actually applied, without changing the content.

M21-24

M22-24

IMC®: 401.1, 401.2, SECTION 403, 403.1, 403.3, 403.3.1, 403.3.2, 403.3.2.1, 403.3.2.2, 403.3.2.3, TABLE 403.3.2.3

Proponents: Mike Moore, Stator LLC, Broan-NuTone (mmoore@statorllc.com)

2024 International Mechanical Code

401.1 Scope. This chapter shall govern the ventilation of spaces within a *building* intended to be occupied. Mechanical exhaust systems, including exhaust systems serving clothes dryers and cooking *appliances*; hazardous exhaust systems; dust, stock and refuse conveyor systems; subslab soil exhaust systems; smoke control systems; energy recovery ventilation systems and other systems specified in Section 502 shall comply with Chapter 5.

Revise as follows:

401.2 Ventilation required. ~~Every occupied space shall be ventilated by natural means in accordance with Section 402 or by mechanical means in accordance with Section 403.~~ *Dwelling units* complying with the air leakage requirements of the *International Energy Conservation Code* or ASHRAE 90.1 shall be ventilated by mechanical means in accordance with Section 403. Ambulatory care facilities and Group I-2 *occupancies* shall be ventilated by mechanical means in accordance with Section 407. Enclosed parking garages shall be ventilated by mechanical means in accordance with Section 404. Every other occupied space shall be ventilated by natural means in accordance with Section 402 or by mechanical means in accordance with Section 403.

SECTION 403
MECHANICAL VENTILATION

Revise as follows:

403.1 Ventilation system. Mechanical ventilation shall be provided by a method of supply air and return or *exhaust air* except that mechanical *ventilation air* requirements for *dwelling units* in Group R-2, R-3 and R-4 *occupancies* shall be provided by an exhaust system, supply system or combination thereof. The amount of supply air shall be approximately equal to the amount of return and *exhaust air*. The system shall not be prohibited from producing negative or positive pressure. The system to convey *ventilation air* shall be designed and installed in accordance with Chapter 6.

403.3 Outdoor air and local exhaust airflow rates. *Dwelling units* in Group R-2, R-3 and R-4 occupancies ~~three stories and less in height above grade plane~~ shall be provided with outdoor air and local exhaust in accordance with Section 403.3.2. Other spaces within *buildings* intended to be occupied shall be provided with outdoor air and local exhaust in accordance with Section 403.3.1.

Exceptions:

1. Enclosed parking garages complying with Section 404.
2. Spaces in ambulatory care facilities and Group I-2 occupancies complying with Section 407.

403.3.1 Spaces other than dwelling units in Group R-2, R-3, and R-4 occupancies~~Other buildings intended to be occupied~~. The design of local exhaust systems and ventilation systems for outdoor air for spaces ~~*occupancies*~~other than *dwelling units* in Group~~s~~ R-2, R-3 and R-4 occupancies shall comply with Sections 403.3.1.1 through 403.3.1.4.

403.3.2 Dwelling units in Group R-2, R-3 and R-4 occupancies. The design of local exhaust systems and ventilation systems for outdoor air for *dwelling units* in Group R-2, R-3 and R-4 *occupancies* shall comply with Sections 403.3.2.1 through 403.3.2.5.

403.3.2.1 Outdoor air for dwelling units. An outdoor air ventilation system consisting of a mechanical exhaust system, supply system or combination thereof shall be installed for each *dwelling unit*. Local exhaust or supply systems, including outdoor air ducts connected to the return side of an air handler, are permitted to serve as such a system. The outdoor air ventilation system shall be designed to provide the required rate of outdoor air continuously during the period that the building is occupied. The minimum continuous outdoor airflow rate shall be determined in accordance with Equation 4-9.

$$Q_{OA} = 0.03A_{floor} + 7.5(N_{br} + 1) \quad \textbf{(Equation 4-9)}$$

where:

Q_{OA} = outdoor airflow rate, cfm

A_{floor} = conditioned floor area, ft^2

N_{br} = number of bedrooms; not to be less than one

Exceptions:

1. The outdoor air ventilation system is not required to operate continuously where the system has controls that enable operation for not less than 1 hour of each 4-hour period. The average outdoor airflow rate over the 4-hour period shall be not less than that prescribed by Equation 4-9.
2. The minimum mechanical ventilation rate determined in accordance with Equation 4-9 shall be reduced by 30 percent provided that both of the following conditions apply:
   2.1. A ducted system supplies *ventilation air* directly to each bedroom and to one or more of the following rooms:
      2.1.1. Living room.
      2.1.2. Dining room.
      2.1.3. Kitchen.
   2.2. The ~~whole-house~~ outdoor air ventilation system is a *balanced ventilation system*.

Delete without substitution:

~~**403.3.2.2 Outdoor air for other spaces.** Corridors and other common areas within the conditioned space shall be provided with outdoor air at a rate of not less than 0.06 cfm per square foot [0.0003 $m^3/(s \times m^2)$] of floor area.~~

Revise as follows:

~~**403.3.2.3**~~ **403.3.2.2 Local exhaust.** Local exhaust systems shall be provided in kitchens, bathrooms and toilet rooms and shall have the capacity to exhaust the minimum airflow rate determined in accordance with Table 403.3.2.~~3~~2.

TABLE ~~403.3.2.3~~ 403.3.2.2 MINIMUM REQUIRED LOCAL EXHAUST RATES FOR DWELLING UNITS IN GROUP R-2, R-3 AND R-4 OCCUPANCIES

AREA TO BE EXHAUSTED	EXHAUST RATE CAPACITY
Kitchens	100 cfm intermittent or 50 cfm continuous
Bathrooms and toilet rooms	50 cfm intermittent or 25 cfm continuous

For SI: 1 cubic foot per minute = 0.0004719 m^3/s.

Reason: These modifications are needed to clarify ventilation requirements for sleeping units, dwelling units, and other spaces within Group R-2, R-3, and R-4 occupancies. A summary of the results of the proposed modifications is as follows:

1. All dwelling units in Group R-2, R-3, and R-4 occupancies shall comply with Section 403.3.2. This is consistent with the prior IMC cycle's action on proposal M19-21.

2. Where provided with mechanical ventilation, all spaces other than dwelling units in Group R-2, R-3, and R-4 occupancies shall comply with Section 403.3.1 (this is meant to parallel the scope divisions of ASHRAE 62.2 and ASHRAE 62.1), with the exception of enclosed parking garages, ambulatory care facilities, and Group I-2 occupancies are addressed elsewhere.

Section 403.3.2 should be restricted to dwelling units because it is based on ASHRAE 62.2 (whose scope is restricted to dwelling units) and is poorly equipped to address spaces in Group R-2, R-3, and R-4 occupancies that are not dwelling units (e.g., dormitory sleeping units, public bathrooms, public laundry rooms, exercise rooms, meeting rooms, etc.). There is currently a subsection to address outdoor air requirements for "corridors and other common areas" within Section 403.3.2, but it is not clear how to apply this section to the myriad of spaces that are better addressed in Section 403.3.1.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal primarily clarifies existing requirements for ventilation.

M22-24

M23-24

IMC®: 401.2, SECTION 407, 407.1

Proponents: Jeff O'Neil, Chair, Committee on Healthcare (ahc@iccsafe.org)

2024 International Mechanical Code

Revise as follows:

401.2 Ventilation required. Every occupied space shall be ventilated by natural means in accordance with Section 402 or by mechanical means in accordance with Section 403. *Dwelling units* complying with the air leakage requirements of the *International Energy Conservation Code* or ASHRAE 90.1 shall be ventilated by mechanical means in accordance with Section 403. Ambulatory care facilities <u>,</u> ~~and~~ <u>Group I-1 and</u> Group I-2 *occupancies* shall be ventilated ~~by mechanical means~~ in accordance with ~~Section 407~~ <u>this code, ASHRAE/ASHE 170 and NFPA 99</u>.

Delete without substitution:

~~SECTION 407~~ ~~AMBULATORY CARE FACILITIES AND GROUP I-2 OCCUPANCIES~~

~~**407.1 General.** Mechanical ventilation for ambulatory care facilities and Group I-2 *occupancies* shall be designed and installed in accordance with this code, ASHRAE/ASHE 170 and NFPA 99.~~

Reason: Currently, the code requires in Section 401.2 that ambulatory care facilities and Group I-2 occupancies are only to be ventilated by mechanical means. Both ASHRAE/ASHE 170 and NFPA 99 have been revised to permit ventilation by natural means under specific conditions. The ventilation for these facilities and occupancies are unique, which is why the references to both ASHRAE/ASHE 170 and NFPA 99. By requiring compliance in Section 401.2 to those two standards, Section 407 is not needed.

Adding Group I-1 for required compliance with ASHRAE/ASHE and NFPA 99 aligns the code with the requirements for licensing of these health care facilities for numerous years.

This proposal is submitted by the ICC Committee for Healthcare (CHC).

The Committee on Healthcare (CHC) was established by the ICC Board of Directors in 2011 to pursue opportunities to study and develop effective and efficient provisions for Hospital, Nursing Homes, Assisted Living and Ambulatory Care Facilities. This committee was formed in cooperation with the American Society for Healthcare Engineering (ASHE). In July of 2017, the ICC Board made CHC a standing committee. In 2023 the CHC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the CHC website at CHC webpage.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Healthcare facilities, both I-1 and I-2, have already had to comply with ASHRAE/ASHE 170 and NFPA 99 for numerous years. By providing an option for hybrid ventilation in certain applications (i.e. natural assisted by mechanical ventilation) can reduce the costs of installation.

M23-24

M24-24

IMC®: 401.2, SECTION 407, 407.1, ASHRAE Chapter 15 (New)

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org); Emily Toto, ASHRAE, ASHRAE (etoto@ashrae.org)

2024 International Mechanical Code

Revise as follows:

401.2 Ventilation required. Every occupied space shall be ventilated by natural means in accordance with Section 402or by mechanical means in accordance with Section 403. *Dwelling units* complying with the air leakage requirements of the *International Energy Conservation Code* or ASHRAE 90.1 shall be ventilated by mechanical means in accordance with Section 403. Ambulatory care facilities and Group I-1 and I-2 *occupancies* shall be ventilated ~~by mechanical means~~ in accordance with ~~Section 407~~ this code, ASHRAE/ASHE 170 and NFPA 99.

Delete without substitution:

~~SECTION 407~~
~~AMBULATORY CARE FACILITIES AND GROUP I-2 OCCUPANCIES~~

~~**407.1 General.** Mechanical ventilation for ambulatory care facilities and Group I-2 *occupancies* shall be designed and installed in accordance with this code, ASHRAE/ASHE 170 and NFPA 99.~~

Add new standard(s) as follows:

ASHRAE

ASHRAE
180 Technology Parkway
Peachtree Corners, GA 30092

ANSI/ASHRAE/ASHE 170-2021 Ventilation of Health Care Facilities with addenda c, d, e, f, g, h, and j

Reason: [BEVIS]: Currently, the code requires in Section 401.2 that ambulatory care facilities and Group I-2 occupancies are only to be ventilated by mechanical means. Both ASHRAE/ASHE 170 and NFPA 99 have been revised to permit ventilation by natural means under specific conditions. The ventilation for these facilities and occupancies are unique, which is why the references to both ASHRAE/ASHE 170 and NFPA 99. By requiring compliance in Section 401.2 to those two standards, Section 407 is not needed.

Adding Group I-1 for required compliance with ASHRAE/ASHE and NFPA 99 aligns the code with the requirements for licensing of these health care facilities for numerous years.

This proposal is submitted by the ICC Plumbing Mechanical Gas Code Action Committee (PMGCAC)

PMGCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 PMGCAC has held 26 virtual meetings open to any interested party. In addition, there were several virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the PMGCAC website at PMGCAC.

[TOTO]:

The ventilation for ambulatory care facilities and Group I-2 occupancies are unique. Different ventilation means are identified in ASHRAE 170 and NFPA 99, including a modified method of both natural and mechanical means of ventilation. ASHRAE 170 is jointly published with ASHE. Establishing a separate section in the beginning of Chapter 4 specifically for these facilities and occupancies provides clarity as to what types of ventilation is required.

Ventilation design for health care spaces is a combination of tasks that leads to a set of documents used in construction. One such task requires medical planners to develop departmental programs of spaces. These programs include space names that suggest the use for which the space is intended, and health care ventilation designers depend upon these names to determine the ventilation parameters for their designs. This standard provides these ventilation parameters.

Without high-quality ventilation in health care facilities, patients, health care workers, and visitors can become infected through normal respiration of particles in the air. Poorly ventilated health care facilities are places where the likelihood of pathogenic particles occurring in the air is quite high. These air-transmitted pathogens can be found everywhere in poorly ventilated health care facilities, and although most individuals can cope using their healthy immune systems, some patients are susceptible to these pathogens or even to normal environmental air-borne organisms such as fungal spores. Because these organisms are found in higher concentrations in hospitals, additional care must be taken in design of the ventilation systems.

Bibliography: ANSI/ASHRAE/ASHE 170—2021: Ventilation of Health Care Facilities, with addenda c, d, e, f, g, h, and j (available online: https://www.ashrae.org/technical-resources/standards-and-guidelines/standards-addenda)

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

[BEVIS]: Healthcare facilities, both I-1 and I-2, have already had to comply with ASHRAE/ASHE 170 and NFPA 99 for numerous years. By providing an option for hybrid ventilation in certain applications (i.e. natural assisted by mechanical ventilation) can reduce the costs of installation.

[TOTO]: This change provides clarity about existing requirements that are already covered in the design and installation standards referenced in this code.

M24-24

M25-24 Part I

IMC®: 401.2.1 (New), 502.21 (New), 502.21.1 (New), 502.21.2 (New), 502.21.3 (New), 502.21.4 (New)

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE MECHANICALCODE COMMITTEE. PART II WILL BE HEARD BY THE IFC CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Mechanical Code

Add new text as follows:

401.2.1 Hazardous materials processes. Natural ventilation shall not be permitted for manufacturing where hazardous materials are used. Mechanical ventilation shall be designed and installed in accordance with Section 403 and the International Fire Code.

502.21 Plant processing or plant extraction facilities. Plant processing or plant extraction facilities shall comply with Sections 502.21.1 through 502.21.4.

502.21.1 Processes using flammable gases or flammable liquids. Plant extraction processes using flammable gases or flammable liquids shall be provided with continuous mechanical exhaust. An airflow rate of not less than 5 cfm/ft2 (0.0038 m3/(s*m2)) of floor area shall be provided. The mechanical exhaust system shall prevent an accumulation of flammable vapors from exceeding 25 percent of the lower explosive limit (LEL). Recirculation of such air shall be prohibited.

> **Exception:** Where a registered design professional demonstrates that an engineered mechanical exhaust system design will prevent the maximum concentration of contaminants from exceeding 25% of the LEL, the minimum required rate of exhaust shall be reduced in accordance with such engineered system design.

502.21.2 Processes using compressed asphyxiant or inert gases. Mechanical exhaust systems for plant extraction processes using compressed asphyxiant or inert gases shall operate continuously. Recirculation of such air shall be prohibited.

502.21.3 Interlocks. Electrical equipment and appliances used in plant extraction processes shall be interlocked with ventilation fans so that the equipment cannot be operated unless the exhaust and ventilation systems are in operation.

502.21.4 Fire interlock prohibited. Exhaust systems used in plant extraction processes shall not be interlocked with the fire alarm system and shall remain in operation during a fire alarm condition.

M25-24 Part I

M25-24 Part II

IFC: 2311.8.8, 5705.3.7.5.1; IMC®: [F] 502.16.2, [F] 502.9.5.4

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Fire Code

Revise as follows:

2311.8.8 Exhaust ventilation system.
Repair garages used for the repair of CNG, LNG, or other lighter-than-air motor fuels other than hydrogen shall be provided with an *approved* mechanical ventilation system. The mechanical exhaust ventilation system shall be in accordance with the *International Mechanical Code* and Sections 2311.8.8.1 and 2311.8.8.2.

~~**Exception:** Where *approved* by the *fire code official*, natural ventilation shall be permitted in lieu of mechanical exhaust ventilation.~~

5705.3.7.5.1 Ventilation.
Continuous mechanical ventilation shall be provided at a rate of not less than 1 cfm per square foot [0.00508 $m^3/(s \times m^2)$] of floor area over the design area. Provisions shall be made for introduction of makeup air in such a manner to include all floor areas or pits where vapors can collect. Local or spot ventilation shall be provided where needed to prevent the accumulation of hazardous vapors. Ventilation system design shall comply with the *International Building Code* and *International Mechanical Code*.

~~**Exception:** Where natural ventilation can be shown to be effective for the materials used, dispensed or mixed.~~

2024 International Mechanical Code

Revise as follows:

[F] 502.16.2 Exhaust ventilation system. Repair garages used for the repair of compressed natural gas, liquefied natural gas or other lighter-than-air motor fuel, other than hydrogen, shall be provided with an *approved* mechanical exhaust ventilation system. The mechanical exhaust ventilation system shall be in accordance with this code and Sections 502.16.2.1 and 502.16.2.2.

~~**Exception:** Where *approved* , *natural ventilation* shall be an alternative to mechanical exhaust *ventilation*.~~

[F] 502.9.5.4 Use, dispensing and mixing. Continuous mechanical ventilation shall be provided for the use, dispensing and mixing of flammable and combustible liquids in open or closed systems in amounts exceeding the maximum allowable quantity per control area and for bulk transfer and process transfer operations. The ventilation rate shall be not less than 1 cfm/ft^2 [0.00508 $m^3/(s \times m^2)$] of floor area over the design area. Provisions shall be made for the introduction of *makeup air* in a manner that will include all floor areas or pits where vapors can collect. Local or spot ventilation shall be provided where needed to prevent the accumulation of hazardous vapors.

~~**Exception:** Where *natural ventilation* can be shown to be effective for the materials used, dispensed or mixed.~~

Reason: These requirements are based on best practices and ensure basic fire and life safety measures. This section provides requirements for hazardous facilities and has been established in collaboration with the PMGCAC and FCAC. These requirements provide an understandable path for compliance.

This proposal is submitted by the ICC Plumbing Mechanical Gas Code Action Committee (PMGCAC)

PMGCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 PMGCAC has held 26 virtual meetings open to any interested party. In addition, there were several virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the PMGCAC website at PMGCAC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

These requirements already exist in the IBC and IFC. Adding these requirements to the IMC only provides guidance for the design and installation of systems that comply with existing code requirements. As such, this proposal does not require additional material or labor costs that would impact the cost of construction.

M25-24 Part II

M26-24

IMC®: 401.5, 501.3.2

Proponents: Amanda Hickman, The Hickman Group, Air Movement and Control Association International, Inc. (AMCA) (amanda@thehickmangroup.com)

2024 International Mechanical Code

Revise as follows:

401.5 Intake opening protection. Air intake openings that terminate outdoors shall be protected with corrosion-resistant screens, louvers or grilles. Openings in louvers, grilles and screens shall be sized in accordance with Table 401.5, and shall be protected against local weather conditions. Louvers that protect air intake openings in structures located in hurricane-prone regions, as defined in the *International Building Code*, shall be *listed* to indicate compliance~~comply~~ with AMCA 550. Outdoor air intake openings located in exterior walls shall meet the provisions for exterior wall opening protectives in accordance with the *International Building Code* .

501.3.2 Exhaust opening protection. Exhaust openings that terminate outdoors shall be protected with corrosion-resistant screens, louvers or grilles. Openings in screens, louvers and grilles shall be sized not less than $^1/_4$ inch (6.4 mm) and not larger than $^1/_2$ inch (12.7 mm). Openings shall be protected against local weather conditions. Louvers that protect exhaust openings in structures located in hurricane-prone regions, as defined in the *International Building Code*, shall be *listed* to indicate compliance ~~comply~~ with AMCA ~~Standard~~ 550. Outdoor openings located in exterior walls shall meet the provisions for exterior wall opening protectives in accordance with the *International Building Code*.

Reason:

The IMC already requires compliance with AMCA 550. However, to ensure code officials are able to enforce this provision, the revised language to require a *listing* is being proposed. Additionally, including a *listing* requirement will ensure that products will perform as designed and meet the performance requirements for the specified application.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Because listing is common practice, especially for wind driven rain resistant louvers and the fact that the cost to list/certify a product is incurred by the manufacturer and divided across multiple projects, there is no cost increase associated with this proposal.

M26-24

M27-24

IMC®: 403.2

Proponents: Emily Toto, ASHRAE, ASHRAE (etoto@ashrae.org)

2024 International Mechanical Code

Revise as follows:

403.2 Outdoor air required. The minimum outdoor airflow rate shall be determined in accordance with Section 403.3 <u>or with the Section 6.3 Indoor Air Quality Procedure of ASHRAE 62.1</u>.

> ~~**Exception:** Where the *registered design professional* demonstrates that an engineered ventilation system design will prevent the maximum concentration of contaminants from exceeding that obtainable by the rate of outdoor air ventilation determined in accordance with Section 403.3, the minimum required rate of outdoor air shall be reduced in accordance with such engineered system design.~~

Staff Analysis: The proposed referenced standard, ASHRAE 62.1, is currently referenced in the IMC.

Reason: The International Mechanical Code (IMC) offers to pathways for determining the minimum outdoor airflow. The first pathway is a reference to Section 403.3, which involves computing minimum outdoor airflow per prescriptive ventilation rates provided in TABLE 403.3.1.1. The second pathway, currently listed as an exception, involves computing minimum outdoor airflow per an “engineered ventilation system design”. An “engineered ventilation system design” is not explicitly defined anywhere in the code language. However, it is defined in the commentary of the code. The commentary states that:

1. An engineered ventilation system design is more of a direct method of controlling air quality and would be classified as an “Indoor Air Quality Procedure” in ASHRAE 62.1

2. The exception to this section could certainly be viewed as allowing the indoor air quality (IAQ) method of that standard [ASHRAE 62.1] as one of the possible means of complying with the exception.The commentary to the exception provides the critical information on what the intent of the exception is and how it should be applied. As such, it is recommended to include a direct reference to the ASHRAE 62.1 IAQP within the body of the code. Additionally, the change aligns the IMC with ASHRAE Standard 62.1 – 2022.

We would also like to propose the following changes to the IMC commentary:

~~Section 403 represents an indirect method of control- ling air quality by diluting contaminants (ventilation rate procedure) to an acceptable level by introducing outdoor air. Although an engineered ventilation system may be approved by the code official as an alter- native design in accordance with Section 105, the exception to this section provides a direct reference to such an alternative design in this section. An engineered ventilation system is more of a direct method of controlling air quality and would be classified as an “Indoor Air Quality Procedure” in ASHRAE 62.1. ASHRAE 62.1, as a whole, is not a referenced standard in the code (with the exception of a limited reference in Section 403.3.1.1.2.3.2), but, the exception to this section could certainly be viewed as allowing the indoor air quality (IAQ) method of that standard as one of the possible means of complying with the exception. The design professional is responsible for demonstrating to the code official that a proposed engineered system will result in air quality at least equivalent to that achievable by the ventilation rate method of Section 403. A demonstration of equivalence would involve detailed analysis of at least the following: the anticipated contaminants of concern in the space to be ventilated; the anticipated sources and concentrations of the contaminants of concern; the acceptable occupant exposure limits or concentration levels for those contaminants; and the means and methods to control the contaminants. The design documentation should include all criteria and assumptions regarding occupancy conditions, equipment/system performance and contaminants. An engineered ventilation system would be allowed to supply outdoor air at any rate essential to the performance of the design.~~
<u>The IAQP is a performance-based procedure. Rather than prescribing rates based on occupancy categories, rates are calculated based on contaminant source emission rates and desired indoor concentrations. The IAQP allows designers to take credit for source-control and removal measures, such as selection of low-emitting materials and air-cleaning devices.</u>

Cost Impact: Increase

Estimated Immediate Cost Impact:

The only cost of using the IAQP is the cost of air cleaning technologies that may be used to clean indoor air and the nominal cost to do post start-up IAQ testing. IAQ testing for a typical office building is $2,500-$10,000 inclusive of equipment, labor, and lab analysis. As noted above, when air cleaning systems are installed with new HVAC systems, the cost of the air cleaning system is often offset by cost savings from a downsized HVAC system. This makes the IAQP approach lower cost than the VRP approach. Where existing HVAC systems sized based on a VRP design are retrofitted with an air cleaning systems to enable a reduction in outside air according to the IAQP, there is an added cost for the retrofit that includes the cost of the air cleaning system(s) and installation costs, which are typically mechanical, electrical, and controls related. These costs are paid back from the ongoing energy savings realized by conditioning less outside air.

Estimated Immediate Cost Impact Justification (methodology and variables):

Air cleaning systems that may be used to comply with the IAQP range in cost depending on the manufacturer and product type. A typical range is from $0.50-$1.00 per ft2. Installation costs are building specific and are impacted by access to power to run the air cleaning system, the need for ducting to and from the air cleaning system (not always required), and some light controls integration work to ensure the air cleaning system(s) only run when the building is occupied and not in economizer mode.

Estimated Life Cycle Cost Impact:

According to a recent study https://enverid.com/resources/learning/iaqpcarbonstudy/ on the carbon reduction potential of the IAQP, the annual thermal load per 1,000 CFM of outdoor airflow can be reduced by up to 90,000 kBtu when using the IAQP for retrofits depending. For new construction, the reduction per 1,000 CFM reduced can be up to 50,000 kBtu. Results vary significantly by climate zone. See figures 3 and 4 in the report referenced in the last section to see these figures by climate zone broken out for heating and cooling.

These thermal load reductions lead to ongoing energy savings from the following sources:

- Cooling / heating energy usage
- Electric peak "demand" charges
- Pump and fans energy consumption
- Water consumption

When new equipment is installed, reducing the thermal load leads to capital cost savings opportunities in the following areas:

- Smaller airside systems (lower tonnage RTU/AHU/DOAS)
- Smaller chillers and cooling towers
- Smaller boilers or electric heat systems
- Smaller onsite renewable systems (e.g., solar and geothermal)
- Eliminate the need or size requirements for energy recovery (ERV can be eliminated under Standard 90.1 when the outside air requirement can be reduced to <10%)
- Eliminate the need for DCV (the IAQP can deliver greater savings with less cost)
- Reduce piping and exhaust duct sizes

Estimated Life Cycle Cost Impact Justification (methodology and variables):

In good applications, the ongoing energy savings and any first cost savings from new equipment more than offset maintenance costs and first costs, respectively, of the air cleaning system used with the IAQP.

- According to GSA's Published Findings from a Green Proving Ground evaluation of sorbent air cleaning technology, which can be used to remove gaseous contaminants from indoor air to comply with the IAQP, savings across climate zones average 1.17 kBtu/sf/yr for cooling and 1.19 kBtu/sf/yr for heating. The GSA also found that sorbent air cleaning technology delivers July peak savings of 9% on average across climate zones. The GSA Published Finding can be found at https://www.gsa.gov/climate-action-and-sustainability/center-for-emerging-building-technologies/completed-assessments/hvac/sorbent-air-cleaning.

- According to a recent study of the energy and carbon impacts of different ventilation strategies to meet the new Standard 241 ECAi targets, the most energy efficient, cost-effective compliance pathway for many buildings is to use the IAQP with MERV 13 filters for particles and pathogen control and sorbent filters for gaseous contaminant control. This study was summarized in an ASHRAE Journal article published in Sept. 2023, which can be accessed at https://www.nxtbook.com/nxtbooks/ashrae/ashraejournal_UUVCDE/index.php#/p/18. See especially Figure 2 and Table 3.

M27-24

M28-24

IMC®: CHAPTER 4, SECTION 403, 403.3, 403.3.1, TABLE 403.3.1.1, 403.3.2, 403.3.2.1, 403.3.2.2, 403.3.2.3, TABLE 403.3.2.3, 403.3.2.4, 403.3.2.5

Proponents: Gayathri Vijayakumar, Steven Winter Associates, Inc., Steven Winter Associates, Inc. (gayathri@swinter.com)

2024 International Mechanical Code

CHAPTER 4 VENTILATION

SECTION 403
MECHANICAL VENTILATION

Revise as follows:

403.3 Outdoor air and local exhaust airflow rates. Group R-2, R-3 and R-4 *occupancies* ~~three stories and less in height above grade plane~~ shall be provided with outdoor air and local exhaust in accordance with Section 403.3.2. Other *occupancies* ~~*buildings* intended to be occupied~~ shall be provided with outdoor air and local exhaust in accordance with Section 403.3.1.

403.3.1 Other buildings intended to be occupied. The design of local exhaust systems and ventilation systems for outdoor air for *occupancies* other than Groups R-2, R-3 and R-4 shall comply with Sections 403.3.1.1 through 403.3.1.4.

Revise as follows:

TABLE 403.3.1.1 MINIMUM VENTILATION RATES

Portions of table not shown remain unchanged.

OCCUPANCY CLASSIFICATION	OCCUPANT DENSITY #/1000 FT^2 [a]	PEOPLE OUTDOOR AIRFLOW RATE IN BREATHING ZONE, R_p CFM/PERSON	AREA OUTDOOR AIRFLOW RATE IN BREATHING ZONE, R_a CFM/FT^2 [a]	EXHAUST AIRFLOW RATE CFM/FT^2 [a]
Hotels, motels, and resorts ~~and dormitories~~				
Bathrooms/toilet—private[g]	—	—	—	25/50[f]
Kitchens - private[b]	—	—	—	50/100[f]
Bedroom/living room	10	5	0.06	—
Conference/meeting	50	5	0.06	—
~~Dormitory sleeping areas~~	~~20~~	~~5~~	~~0.06~~	~~—~~
Gambling casinos	120	7.5	0.18	—
Laundry rooms, central	10	5	0.12	—
~~Laundry rooms within dwelling units~~	~~10~~	~~5~~	~~0.12~~	~~—~~
Lobbies/prefunction	30	7.5	0.06	—
Multipurpose assembly	120	5	0.06	—
~~Private dwellings, single and multiple~~				
~~Garages, common for multiple units~~[b]	~~—~~	~~—~~	~~—~~	~~0.75~~
~~Kitchens~~[b]	~~—~~	~~—~~	~~—~~	~~50/100~~[f]
~~Living areas~~[e]	~~Based on number of bedrooms. First bedroom, 2; each additional bedroom, 1~~	~~0.35 ACH but not less than 15 cfm/person~~	~~—~~	~~—~~
~~Toilet rooms and bathrooms~~[g]	~~—~~	~~—~~	~~—~~	~~25/50~~[f]

For SI: 1 cubic foot per minute = 0.0004719 m^3/s, 1 ton = 908 kg, 1 cubic foot per minute per square foot = 0.00508 m^3/(s × m^2), °C = [(°F) – 32]/1.8, 1 square foot = 0.0929 m^2.

a. Based on net occupiable floor area.

b. Mechanical exhaust required and the recirculation of air from such spaces is prohibited. Recirculation of air that is contained completely within such spaces shall not be prohibited (see Section 403.2.1, Item 3).

c. Spaces unheated or maintained below 50°F are not covered by these requirements unless the occupancy is continuous.

d. Ventilation systems in enclosed parking garages shall comply with Section 404.

e. Rates are per water closet , urinal or adult changing station. The higher rate shall be provided where the exhaust system is designed to operate intermittently. The lower rate shall be permitted only where the exhaust system is designed to operate continuously while occupied.

f. Rates are per room unless otherwise indicated. The higher rate shall be provided where the exhaust system is designed to operate intermittently. The lower rate shall be permitted only where the exhaust system is designed to operate continuously while occupied.

g. Mechanical exhaust is required and recirculation from such spaces is prohibited. For occupancies other than science laboratories, where there is a wheel-type energy recovery ventilation (ERV) unit in the exhaust system design, the volume of air leaked from the exhaust airstream into the outdoor airstream within the ERV shall be less than 10 percent of the outdoor air volume. Recirculation of air that is contained completely within such spaces shall not be prohibited (see Section 403.2.1, Items 2 and 4).

h. For nail salons, each manicure and pedicure station shall be provided with a source capture system capable of exhausting not less than 50 cfm per station. Exhaust inlets shall be located in accordance with Section 502.20. Where one or more required source capture systems operate continuously during occupancy, the exhaust rate from such systems shall be permitted to be applied to the exhaust flow rate required by Table 403.3.1.1 for the nail salon.

i. Outpatient facilities to which the rates apply are freestanding birth centers, urgent care centers, neighborhood clinics and physicians' offices, Class 1 imaging facilities, outpatient psychiatric facilities, outpatient rehabilitation facilities and outpatient dental facilities.

j. The requirements of this table provide for acceptable IAQ. The requirements of this table do not address the airborne transmission of airborne viruses, bacteria and other infectious contagions.

k. These rates are intended only for outpatient dental clinics where the amount of nitrous oxide is limited. They are not intended for dental operatories in institutional buildings where nitrous oxide is piped.

l. The occupiable floor area in warehouses shall not include the floor area of self-storage units, floor areas under rack storage or designated palletized storage floor areas.

403.3.2 Group R-2, R-3 and R-4 occupancies. The design of local exhaust systems and ventilation systems for outdoor air in Group R-2, R-3 and R-4 *occupancies* shall comply with Sections 403.3.2.1 through 403.3.2.5.

Revise as follows:

403.3.2.1 Outdoor air for dwelling units and sleeping units. An outdoor air ventilation system consisting of a mechanical exhaust system, supply system or combination thereof shall be installed for each *dwelling unit* and *sleeping unit*. Local exhaust or supply systems, including outdoor air ducts connected to the return side of an air handler, are permitted to serve as such a system. The outdoor air ventilation system shall be designed to provide the required rate of outdoor air continuously during the period that the *building* is occupied. The minimum continuous outdoor airflow rate shall be determined in accordance with Equation 4-9.

$$Q_{OA} = 0.03A_{floor} + 7.5(N_{br} + 1) \qquad \textbf{(Equation 4-9)}$$

where:

Q_{OA} = outdoor airflow rate, cfm

A_{floor} = conditioned floor area, ft^2

N_{br} = number of bedrooms; not to be less than one

Exceptions:

1. The outdoor air ventilation system is not required to operate continuously where the system has controls that enable operation for not less than 1 hour of each 4-hour period. The average outdoor airflow rate over the 4-hour period shall be not less than that prescribed by Equation 4-9.

2. The minimum mechanical ventilation rate determined in accordance with Equation 4-9 shall be reduced by 30 percent provided that both of the following conditions apply:
   2.1. A ducted system supplies *ventilation air* directly to each bedroom and to one or more of the following rooms:
      2.1.1. Living room.
      2.1.2. Dining room.
      2.1.3. Kitchen.
   2.2. The ~~whole-house~~ outdoor air ventilation system is a *balanced ventilation system*.

403.3.2.2 Outdoor air and local exhaust for other spaces. Spaces other than *dwelling units* and *sleeping units* shallcomply with Sections 403.3.1.1 through 403.3.1.4~~Corridors and other common areas within the conditioned space shall be provided with outdoor air at a rate of not less than 0.06 cfm per square foot [0.0003 m³/(s × m²)] of floor area~~.

403.3.2.3 Local exhaust for dwelling units and sleeping units. Local exhaust systems shall be provided in kitchens, bathrooms and toilet rooms and shall have the capacity to exhaust the minimum airflow rate determined in accordance with Table 403.3.2.3.

TABLE 403.3.2.3 MINIMUM REQUIRED LOCAL EXHAUST RATES FOR GROUP R-2, R-3 AND R-4 OCCUPANCIES

AREA TO BE EXHAUSTED	EXHAUST RATE CAPACITY
Kitchens	100 cfm intermittent or 50 cfm continuous
Bathrooms and toilet rooms	50 cfm intermittent or 25 cfm continuous

For SI: 1 cubic foot per minute = 0.0004719 m^3/s.

Revise as follows:

403.3.2.4 System controls. Where provided within a *dwelling unit*or *sleeping unit*, controls for outdoor air ventilation systems shall include text or a symbol indicating the system's function.

403.3.2.5 Ventilating equipment. Fans providing exhaust or outdoor air shall be *listed* and *labeled* to provide the minimum required air flow in accordance with ANSI/AMCA 210-ANSI/ASHRAE 51.

Reason: For Residential Group R-2, R-3 and R-4, 2024 IMC made an important change to have the same ventilation and exhaust requirements, regardless of building height.

However, it is not clear by the charging language in R403.3 and R403.3.1 what ventilation requirements are if the building exceeds 3 stories. It seems that R403.3.2 is intended to apply to all R-2, R-3 and R-4, regardless of building height, so this proposal makes that intent more explicit.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is not intended to change stringency of requirements, but rather clarify the current requirements for all the occupancies within a multifamily building, regardless of building height.

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IMC®: TABLE 403.3.1.1

Proponents: Micheal Anderson, Nelson Rudie & Associates, self

2024 International Mechanical Code

Revise as follows:

TABLE 403.3.1.1 MINIMUM VENTILATION RATES

OCCUPANCY CLASSIFICATION	OCCUPANT DENSITY #/1000 FT^{2} [a]	PEOPLE OUTDOOR AIRFLOW RATE IN BREATHING ZONE, R_p CFM/PERSON	AREA OUTDOOR AIRFLOW RATE IN BREATHING ZONE, R_aCFM/FT^{2} [a]	EXHAUST AIRFLOW RATE CFM/FT^{2} [a]
Animal facilities				
Animal exam room (veterinary office)	20	10	0.12	—
Animal imaging (MR/CT/PET)	20	10	0.18	0.9
Animal operating rooms	20	10	0.18	3.00
Animal postoperative recovery room	20	10	0.18	1.50
Animal preparation rooms	20	10	0.18	1.50
Animal procedure room	20	10	0.18	2.25
Animal surgery scrub	20	10	0.18	1.50
Large-animal holding room	20	10	0.18	2.25
Necropsy	20	10	0.18	2.25
Small-animal cage room (static cages)	20	10	0.18	2.25
Small-animal cage room (ventilated cages)	20	10	0.18	1.50
Correctional facilities				
Booking/waiting	50	7.5	0.06	—
Cells				
without plumbing fixtures	25	5	0.12	—
with plumbing fixtures[g]	25	5	0.12	1.0
Day room	30	5	0.06	—
Dining halls(see “Food and beverage service”)	—	—	—	—
Guard stations	15	5	0.06	—
Dry cleaners, laundries				
Coin-operated dry cleaner	20	15	—	—
Coin-operated laundries	20	7.5	0.12	—
Commercial dry cleaner	30	30	—	—
Commercial laundry	10	5	0.12	—
Storage, pick up	30	7.5	0.12	—
Education				
Art classroom[g]	20	10	0.18	0.7
Auditoriums	150	5	0.06	—
Classrooms (ages 5–8)	25	10	0.12	—
Classrooms (age 9 plus)	35	10	0.12	—
Computer lab	25	10	0.12	—
Corridors (see “Public spaces”)	—	—	—	—
Day care (through age 4)	25	10	0.18	—
Lecture classroom	65	7.5	0.06	—
Lecture hall (fixed seats)	150	7.5	0.06	—
Locker/dressing rooms[g]	—	—	—	0.25
Media center	25	10	0.12	—
Multiuse assembly	100	7.5	0.06	—
Music/theater/dance	35	10	0.06	—
Science laboratories[g]	25	10	0.18	1.0
Smoking lounges[b]	70	60	—	—
Sports locker rooms[g]	—	—	—	0.5
Wood/metal shops[g]	20	10	0.18	0.5
Food and beverage service				
Bars, cocktail lounges	100	7.5	0.18	—
Break rooms	25	5	0.06	—
Cafeteria, fast food	100	7.5	0.18	—
Coffee stations	20	5	0.06	—
Corridors	—	—	0.06	—
Dining rooms	70	7.5	0.18	—
Kitchens (cooking)[b]	20	7.5	0.12	0.7
Occupiable storage rooms for liquids or gels	2	5	0.12	—
Hotels, motels, resorts and dormitories				
Bathrooms/toilet—private[g]	—	—	—	25/50[f]
Bedroom/living room	10	5	0.06	—

OCCUPANCY CLASSIFICATION	OCCUPANT DENSITY #/1000 FT	PEOPLE OUTDOOR AIRFLOW RATE IN BREATHING ZONE, *R* CFM/PERSON	AREA OUTDOOR AIRFLOW RATE IN BREATHING ZONE, *R* CFM/FT	EXHAUST AIRFLOW RATE CFM/FT
Conference/meeting	50	5	0.06	—
Dormitory sleeping areas	20	5	0.06	—
Gambling casinos	120	7.5	0.18	—
Laundry rooms, central	10	5	0.12	—
Laundry rooms within dwelling units	10	5	0.12	—
Lobbies/prefunction	30	7.5	0.06	—
Multipurpose assembly	120	5	0.06	—
Offices				
Break rooms	50	5	0.12	—
Conference rooms	50	5	0.06	—
Main entry lobbies	10	5	0.06	—
Occupiable storage rooms for dry materials	2	5	0.06	—
Office spaces	5	5	0.06	—
Reception areas	30	5	0.06	—
Telephone/data entry	60	5	0.06	—
Outpatient healthcare facilities[i, j]				
Birthing room	15	10	0.18	—
Class 1 imaging room	5	5	0.12	—
Dental operatory[k]	20	10	0.18	—
General examination room	20	7.5	0.12	—
Other dental treatment areas	5	5	0.06	—
Physical therapy exercise area	7	20	0.18	—
Physical therapy individual room	20	10	0.06	—
Physical therapeutic pool area	—	—	0.48	—
Prosthetics and orthotics room	20	10	0.18	—
Psychiatric consultation room	20	5	0.06	—
Psychiatric examination room	20	5	0.06	—
Psychiatric group room	50	5	0.06	—
Psychiatric seclusion room	5	10	0.06	—
Speech therapy room	20	5	0.06	—
Urgent care examination room	20	7.5	0.12	—
Urgent care observation room	20	5	0.06	—
Urgent care treatment room	20	7.5	0.18	—
Urgent care triage room	20	10	0.18	—
Private dwellings, single and multiple				
Garages, common for multiple units[b]	—	—	—	0.75
Kitchens[b]	—	—	—	50/100[f]
Living areas[c]	Based on number of bedrooms. First bedroom, 2; each additional bedroom, 1	0.35 ACH but not less than 15 cfm/person	—	—
Toilet rooms and bathrooms[g]	—	—	—	25/50[f]
Public spaces				
Corridors	—	—	0.06	—
Courtrooms	70	5	0.06	—
Elevator car	—	—	—	1.0
Legislative chambers	50	5	0.06	—
Libraries	10	5	0.12	—
Museums (children's)	40	7.5	0.12	—
Museums/galleries	40	7.5	0.06	—
Places of religious worship	120	5	0.06	—
Room with adult changing station	—	—	—	50/70[e]
Shower room (per shower head)[g]	—	—	—	50/20[f]
Smoking lounges[b]	70	60	—	—
Toilet rooms — public[g]	—	—	—	50/70[e]
Retail stores, sales floors and showroom floors				
Dressing rooms	—	—	—	0.25
Mall common areas	40	7.5	0.06	—
Sales	15	7.5	0.12	—
Shipping and receiving	2	10	0.12	—
Smoking lounges[b]	70	60	—	—
Storage rooms	—	—	0.12	—
Warehouses (see "Storage")	—	10	0.06	—
Specialty shops				
Automotive motor fuel-dispensing stations[b]	—	—	—	1.5
Banks or lobbies	15	7.5	0.06	—
Barber	25	7.5	0.06	0.5
Beauty salons[b]	25	20	0.12	0.6
Embalming room[b]	—	—	—	2.0
Nail salons[b, h]	25	20	0.12	0.6
Pet shops (animal areas)[b]	10	7.5	0.18	0.9
Supermarkets	8	7.5	0.06	—

OCCUPANCY CLASSIFICATION	OCCUPANT DENSITY #/1000 FT	PEOPLE OUTDOOR AIRFLOW RATE IN BREATHING ZONE, *R* CFM/PERSON	AREA OUTDOOR AIRFLOW RATE IN BREATHING ZONE, *R* CFM/FT	EXHAUST AIRFLOW RATE CFM/FT
Sports and amusement				
Bowling alleys (seating areas)	40	10	0.12	—
Disco/dance floors	100	20	0.06	—
Game arcades	20	7.5	0.18	—
Gym, stadium, arena (play area)	7	20	0.18	—
Health club/aerobics room	40	20	0.06	—
Health club/weight room	10	20	0.06	—
~~Ice arenas without combustion engines~~	~~—~~	~~—~~	~~0.30~~	~~0.5~~
Spectator areas	150	7.5	0.06	—
Swimming pools (pool and deck area)	—	—	0.48	—
Storage				
Refrigerated warehouses/freezers (< 50°F)	—	10	—	—
Repair garages, enclosed parking garages[b, d]	—	—	—	0.75
Warehouses [f]	—	10	0.06	—
Theaters				
Auditoriums (see “Education”)	—	—	—	—
Lobbies	150	5	0.06	—
Stages, studios	70	10	0.06	—
Ticket booths	60	5	0.06	—
Transportation				
Platforms	100	7.5	0.06	—
Transportation waiting	100	7.5	0.06	—
Workrooms				
Bank vaults/safe deposit	5	5	0.06	—
Computer (without printing)	4	5	0.06	—
Copy, printing rooms	4	5	0.06	0.5
Darkrooms	—	—	—	1.0
Manufacturing where hazardous materials are not used	7	10	0.18	—
Manufacturing where hazardous materials are used (excludes heavy industrial and chemical processes)	7	10	0.18	—
Meat processing[c]	10	15	—	—
Pharmacy (prep. area)	10	5	0.18	—
Photo studios	10	5	0.12	—
Sorting, packing, light assembly	7	7.5	0.12	—
Telephone closets	—	—	0.00	—

For SI: 1 cubic foot per minute = 0.0004719 m^3/s, 1 ton = 908 kg, 1 cubic foot per minute per square foot = 0.00508 $m^3/(s \times m^2)$, °C = [(°F) – 32]/1.8, 1 square foot = 0.0929 m^2.

a. Based on net occupiable floor area.

b. Mechanical exhaust required and the recirculation of air from such spaces is prohibited. Recirculation of air that is contained completely within such spaces shall not be prohibited (see Section 403.2.1, Item 3).

c. Spaces unheated or maintained below 50°F are not covered by these requirements unless the occupancy is continuous.

d. Ventilation systems in enclosed parking garages shall comply with Section 404.

e. Rates are per water closet , urinal or adult changing station. The higher rate shall be provided where the exhaust system is designed to operate intermittently. The lower rate shall be permitted only where the exhaust system is designed to operate continuously while occupied.

f. Rates are per room unless otherwise indicated. The higher rate shall be provided where the exhaust system is designed to operate intermittently. The lower rate shall be permitted only where the exhaust system is designed to operate continuously while occupied.

g. Mechanical exhaust is required and recirculation from such spaces is prohibited. For occupancies other than science laboratories, where there is a wheel-type energy recovery ventilation (ERV) unit in the exhaust system design, the volume of air leaked from the exhaust airstream into the outdoor airstream within the ERV shall be less than 10 percent of the outdoor air volume. Recirculation of air that is contained completely within such spaces shall not be prohibited (see Section 403.2.1, Items 2 and 4).

h. For nail salons, each manicure and pedicure station shall be provided with a source capture system capable of exhausting not less than 50 cfm per station. Exhaust inlets shall be located in accordance with Section 502.20. Where one or more required source capture systems operate continuously during occupancy, the exhaust rate from such systems shall be permitted to be applied to the exhaust flow rate required by Table 403.3.1.1 for the nail salon.

i. Outpatient facilities to which the rates apply are freestanding birth centers, urgent care centers, neighborhood clinics and physicians' offices, Class 1 imaging facilities, outpatient psychiatric facilities, outpatient rehabilitation facilities and outpatient dental facilities.

j. The requirements of this table provide for acceptable IAQ. The requirements of this table do not address the airborne transmission of airborne viruses, bacteria and other infectious contagions.

k. These rates are intended only for outpatient dental clinics where the amount of nitrous oxide is limited. They are not intended for dental operatories in institutional buildings where nitrous oxide is piped.

l. The occupiable floor area in warehouses shall not include the floor area of self-storage units, floor areas under rack storage or designated palletized storage floor areas.

Reason: I am proposing the row in the ventilation table (table 403.3.1.1) labeled Ice arenas without combustion engines to be deleted.

Reason for removal: The requirement / row has been removed from ASHRAE 62.1 since the 2013 addition. As well as the values currently required in the current code do not make sense. The ventilation rate for the ice surface on an area basis is 0.30 cfm/sf which is higher than gym play area which is at 0.18 cfm/sf. My understanding of the ventilation rate for area is to account for off gassing of materials, and ice off gasses water vapor where a gym floor would be much worse and yet ventilation rate is higher for ice. As the row indicates this requirement is for ice arenas without combustion engines so I do not understand why there is a requirement for exhaust, this requirement would more be for an ice arena with combustion engines.

Cost Impact: Decrease

- **cdpAccess Ice Arena Code Change Savings.xlsx**
  https://www.cdpaccess.com/proposal/9413/28499/documentation/134102/attachments/download/4623/

Estimated Immediate Cost Impact:

Assuming desiccant style dehumidification units are used which are industry standard there would be a savings of $50,000 to $100,000 savings per ice rink. Desiccant style dehumidification units are much more expensive per unit airflow than a typical DX unit.

Estimated Immediate Cost Impact Justification (methodology and variables):

A typical NHL size ice sheet is 16,400sqft in area. If the "Ice Arenas without Combustion Engines" was removed and the ice would now fall under "Gym, Stadium, Arena (play area)", the airflow per square foot goes from 0.30 to 0.18 cfm/sf. This is a reduction close to 2,000 cfm. Ice arenas need to be positively pressurized to control humidity so if the exhaust rate is taken into account and dropped from 0.5 to 0.18, this would reduce the required airflow around 5,000 cfm. Ice arenas required dew points below what standard DX systems can supply so more expensive desiccant type dehumidification units are used.

Estimated Life Cycle Cost Impact:

Depending on controls and design conditions there is a chance to save $7,000 to $20,000 over the 15 year life of the desiccant unit, majority being fan energy but there is some gas savings.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

It is difficult to quantify the life cycle savings, the savings come from not having to condition 2,000 to 5,000 cfm for the life of the equipment and what are the outside conditions of the building. As well as most of these systems are ran with demand control ventilation or scheduled only full ventilation when there is a high occupancy event. A high school hockey team will have 8-15 home hockey games and typically have at least 2 teams (mens and womens) call the rink home ice, with high occupancy games happening between November and February with playoffs happening in March of every year. . A college hockey team will have about 20 home hockey games and typically have at least 2 teams (mens and womens) call the rink home ice, with high occupancy games happening between October and March with playoffs happening in March/April of every year. I will be using 20 events per season for calc, more event will lead to more cost savings. Life expectancy for a gas regen desiccant unit is around 15 years. The unit is ran as a constant volume unit unit supply airflow is equal to the requires outside airflow rate, so if the requires outside airflow rate can be reduced the supply airflow can be reduced saving fan energy.

M29-24

M30-24

IMC®: 403.3.2.1

Proponents: Diana Burk, Energy Solutions, Energy Solutions (dburk@energy-solution.com)

2024 International Mechanical Code

Revise as follows:

403.3.2.1 Outdoor air for dwelling units. An outdoor air ventilation system shall comply with one of the following:

1. In Climate Zones 0 through 5, an outdoor ventilation system consisting of a mechanical exhaust system, supply system or combination thereof shall be installed for each *dwelling unit*. Local exhaust or supply systems, including outdoor air ducts connected to the return side of an air handler, are permitted to serve as such a system.
2. In Climate Zones 6, 7, and 8, an outdoor ventilation system shall be a *balanced ventilation system* in compliance with the residential provisions of the *International Energy Conservation Code*.

The outdoor air ventilation system shall be designed to provide the required rate of outdoor air continuously during the period that the *building* is occupied. The minimum continuous outdoor airflow rate shall be determined in accordance with Equation 4-9.

$$Q_{OA} = 0.03A_{floor} + 7.5(N_{br} + 1) \quad \textbf{(Equation 4-9)}$$

where:

Q_{OA} = outdoor airflow rate, cfm

A_{floor} = conditioned floor area, ft^2

N_{br} = number of bedrooms; not to be less than one

Exceptions:

1. The outdoor air ventilation system is not required to operate continuously where the system has controls that enable operation for not less than 1 hour of each 4-hour period. The average outdoor airflow rate over the 4-hour period shall be not less than that prescribed by Equation 4-9.
2. The minimum mechanical ventilation rate determined in accordance with Equation 4-9 shall be reduced by 30 percent provided that both of the following conditions apply:
   2.1. A ducted system supplies *ventilation air* directly to each bedroom and to one or more of the following rooms:
      2.1.1. Living room.
      2.1.2. Dining room.
      2.1.3. Kitchen.
   2.2. The whole-house ventilation system is a *balanced ventilation system*.

Reason: This proposal is intended to align the residential ventilation requirements in the mechanical code with the energy efficiency requirements in the 2024 IECC. Public draft #2 of the 2024 IECC requires the use of an energy recovery ventilator or heat recovery ventilator in Climate Zones 6 through 8 which are both balanced ventilation systems.

Section 403.3.2.1 of the 2024 IMC explicitly allows the use of supply-only, exhaust-only or balanced ventilation systems in low-rise multifamily buildings. This proposal is intended to clarify that supply-only and exhaust-only ventilation systems are only allowed in Climate Zones 0 through 5 and balanced ventilation systems are required in Climate Zones 6 through 8.

Bibliography: THE INTERNATIONAL RESIDENTAIL CODE-CHAPTER 11 ENERGY EFFICIENCY PUBLIC COMMENT DRAFT #2 https://www.iccsafe.org/wp-content/uploads/PCD2-IRC-CHAP-11.pdf

REPI-93-21 https://energy.cdpaccess.com/proposal/443/1236/preview/

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

There are no increased costs for this proposal, as it is simply a coordination proposal. Increased costs due to the ERV/HRV requirements have been addressed as part of the development process of the IECC-R.

M30-24

M31-24

IMC®: 403.3.2.1

Proponents: Armin Rudd, AB Systems LLC, National Association of Home Builders (arudd@absystems.us)

2024 International Mechanical Code

Revise as follows:

403.3.2.1 Outdoor air for dwelling units. An outdoor air ventilation system consisting of a mechanical exhaust system, supply system or combination thereof shall be installed for each *dwelling unit*. Local exhaust or supply systems, including outdoor air ducts connected to the return side of an air handler, are permitted to serve as such a system. The outdoor air ventilation system shall be designed to provide the required rate of outdoor air continuously during the period that the *building* is occupied. The minimum continuous outdoor airflow rate shall be determined in accordance with Equation 4-9.

$\cancel{Q_{OA} = 0.03}$ $\underline{Q_{OA} = 0.01}A_{floor} + 7.5(N_{br} + 1)$ **(Equation 4-9)**

where:

Q_{OA} = outdoor airflow rate, cfm

A_{floor} = conditioned floor area, ft^2

N_{br} = number of bedrooms; not to be less than one

Exceptions:

1. The outdoor air ventilation system is not required to operate continuously where the system has controls that enable operation for not less than 1 hour of each 4-hour period. The average outdoor airflow rate over the 4-hour period shall be not less than that prescribed by Equation 4-9.
2. The minimum mechanical ventilation rate determined in accordance with Equation 4-9 shall be reduced by 30 percent provided that both of the following conditions apply:
   - 2.1. A ducted system supplies *ventilation air* directly to each bedroom and to one or more of the following rooms:
     - 2.1.1. Living room.
     - 2.1.2. Dining room.
     - 2.1.3. Kitchen.
   - 2.2. The whole-house ventilation system is a *balanced ventilation system*.

Reason: The goal of this proposal is roll-back the mechanical ventilation rate for Group R-2, R-3 and R-4 occupancies to the previous 2021 rate.

The 2024 IMC residential ventilation rate is too high. Too much ventilation airflow wastes energy and causes humidity control difficulties and inefficiencies in warm-humid summers and cold-dry winters.

The 2024 IMC increase from (0.01*A_{floor} + 7.5*(Nbdrm+1)) to (0.03*A_{floor} to 7.5*(Nbdrm+1)) was presented as an attempt to align the IMC with ASHRAE Standard 62.2. However, 62.2 allows for an infiltration credit to reduce the ventilation rate, the 2024 IMC does not. 62.2 allows for an air filtration credit to reduce the ventilation rate, the 2024 IMC does not. As such, the effective 2024 IMC ventilation rate is greater than the ASHRAE 62.2 rate and the IMC rate change should be reversed.

Behind that is the fact that the 2013 increase in the ASHRAE 62.2 ventilation rate did not come about due to any health-based data or studies. It came about due to committee leadership maneuvering to split up a standing change proposal that involved a combined change to eliminate the default infiltration credit[1] (infiltration credit would have to be measured in the future) and to find consensus on what the ventilation rate should be based on human health data. Because the committee leadership wanted to bifurcate the change proposal, the proponents were promised that if the proposal was withdrawn, and the default infiltration credit was eliminated, the committee would act in good faith to base the new ventilation rate requirement on health-based studies rather than the current ventilation rate status which was based on qualitative judgement of the committee membership. Since the proposal had been mired in process for a long time, the proponents agreed to what the committee leadership promised and withdrew the proposal. After that, there was a swift dispensing of the default infiltration credit followed by a large ventilation rate increase without presentation of any health data studies to support it.

Fast forward a decade and there is still no health-based data or study to support the ASHRAE Standard 62.2 residential ventilation rate quantitatively. Rather, indoor air quality research, using the Disability Adjusted Life Years (DALY) analysis approach, has shifted away from concern over dilution of chemical contaminants by ventilation air exchange to fine particle filtration in the indoor environment.

Fine particle (PM2.5) filtration is now presented as the most significant indoor air health issue, being about 10 times more important than the next closest indoor air contaminant of concern which is formaldehyde, and formaldehyde is best limited by limiting the material source. As such, the primary contaminant of concern in residential indoor environments has shifted largely away from chemical compounds to fine particles. Fine particulate matter is ameliorated by air filtration, not dilution with outdoor air, since outdoor concentrations often exceed indoor concentrations[2,3,4].

Therefore, the residential ventilation rate should not have been increased in the 2024 IMC due to the following:

1. The effective 2024 IMC ventilation rate is greater than the ASHRAE Standard 62.2 rate because the 2024 IMC does not allow the credits against ventilation rate that ASHRAE 62.2 allows; and
2. There is no health-based data to support the prior or the new IMC ventilation rate, and there has been an order of magnitude shift in the indoor air quality research community to the importance of fine particle filtration over chemical dilution.

<u>Ventilation excess compared to ASHRAE Standard 62.2:</u>

By not allowing a measured infiltration credit against the ventilation rate per ASHRAE Standard 62.2, the IMC's current ventilation rate requirement is about 12 CFM or 14% higher than even the ASHRAE 62.2 rate for a 2400 ft^2, 3 bedroom, 3 ACH50 leakage dwelling-unit in Baltimore with a reference-case exhaust-only ventilation system. For the same dwelling-unit with a balanced ventilation system, the IMC's current ventilation rate requirement is about 36 CFM or 53% higher than the ASHRAE 62.2 rate. The excess ventilation rate translates to excess energy use and indoor humidity control issues.

[1] The default infiltration credit was a presumption that infiltration contributed 2 CFM per 100 ft^2 of floor area to outdoor air exchange for all dwelling units.

[2] A Method to Estimate the Chronic Health Impact of Air Pollutants in U.S. Residences. Jennifer M. Logue, Phillip N. Price, Max H. Sherman, and Brett C. Singer. Environmental Energy Technologies Division, Lawrence Berkeley National Lab, Berkeley, California, USA. Environmental Health Perspectives, volume 120, number 2, February 2012.

[3] Inhalable Particulate Matter and Health (PM2.5 and PM10), California Air Resources Board. https://ww2.arb.ca.gov/resources/inhalable-particulate-matter-and-health (accessed 11/22/2023)

[4] Relationships of Indoor, Outdoor, and Personal Air (RIOPA). Part I. Collection Methods and Descriptive Analyses. Weisel CP, Zhang J, Turpin BJ, Morandi M, Colome S, Stock T, et al. 2005. HEI Research Report 130; NUARTC Research Report 7. Boston:Health Effects Institute.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

<u>Equipment:</u> The proposed decrease in required ventilation rate will generally result in cost savings due to reduced size of ventilation fan equipment and reduced size of ducts. Smaller ventilation system components will generally result in reduced material costs but that can depend on the specifics of each ventilation system.

<u>Energy Use:</u> Energy modeling of residential ventilation systems show the following impacts.

For an exhaust-only ventilation system in a 2467 ft^2, 3 bedroom, 3 ACH50 dwelling unit in Washington DC, annual energy savings due to the reduced ventilation rate can be expected as follows:

89% savings for the ventilation fan energy itself;

20% or $161 savings for total HVAC system energy; and

10% or $161 savings for total dwelling unit energy including HVAC, hot water, appliances, and miscellaneous loads.

For an ERV ventilation system in the same dwelling unit and location, annual energy savings due to the reduced ventilation rate can be expected as follows:

90% savings for the ventilation fan energy itself;

10% or $76 savings for total HVAC system energy; and
5% or $76 savings for total dwelling unit energy including HVAC, hot water, appliances, and miscellaneous loads.

Estimated Immediate Cost Impact Justification (methodology and variables):

	Electric, Cooling Season					Dehum.		Gas, Heating Season				Gas, DHW		Elec. Appl.		House Totals			Difference	
Location and Ventilation System	Outdoor Unit (kWh)	Indoor Unit (kwh)	Vent Fan (kWh)	Sub Total (kWh)	Sub Total ($)	(kWh)	($)	(Therm)	Furnace Fan (kWh)	Vent. Fan (kWh)	Sub Total ($)	(Therm)	($)	(kWh)	($)	(kWh)	(Therm)	($)	($)	(%)
Wash DC-Reagan (CZ 4)																				
Vent1-Exh (0.01*A_{floor})	1586	323	80	1989	230	87	10	438.4	238	96	561	133.0	158	5508	637	7918	571.4	1595	--	--
Vent1-Exh (0.03*A_{floor})	1755	355	144	2254	260	240	28	519.6	287	189	674	133.0	158	5508	637	8478	652.6	1756	161	10.1
Vent3-Bal ERV (0.01*A_{floor})	1540	316	162	2018	233	55	6	412.6	226	189	539	133.0	158	5508	637	7996	545.6	1573	--	--
Vent3-Bal ERV (0.03*A_{floor})	1599	326	301	2226	257	68	8	436.0	242	365	589	133.0	158			8409	569.0	1649	76	4.8
Notes:																				
Appliance and lighting heat gain was by the HERS 2006 Reference schedule within EnergyGuageUSA.																				

M31-24

M32-24

IMC®: 403.3.2.1

Proponents: Emily Toto, ASHRAE, ASHRAE (etoto@ashrae.org)

2024 International Mechanical Code

Revise as follows:

403.3.2.1 Outdoor air for dwelling units. An outdoor air ventilation system consisting of a mechanical exhaust system, supply system or combination thereof shall be installed for each *dwelling unit*. Local exhaust or supply systems, including outdoor air ducts connected to the return side of an air handler, are permitted to serve as such a system. The outdoor air ventilation system shall be designed to provide the required rate of outdoor air continuously during the period that the *building* is occupied. The minimum continuous outdoor airflow rate shall be determined in accordance with Equation 4-9.

$$Q_{OA} = 0.03A_{floor} + 7.5(N_{br} + 1) \quad \textbf{(Equation 4-9)}$$

where:

Q_{OA} = outdoor airflow rate, cfm

A_{floor} = conditioned floor area, ft^2

N_{br} = number of bedrooms; not to be less than one

Exception~~s~~:

~~1.~~ The outdoor air ventilation system is not required to operate continuously where the system has controls that enable operation for not less than 1 hour of each 4-hour period. The average outdoor airflow rate over the 4-hour period shall be not less than that prescribed by Equation 4-9.

~~2. The minimum mechanical ventilation rate determined in accordance with Equation 4-9 shall be reduced by 30 percent provided that both of the following conditions apply:~~

~~2.1. A ducted system supplies *ventilation air* directly to each bedroom and to one or more of the following rooms:~~

~~2.1.1. Living room.~~

~~2.1.2. Dining room.~~

~~2.1.3. Kitchen.~~

~~2.2. The whole-house ventilation system is a *balanced ventilation system*.~~

Reason: ASHRAE 62.2 is the basis for this proposal.

ASHRAE 62.2 does not have this reduction for distribution or balanced systems.

For balanced systems in single-family applications ASHRAE 62.2 uses a calculation procedure to combine natural infiltration with mechanical ventilation. This procedure results in smaller air flow requirements for balanced systems compared to unbalanced systems. However, this is not fixed at 30% and depends on building envelope leakage levels and weather. This calculation is not allowed for multifamily buildings in ASHRAE 62.2 because no credit is given for natural infiltration in multifamily applications. ASHRAE 62.2 does not allow infiltration credit in multifamily buildings because infiltration calculations are very difficult to perform for multifamily buildings (note that the infiltration calculations used in ASHRAE 62.2 only apply to single zone buildings and were developed for single family dwellings - see the ASHRAE Handbook of Fundamentals Chapter 16) plus concerns about giving credit for flow from other units and adjacent spaces for which there is a substantial supporting literature.

ASHRAE 62.2 does not have this reduction for systems that supply air to specified rooms.

There are multiple reasons for this. Firstly, residences, unlike commercial buildings, are not zoned from an air flow perspective and there is insufficient advantage from delivering air to specific locations in a home to justify a 30% reduction in ventilation rates. This is for a host of reasons, primarily because other factors such as open or closed doors, magnitude and location of building envelope leakage and natural infiltration, and operation of central forced air HVAC systems, obscure any differences in ventilation system type. The bibliography has a list of several publications address these issues. Secondly, it is bad practice to supply air to kitchens. Kitchens are a major source of indoor contaminants from cooking and to prevent transfer of these contaminants to the rest of the dwelling ASHRAE 62.2 and other ventilation standards all require exhaust ventilation from kitchens.

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Controls for Residential Applications. Energies 2021, 14, 5257. https:// doi.org/10.3390/en14175257

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The code change proposal would have a minor, if any, change the cost of construction. Balanced and distributed systems already have additional installation costs and the current language attempts to offset this by requiring a smaller capacity system. In practical terms, however, systems come in a limited number of individual capacities. For example manufacturers offer residential ventilation fans in fixed capacities, or offer a single unit to cover a range of flow. A 30% reduction does not always result in an upfront equipment or installation costs savings.

M32-24

M33-24

IMC®: TABLE 403.3.1.1

Proponents: Emily Toto, ASHRAE, ASHRAE (etoto@ashrae.org)

2024 International Mechanical Code

Revise as follows:

TABLE 403.3.1.1 MINIMUM VENTILATION RATES

Portions of table not shown remain unchanged.

OCCUPANCY CLASSIFICATION	OCCUPANT DENSITY #/1000 FT$^{2\ a}$	PEOPLE OUTDOOR AIRFLOW RATE IN BREATHING ZONE, R_p CFM/PERSON	AREA OUTDOOR AIRFLOW RATE IN BREATHING ZONE, R_aCFM/FT$^{2\ a}$	EXHAUST AIRFLOW RATE CFM/FT$^{2\ a}$
Animal facilities				
Animal exam room (veterinary office)	20	10	0.12	—
Animal imaging (MR/CT/PET)	20	10	0.18	0.9
Animal operating rooms	20	10	0.18	3.00
Animal postoperative recovery room	20	10	0.18	1.50
Animal preparation rooms	20	10	0.18	1.50
Animal procedure room	20	10	0.18	2.25
Animal surgery scrub	20	10	0.18	1.50
Large-animal holding room	20	10	0.18	2.25
Necropsy	20	10	0.18	2.25
Small-animal cage room (static cages)	20	10	0.18	2.25
Small-animal cage room (ventilated cages)	20	10	0.18	1.50
Correctional facilities				
Booking/waiting	50	7.5	0.06	—
Cells				
without plumbing fixtures	25	5	0.12	—
with plumbing fixtures[g]	25	5	0.12	1.0
Day room	30	5	0.06	—
Dining halls(see “Food and beverage service”)	—	—	—	—
Guard stations	15	5	0.06	—
Dry cleaners, laundries				
Coin-operated dry cleaner	20	15	—	—
Coin-operated laundries	20	7.5	0.12	—
Commercial dry cleaner	30	30	—	—
Commercial laundry	10	5	0.12	—
Storage, pick up	30	7.5	0.12	—
Education				
Art classroom[g]	20	10	0.18	0.7
Auditoriums	150	5	0.06	—
Classrooms (ages 5–8)	25	10	0.12	—
Classrooms (age 9 plus)	35	10	0.12	—
Computer lab	25	10	0.12	—
Corridors (see “Public spaces”)	—	—	—	—
Day care (through age 4)	25	10	0.18	—
Lecture classroom	65	7.5	0.06	—
Lecture hall (fixed seats)	150	7.5	0.06	—
Locker/dressing rooms[g]	—	—	—	0.25
Media center	25	10	0.12	—
Multiuse assembly	100	7.5	0.06	—
Music/theater/dance	35	10	0.06	—
Science laboratories[g]	25	10	0.18	1.0
Smoking lounges[b]	70	60	—	—
Sports locker rooms[g]	—	—	—	0.5
Wood/metal shops[g]	20	10	0.18	0.5
Food and beverage service				
Bars, cocktail lounges	100	7.5	0.18	—
Break rooms	25	5	0.06	—
Cafeteria, fast food	100	7.5	0.18	—
Coffee stations	20	5	0.06	—
Corridors	—	—	0.06	—
Dining rooms	70	7.5	0.18	—
Kitchens (cooking)[b]	20	7.5	0.12	0.7
Occupiable storage rooms for liquids or gels	2	5	0.12	—
Hotels, motels, resorts and dormitories				

OCCUPANCY CLASSIFICATION	OCCUPANT DENSITY #/1000 FT	PEOPLE OUTDOOR AIRFLOW RATE IN BREATHING ZONE, *R* CFM/PERSON	AREA OUTDOOR AIRFLOW RATE IN BREATHING ZONE, *R* CFM/FT	EXHAUST AIRFLOW RATE CFM/FT
Bathrooms/toilet—private[g]	—	—	—	25/50[f]
Bedroom/living room	10	5	0.06	—
Conference/meeting	50	5	0.06	—
Dormitory sleeping areas	20	5	0.06	—
Gambling casinos	120	7.5	0.18	—
Laundry rooms, central	10	5	0.12	—
Laundry rooms within dwelling units	10	5	0.12	—
Lobbies/prefunction	30	7.5	0.06	—
Multipurpose assembly	120	5	0.06	—
Offices				
Break rooms	50	5	0.12	—
Conference rooms	50	5	0.06	—
Main entry lobbies	10	5	0.06	—
Occupiable storage rooms for dry materials	2	5	0.06	—
Office spaces	5	5	0.06	—
Reception areas	30	5	0.06	—
Telephone/data entry	60	5	0.06	—
Outpatient healthcare facilities[i, j]				
Birthing room	15	10	0.18	—
Class 1 imaging room	5	~~5~~7.5	0.12	—
Dental operatory[k]	20	10	0.18	—
General examination room	20	7.5	0.12	—
Other dental treatment areas	5	5	0.06	—
Physical therapy exercise area	7	20	0.18	—
Physical therapy individual room	20	10	~~0.06~~0.12	—
Physical therapeutic pool area	—	—	0.48	—
Prosthetics and orthotics room	20	10	0.18	—
Psychiatric consultation room	20	5	0.06	—
Psychiatric examination room	20	5	0.06	—
Psychiatric group room	50	5	0.06	—
Psychiatric seclusion room	5	10	~~0.06~~0.12	—
Speech therapy room	20	5	0.06	—
Urgent care examination room	20	7.5	0.12	—
Urgent care observation room	20	5	0.06	—
Urgent care treatment room	20	7.5	~~0.18~~0.12	—
Urgent care triage room	20	10	0.18	—
Private dwellings, single and multiple				
Garages, common for multiple units[b]	—	—	—	0.75
Kitchens[b]	—	—	—	50/100[f]
Living areas[c]	Based on number of bedrooms. First bedroom, 2; each additional bedroom, 1	0.35 ACH but not less than 15 cfm/person	—	—
Toilet rooms and bathrooms[g]	—	—	—	25/50[f]
Public spaces				
Corridors	—	—	0.06	—
Courtrooms	70	5	0.06	—
Elevator car	—	—	—	1.0
Legislative chambers	50	5	0.06	—
Libraries	10	5	0.12	—
Museums (children's)	40	7.5	0.12	—
Museums/galleries	40	7.5	0.06	—
Places of religious worship	120	5	0.06	—
Room with adult changing station	—	—	—	50/70[e]
Shower room (per shower head)[g]	—	—	—	~~50/20~~20/50[f]
Smoking lounges[b]	70	60	—	—
Toilet rooms — public[g]	—	—	—	50/70[e]
Retail stores, sales floors and showroom floors				
Dressing rooms	—	—	—	0.25
Mall common areas	40	7.5	0.06	—
Sales	15	7.5	0.12	—
Shipping and receiving	2	10	0.12	—
Smoking lounges[b]	70	60	—	—
Storage rooms	—	—	0.12	—
Warehouses (see "Storage")	—	10	0.06	—
Specialty shops				
Automotive motor fuel-dispensing stations[b]	—	—	—	1.5
Banks or lobbies	15	7.5	0.06	—
Barber	25	7.5	0.06	0.5
Beauty salons[b]	25	20	0.12	0.6
Embalming room[b]	—	—	—	2.0

OCCUPANCY CLASSIFICATION	OCCUPANT DENSITY #/1000 FT	PEOPLE OUTDOOR AIRFLOW RATE IN BREATHING ZONE, R CFM/PERSON	AREA OUTDOOR AIRFLOW RATE IN BREATHING ZONE, R CFM/FT	EXHAUST AIRFLOW RATE CFM/FT
Nail salons [b, h]	25	20	0.12	0.6
Pet shops (animal areas)[b]	10	7.5	0.18	0.9
Supermarkets	8	7.5	0.06	—
Sports and amusement				
Bowling alleys (seating areas)	40	10	0.12	—
Disco/dance floors	100	20	0.06	—
Game arcades	20	7.5	0.18	—
Gym, stadium, arena (play area)	7	20	0.18	—
Health club/aerobics room	40	20	0.06	—
Health club/weight room	10	20	0.06	—
Ice arenas without combustion engines	—	—	0.30	0.5
Spectator areas	150	7.5	0.06	—
Swimming pools (pool and deck area)	—	—	0.48	—
Storage				
Refrigerated warehouses/freezers (< 50°F)	—	10	—	—
Repair garages, enclosed parking garages[b, d]	—	—	—	0.75
Warehouses[f]	—	10	0.06	—
Theaters				
Auditoriums (see “Education”)	—	—	—	—
Lobbies	150	5	0.06	—
Stages, studios	70	10	0.06	—
Ticket booths	60	5	0.06	—
Transportation				
Platforms	100	7.5	0.06	—
Transportation waiting	100	7.5	0.06	—
Workrooms				
Bank vaults/safe deposit	5	5	0.06	—
Computer (without printing)	4	5	0.06	—
Copy, printing rooms	4	5	0.06	0.5
Darkrooms	—	—	—	1.0
Manufacturing where hazardous materials are not used	7	10	0.18	—
Manufacturing where hazardous materials are used (excludes heavy industrial and chemical processes)	7	10	0.18	—
Meat processing[c]	10	15	—	—
Pharmacy (prep. area)	10	5	0.18	—
Photo studios	10	5	0.12	—
Sorting, packing, light assembly	7	7.5	0.12	—
Telephone closets	—	—	0.00	—

For SI: 1 cubic foot per minute = 0.0004719 m^3/s, 1 ton = 908 kg, 1 cubic foot per minute per square foot = 0.00508 $m^3/(s \times m^2)$, °C = [(°F) – 32]/1.8, 1 square foot = 0.0929 m^2.

a. Based on net occupiable floor area.

b. Mechanical exhaust required and the recirculation of air from such spaces is prohibited. Recirculation of air that is contained completely within such spaces shall not be prohibited (see Section 403.2.1, Item 3).

c. Spaces unheated or maintained below 50°F are not covered by these requirements unless the occupancy is continuous.

d. Ventilation systems in enclosed parking garages shall comply with Section 404.

e. Rates are per water closet, urinal or adult changing station. The higher rate shall be provided where the exhaust system is designed to operate intermittently. The lower rate shall be permitted only where the exhaust system is designed to operate continuously while occupied.

f. Rates are per room unless otherwise indicated. The higher rate shall be provided where the exhaust system is designed to operate intermittently. The lower rate shall be permitted only where the exhaust system is designed to operate continuously while occupied.

g. Mechanical exhaust is required and recirculation from such spaces is prohibited. For occupancies other than science laboratories, where there is a wheel-type energy recovery ventilation (ERV) unit in the exhaust system design, the volume of air leaked from the exhaust airstream into the outdoor airstream within the ERV shall be less than 10 percent of the outdoor air volume. Recirculation of air that is contained completely within such spaces shall not be prohibited (see Section 403.2.1, Items 2 and 4).

h. For nail salons, each manicure and pedicure station shall be provided with a source capture system capable of exhausting not less than 50 cfm per station. Exhaust inlets shall be located in accordance with Section 502.20. Where one or more required source capture systems operate continuously during occupancy, the exhaust rate from such systems shall be permitted to be applied to the exhaust flow rate required by Table 403.3.1.1 for the nail salon.

i. Outpatient facilities to which the rates apply are freestanding birth centers, urgent care centers, neighborhood clinics and physicians' offices, Class 1 imaging facilities, outpatient psychiatric facilities, outpatient rehabilitation facilities and outpatient dental facilities.

j. The requirements of this table provide for acceptable IAQ. The requirements of this table do not address the airborne transmission of airborne viruses, bacteria and other infectious contagions.

k. These rates are intended only for outpatient dental clinics where the amount of nitrous oxide is limited. They are not intended for dental operatories in institutional buildings where nitrous oxide is piped.

l. The occupiable floor area in warehouses shall not include the floor area of self-storage units, floor areas under rack storage or designated palletized storage floor areas.

Reason: This proposal seeks to update the existing ventilation rate table in the IMC. Standard 62.1 is the source material for this table, and this updates Table 403.3.1.1 to match the appropriate ventilation rates in 62.1-2022.

Bibliography: ASHRAE Standard 62.1-2022

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal revises ventilation rates for specific spaces within varying occupancy classifications. However, this does not dictate system design to meet those requirements and therefore does not increase the cost of construction.

M33-24

M34-24

IMC®: 403.3.2.5

Proponents: Amanda Hickman, The Hickman Group, Air Movement and Control Association International, Inc. (AMCA) (amanda@thehickmangroup.com)

2024 International Mechanical Code

Revise as follows:

403.3.2.5 Ventilating equipment. Fans that supply ~~providing exhaust or~~ outdoor airto or *exhaust air* from a space shall be *listed* and *labeled* ~~to provide the minimum required air flow~~ in accordance with ANSI/AMCA 210-ANSI/ASHRAE 51. Minimum required airflow rates shall be determined in accordance with Chapter 4 of this code.

Reason: This proposal suggests editorial changes to the language to more accurately describe how fans in ventilating equipment function and to harmonize the language with language in the standard that is referenced in this section. The original wording contains two separate requirements that are mixed. Requirement one is to have the fans listed and labeled to AMCA 210/ASHRAE 51. Requirement two is that the fans must provide the minimum required airflow. As currently stated, section 403.3.2.5 can be interpreted to state that the fans shall "provide the minimum required air flow in accordance with" AMCA 210/ASHRAE 51. However, AMCA 210/ASHRAE 51 provides no minimum air flow rates. Minimum airflow rates are regulated by Chapter 4 of the IMC.

This proposal harmonizes the following IMC-defined terms:

Outdoor air is a defined term. OUTDOOR AIR. Air taken from the outdoors, and therefore not previously circulated through the system.

Exhaust air is a defined term. AIR, EXHAUST. Air being removed from any space, appliance or piece of equipment and conveyed directly to the atmosphere by means of openings or ducts.

Supply air is a defined term. SUPPLY AIR. That air delved to each or any space supplied by the air distribution system or the total air delivered to all spaces supply by the air distribution system, which is provided for ventilating, heating, cooling, humidification, dehumidification, and other similar purposes.

The definition of Balanced ventilation system provides a basis for better wording of this section.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal only updates terminology to be more consistent with referenced standard and industry practice.

M34-24

M35-24

IMC®: CHAPTER 4, 408.1 (New), 408.1.1 (New), APPENDIX D, SECTION D101, D101.1, D101.1.1

Proponents: Jonathan Flannery, Pandemic Task Force Code Development Working Group, PTF CDWG (jflannery@aha.org)

2024 International Mechanical Code

CHAPTER 4 VENTILATION

Add new text as follows:

408.1 Clean Air Delivery Capability. In group A, B, E, and I occupancies, each mechanical system shall meet the requirement in Section 408.1.1.

408.1.1 Airflow for increased filtration. Mechanical systems shall be sized to accommodate a design airflow at a total static pressure drop that assumes the utilization of a supply air filter with a Minimum Efficiency Reporting Value of not less than 13 (MERV 13).

Exceptions:

1. Ventilation for ambulatory care facilities, Group I-1 and Group I-2 occupancies shall be designed and installed in accordance with this code, ASHRAE/ASHE 170 and NFPA 99.
2. In group B occupancies, spaces smaller than 500 square feet (47 m^2) served by unitary or Packaged Terminal HVAC equipment.

Delete without substitution:

~~APPENDIX D CLEAN AIR DELIVERY~~

~~SECTION D101~~
~~GENERAL~~

~~**D101.1 Clean air delivery capability.**~~

~~In Group A, B, E and I *occupancies*, each mechanical system shall meet the requirements in Section D101.1.1.~~

~~**Exception:** Occupiable spaces where 100 percent of the supply air meets high-efficiency particulate air filtration.~~

~~**D101.1.1 Airflow for increased filtration.**~~

~~Mechanical systems shall be sized to accommodate a design airflow at a total static pressure drop that assumes the utilization of a supply air filter with a Minimum Efficiency Reporting Value (MERV) of not less than 13.~~

Reason: According to the World Health Organization, 3.2 million people die from household air pollution worldwide[1]. As we spend 90% of our time indoors (inclusive of any occupancy types), this is where we absorb most of the pollutants.

There is currently no requirement for filtration in the International Code. MERV 13 is critical to fight both particulate matter and airborne biological contaminants.

Since the pandemic, we have seen numerous events of wildfire affecting a large percentage of the population.

- ASHRAE 241 document that MERV-13 filters are 77% efficient at removing infectious aerosol.
- ASHRAE GPC 44 documents that filters with a MERV rating lower than 11 are not effective to at removing PM2.5

The choice of filtration level efficiency is made by the person who originally selected and engineered the HVAC system. It is frequently not feasible to upgrade to a MERV-13 in equipment that has not been sized for it.

California Title 24 requires MERV-13 for high-rise residential buildings, nonresidential and hotel/motel buildings.

This proposal will relocate language regarding clean air delivery capability from Appendix D to Chapter 4, Ventilation, of the IMC.

[1] https://www.who.int/news-room/fact-sheets/detail/household-air-pollution-and-health

The ICC/NEHA Pandemic Task Force (PTF) was organized and tasked with researching the effects of the COVID-19 pandemic on the built environment and developing a roadmap and proposing needed resources – including guidelines, recommended practices, publications and updates to the International Codes® (I-Codes®) – that are necessary to overcome the numerous challenges that may be faced during future pandemics and to construct and manage safe, sustainable and affordable occupancy of the built environment. The ICC Pandemic Task Force Code Development Work Group (PTF CDWG) has conducted a comprehensive review of current code requirements as they relate to the prevention of the transmission of diseases and other serious health concerns and suggested revisions to current code requirements based on this assessment.

Cost Impact: Increase

Estimated Immediate Cost Impact:

Estimated installation cost increase on a 7.5-ton rooftop air conditioning unit (serves ~3,000 ft^2 space) with MERV13 is about 2% or < $0.20 per square foot.

Estimated Immediate Cost Impact Justification (methodology and variables):

Based cost impact on a typical rooftop air conditioning unit.

M35-24

M36-24

IMC®: 501.3.1

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Mechanical Code

Revise as follows:

501.3.1 Location of exhaust outlets. The termination point of exhaust outlets and ducts discharging to the outdoors shall be located with the following minimum distances:

1. For ducts conveying explosive or flammable vapors, fumes or dusts: 30 feet (9144 mm) from property lines; 10 feet (3048 mm) from operable openings into buildings; 6 feet (1829 mm) from exterior walls and roofs; 30 feet (9144 mm) from combustible walls and operable openings into buildings that are in the direction of the exhaust discharge; 10 feet (3048 mm) above adjoining grade.
2. For other product-conveying outlets: 10 feet (3048 mm) from the property lines; 3 feet (914 mm) from exterior walls and roofs; 10 feet (3048 mm) from operable openings into buildings; 10 feet (3048 mm) above adjoining grade.
3. For all environmental air exhaust: 3 feet (914 mm) from property lines; 3 feet (914 mm) from operable openings ~~, except where the exhaust opening is located not less than 1 foot (305 mm) above the gravity air intake opening~~ into buildings for all occupancies other than Group U; <u>except where the exhaust opening is located not less than 1 foot (305 mm) above the gravity air intake opening</u> ~~and~~ 10 feet (3048 mm) from mechanical air intakes. Such exhaust shall not be considered hazardous or noxious. Separation is not required between intake air openings and living space exhaust air openings of an individual dwelling unit or sleeping unit where an approved factory built intake/exhaust combination termination fitting is used to separate the air streams in accordance with the manufacturer's instructions.
4. Exhaust outlets serving structures in flood hazard areas shall be installed at or above the elevation required by Section 1612 of the International Building Code for utilities and attendant equipment.
5. For specific systems, see the following sections:
   - 5.1. Clothes dryer exhaust, Section 504.4.
   - 5.2. Kitchen hoods and other kitchen exhaust *equipment*, Sections 506.3.13, 506.4 and 506.5.
   - 5.3. Dust, stock and refuse conveying systems, Section 510.2.
   - 5.4. Subslab soil exhaust systems, Section 511.4.
   - 5.5. Smoke control systems, Section 512.10.3.
   - 5.6. Refrigerant discharge, Section 1105.7.
   - 5.7. *Machinery room* discharge, Section 1105.6.1.

Reason: This proposal fixes poor language of M28-21 so that it is understandable and clear.

This proposal is submitted by the ICC Plumbing Mechanical Gas Code Action Committee (PMGCAC)

PMGCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 PMGCAC has held 26 virtual meetings open to any interested party. In addition, there were several virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the PMGCAC website at PMGCAC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

There is no change to the technical requirements of the code. This is just simple wordsmithing to clarify what the intent of the section was requiring.

M37-24

IMC®: [F] 502.4, [F] 502.5

Proponents: Jeanne Rice, NYS DOS, NYS DOS (jeanne.rice@dos.ny.gov); Chad Sievers, NYS, NYS DOS (chad.sievers@dos.ny.gov); Kevin Duerr-Clark, NYS DOS, NYS DOS (kevin.duerr-clark@dos.ny.gov); China Clarke, New York State Dept of State, Manager Technical Support Unit (china.clarke@dos.ny.gov)

THIS PROPOSAL WILL BE HEARD BY THE IFC CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEE.

2024 International Mechanical Code

Revise as follows:

[F] 502.4 ~~Stationary storage battery~~ Energy storage systems. ~~Stationary storage battery~~ Energy storage systems (ESS) shall be regulated and ventilated in accordance with Section 1207.6.1 of the International Fire Code and the general requirements of this chapter.

Delete without substitution:

~~**[F] 502.5 Ventilation of battery systems in cabinets.**~~ ~~Stationary storage battery systems installed in cabinets shall be provided with ventilation in accordance with Section 502.4.~~

Reason: The terminology "battery storage systems" is outdated. This proposed change updates the language to utilize the current terminology found throughout the ICC code books - Energy Storage Systems (ESS). This change also removes section 502.5, as it is redundant - section 502.4 covers all ESS, including ones in cabinets.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposed change is editorial only - changing terminology and removing redundant provisions.

M37-24

M38-24 Part I

IMC®: 504.1, 504.9.6

Proponents: Jonathan Roberts, UL Solutions, UL Solutions (jonathan.roberts@ul.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE MECHANICAL CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Mechanical Code

Revise as follows:

504.1 Installation. Clothes dryers shall be exhausted in accordance with the manufacturer's instructions. Dryer exhaust systems shall convey the moisture and any products of *combustion* to the outside of the *building*.

> **Exception:** This section shall not apply to *listed* and *labeled* condensing-type ~~(ductless)~~ or heat pump clothes dryers.

504.9.6 Exhaust duct required. Where space for a clothes dryer is provided, an exhaust duct system shall be installed. Where the clothes dryer is not installed at the time of occupancy, the exhaust duct shall be capped at the location of the future dryer.

> **Exception:** This section shall not apply w~~W~~here a *listed* and *labeled* condensing-type or heat pump clothes dryer is installed prior to occupancy of structure.

M38-24 Part I

M38-24 Part II

IRC: M1502.2, M1502.4.8

Proponents: Jonathan Roberts, UL Solutions, UL Solutions (jonathan.roberts@ul.com)

2024 International Residential Code

Revise as follows:

M1502.2 Independent exhaust systems. Dryer exhaust systems shall be independent of all other systems and shall convey the moisture to the outdoors.

Exception: This section shall not apply to *listed* and *labeled* condensing-type ~~(ductless)~~ or heat pump clothes dryers.

M1502.4.8 Exhaust duct required.

Where space for a clothes dryer is provided, an exhaust *duct system* shall be installed. Where the clothes dryer is not installed at the time of occupancy the exhaust duct shall be capped or plugged in the space in which it originates and identified and marked “future use.”

Exception: This section shall not apply w~~W~~here a *listed* and *labeled* condensing-type or heat pump clothes dryer is installed prior to occupancy of structure.

Reason: This proposal recognizes the new technology of heat pump clothes dryers. These dryers use a refrigerant system to heat the air within the dryer and remove the moisture. Like condensing-type dryers, these dryers need to be connected to a drain line to dispose of the water. They are electric and are listed and labeled in accordance with UL 2158, which is referenced in IMC 913.1. This proposal also updates description for condensing-type dryers to industry standard terminology, and standardizes formatting of exception language.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Clarifies scope of standards as part of existing listing requirements already applicable to all electric- powered dryers.

M38-24 Part II

M39-24

IMC®: 504.2, 504.2.1 (New)

Proponents: Tony Crimi, A.C. Consulting Solutions Inc., International Firestop Council (tcrimi@sympatico.ca)

2024 International Mechanical Code

Revise as follows:

504.2 Exhaust penetrations. Where a clothes dryer exhaust duct penetrates a non-fire-resistance rated wall or ceiling membrane, the annular space shall be sealed with noncombustible material, *approved* fire caulking or a noncombustible dryer exhaust duct wall receptacle. ~~Ducts that exhaust clothes dryers shall not penetrate or be located within any fireblocking, draftstops or any wall, floor/ceiling or other assembly required by the *International Building Code* to be fire-resistance rated, unless such duct is constructed of galvanized steel or aluminum of the thickness specified in Section 603.4 and the fire-resistance rating is maintained in accordance with the *International Building Code*.~~ *Fire dampers*, *combination fire/smoke dampers* and any similar devices that will obstruct the exhaust flow shall be prohibited in clothes dryer exhaust ducts.

Add new text as follows:

504.2.1 Ducts penetrating fire resistance rated assemblies, fireblocks or draftstops. . Ducts that exhaust clothes dryers shall not penetrate or be located within any fireblocking, draft stopping or any wall, floor/ceiling or other assembly required by the *International Building Code* to be fire-resistance rated, unless it complies with one of the following:

1. The duct is constructed of galvanized steel or aluminum of the thickness specified in Section 603.4 and the fire-resistance rating of any wall, floor/ceiling or other assembly required by the International Building Code to be fire- resistance rated is*maintained in accordance with Chapter 7 of the International Building Code.*
2. Ducts that are continuously covered on all sides from the point at which the duct penetrates the membrane of a wall or ceiling to the outlet terminal with a classified, listed and labeled system specifically evaluated for such purpose, in accordance with nationally recognized standards. The required fire resistance-rating shall be equal to the fire-resistance rating of the assembly being penetrated.

Reason: This proposal does several things. First, it reformats the paragraph and separates the individual criteria for better clarity. It also better differentiates the requirements based on whether the wall or ceiling is fire resistance rated, or not. Lastly, the proposal provides an additional option for ducts that penetrate fire resistance rated walls and floors. Third-party certification organizations like UL and Intertek provide listing and labelling services for fire-resistant duct systems using a variety of nationally recognized Standards and applicable ICC-ES criteria. These Listings have been in the marketplace for many years and have proven their effectiveness.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal adds an additional option for protection of ducts. It does not remove any existing provisions or mandate additional costs.

M39-24

M40-24

IMC®: 506.3 (New), ASTM Chapter 15 (New)

Proponents: Tony Crimi, A.C. Consulting Solutions Inc., International Firestop Council (tcrimi@sympatico.ca)

2024 International Mechanical Code

Add new text as follows:

506.3.1 Special inspection and test requirements. Commercial kitchen grease ducts serving Type I hoods conforming to the provisions of Section 506.3.11 that are listed and labeled to the requirements of 506.3.11.2 or 506.3.11.3 shall undergo special inspection by an approved agency in accordance with ASTM WK70806.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

ASTM WK70806	Standard Practice for On-Site Inspection of Fire Resistive Duct Systems

Staff Analysis: A review of the standard proposed for inclusion in the code, ASTM WK70806 Standard Practice for On-Site Inspection of Fire Resistive Duct Systems, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: Commercial kitchen operations are consistently one of the leading causes of non-residential fires reported in the United States. Until recently, there has been no document produced in the industry that is a consensus of the manufacturers, installation contractors, and inspection agencies. The new ASTM Standard is a key document that provides a standard set of procedures for inspecting and reporting on the installed fire resistive duct systems. At the time of submission, the ASTM WK70806*, Standard Practice for On-Site Inspection of Fire Resistive Duct Systems* had not been published, but has gone through the full ASTM process and is awaiting final publication.

This Standard Practice provides a means to verify compliance of the installed fire resistive duct system to the inspection document, and requires all information contained in the inspection document to be submitted to the Authorizing Authority having jurisdiction. It establishes procedure to inspect products and systems, including methods for field verification and inspection.

Bibliography: ASTM WK70806, Standard Practice for On-Site Inspection of Fire Resistive Duct Systems, ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428.

Cost Impact: Increase

Estimated Immediate Cost Impact:

There are multiple jurisdictions that already require commercial grease duct inspections. The estimated cost is lower for instances where multiple duct inspections could be coordinated in the same time period, or for projects of low complexity. For those jurisdictions that already require duct inspection, the anticipated costs would be much lower as this proposal would be a replacement of existing requirements rather than an additional item.

Estimated Immediate Cost Impact Justification (methodology and variables):

For jurisdictions that do not currently require fire-resistant duct inspections, the anticipated cost increase for this proposal is between $1000 to $1500 per duct system inspected.

M40-24

M41-24

IMC®: 506.3.2.5, 506.3.2.5.1, 506.3.2.5.2, 506.3.2.5.2 (New), 506.3.2.5.3 (New)

Proponents: Joseph Summers, Mashantucket Pequot Tribal Nation, Building Code Enforcement

2024 International Mechanical Code

Revise as follows:

506.3.2.5 Grease duct test. A field test shall be performed prior to the use or concealment of any portion of a grease duct system. Grease ducts shall be considered to be concealed where installed in shafts or covered by coatings or wraps that prevent the grease ducts from being visually inspected on all sides. The permit holder shall be responsible to provide the necessary *equipment* and perform the grease duct leakage test. ~~A light test shall be performed to determine that all welded and brazed joints are liquid tight.~~
A test shall be performed for the entire grease duct system, including the hood-to-duct connection. The grease duct system shall be permitted to be tested in sections, provided that every joint is tested. For *listed* factory-built grease ducts, this test shall be limited to duct joints assembled in the field and shall exclude factory welds. The test shall be performed in accordance with either Section 506.3.2.5.1 or 506.3.2.5.2.

~~506.3.2.5.1 Light test~~ .
~~A duct test shall be performed by passing a lamp, having not less than 1600 lumens, through the entire section of ductwork to be tested. The lamp shall be open so as to emit light equally in all directions perpendicular to the duct walls. A successful test shall be where the light from the lamp is not visible at any point on the exterior of the duct.~~

~~506.3.2.5.2~~ <u>506.3.2.5.1</u> Water spray test.
A duct test shall be performed by simulating a cleaning operation of the interior of the duct. A water pump capable of a flowing outlet pressure of not less than 1,200 psi (8274 kPa) shall be used, along with any necessary hoses and spray nozzles, to apply high-pressure water to the inside surfaces of the duct. A successful test shall be where there is no evidence of cleaning water at any point on the exterior of the duct.

Add new text as follows:

<u>**506.3.2.5.2 Positive pressure smoke test.** The positive pressure smoke test shall be performed by sealing the entire duct system from the hood exhaust opening(s) to the duct termination. Visible smoke shall be introduced to the duct system. The sealed duct shall then be pressurized to a minimum pressure of 1.0 inch water column, but shall not exceed the positive pressure capability of the system and components under test. No smoke shall emit from any exterior surface of the duct.</u>

<u>**506.3.2.5.3 Air test.** The air test shall be performed by sealing the entire duct system from the hood exhaust opening(s) to the duct termination. The sealed duct system shall then be pressurized to a minimum pressure of 1.0 inch (249 Pa) water column and shall be required to hold the initial set pressure for a minimum of 20 minutes.</u>

Reason: The light test can be easily manipulated by “bubble gum” patches. The industry criteria for a light test also requires the room to be in total darkness which is very difficult to achieve. The benefit of the water test is that is how hoods and ducts are cleaned. Very little water is used and is easily cleaned up. The other benefit is that during construction, if you can not hit a joint with the high pressure water, then an access panel is required.
The IKECA, recommends the use of a water test in their standards

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This adds alternatives to test methods the installer can use.

M42-24

IMC®: 507.1; IFC: [M] 606.2, UL Chapter 80 (New)

Proponents: Jonathan Roberts, UL Solutions, UL Solutions (jonathan.roberts@ul.com)

2024 International Mechanical Code

Revise as follows:

507.1 General. Commercial kitchen exhaust hoods shall comply with the requirements of this section. Hoods shall be Type I or II and shall be designed to capture and confine cooking vapors and residues. A Type I hood shall be installed at or above appliances in accordance with Section 507.2. A Type II hood shall be installed at or above *appliances* in accordance with Section 507.3. Where any cooking *appliance* under a single hood requires a Type I hood, a Type I hood shall be installed. Where a Type II hood is required, a Type I or Type II hood shall be installed.

Exceptions:

1. Factory-built commercial ~~cooking recirculating systems~~ exhaust hoods that are *listed* and *labeled* in accordance with UL 710~~B~~, and installed in accordance with Section 304.1, shall not be required to comply with Sections 507.1.5, 507.1.6, 507.2.3, 507.2.5, 507.2.8, 507.2.10, ~~and~~ 507.3.1~~,~~ and 507.3.3. ~~Spaces in which such systems are located shall be considered to be kitchens and shall be ventilated in accordance with Table 403.3.1.1. For the purpose of determining the floor area required to be ventilated, each individual *appliance* shall be considered as occupying not less than 100 square feet (9.3 m^2).~~
2. A hood shall not be required at or above any of the following:
   2. 1. Factory-built commercial cooking recirculating systems *listed* and *labeled* in accordance with UL 710B, and installed in accordance with Section 304.1 . Spaces in which such systems are located shall be considered to be kitchens and shall be ventilated in accordance with Table 403.3.1.1. For the purpose of determining the floor area required to be ventilated, each individual *appliance* shall be considered as occupying not less than 100 square feet (9.3 m^2).

   2.2. Cooking *appliances* equipped with integral down-draft exhaust systems ~~are~~ *listed* and *labeled* for the application in accordance with NFPA 96.

   2.3. Smoker ovens with ~~the~~ integral exhaust systems ~~are~~ *listed* and tested for the application.

   ~~3~~ 2.4. Ovens *listed* and *labeled* for use with wood fuel in accordance with UL 2162 and vented in accordance with the manufacturer's instructions.

   ~~4~~ 2.5. An electric cooking *appliance listed* and *labeled* in accordance with UL 197 for reduced grease emissions.

   ~~5~~ 2.6. Commercial electric dishwashers incorporating a self-contained condensing system *listed* and *labeled* in accordance with UL 921.

   ~~6~~ 2.7. Where the heat and moisture loads from dishwashers and *appliances* that produce heat or moisture and do not produce grease or smoke as a result of the cooking process are incorporated into the HVAC system design or into the design of a separate removal system. Spaces containing such cooking *appliances* that do not require Type II hoods shall be provided with exhaust at a rate of 0.70 cfm per square foot [0.00356 m^3/(s × m^2)]. For the purpose of determining the floor area required to be exhausted, each individual *appliance* that is not required to be installed under a Type II hood shall be considered as occupying not less than 100 square feet (9.3 m^2). Such additional square footage shall be provided with exhaust at a rate of 0.70 cfm per square foot [0.00356 m^3/(s × m^2)].

2024 International Fire Code

Revise as follows:

[M] 606.2 Where required.

A Type I hood shall be installed at or above all commercial cooking appliances and domestic cooking appliances used for commercial purposes that produce grease vapors.

Exceptions:

1. Factory-built commercial exhaust hoods that are *listed* and *labeled* in accordance with UL 710, and installed in accordance with Section 304.1 of the International Mechanical Code, shall not be required to comply with Sections 507.1.5, 507.1.6, 507.2.3, 507.2.5, 507.2.8, 507.2.10, 507.3.1, and 507.3.3, ~~507.1.6 and 507.2.10~~ of the International Mechanical Code.
2. A hood shall not be required at or above any of the following:
   - 2.1. A Factory-built commercial cooking recirculating systems that are *listed* and *labeled* in accordance with UL 710B, and installed in accordance with Section 304.1 of the International Mechanical Code, ~~shall not be required to comply with Sections 507.1.5, 507.2.3, 507.2.5, 507.2.8, 507.3.1, 507.3.3, 507.1.6 and 507.2.10 of the International Mechanical Code.~~ Spaces in which such systems are located shall be considered to be kitchens and shall be ventilated in accordance with Table 403.3.1.1 of the International Mechanical Code. For the purpose of determining the floor area required to be ventilated, each individual appliance shall be considered as occupying not less than 100 square feet (9.3 m^2).
   - 2.2. Cooking appliances equipped with integral down-draft exhaust systems listed and labeled for the application in accordance with NFPA 96.
   - 2.3. Smoker ovens with integral exhaust systems listed and tested for the application.
   - 2.4. Ovens listed and labeled for use with wood fuel in accordance with UL 2162 and vented in accordance with the manufacturer's instructions.
   - 2.5. Electric cooking appliances listed and labeled in accordance with UL 197 for reduced grease emissions.
3. ~~Where cooking appliances are equipped with integral down-draft exhaust systems and such appliances and exhaust systems are *listed* and *labeled* for the application in accordance with NFPA 96, a hood shall not be required at or above them.~~
4. ~~A Type I hood shall not be required for an electric cooking appliance where an *approved* testing agency provides documentation that the appliance effluent contains 5 mg/m^3 or less of grease when tested at an exhaust flow rate of 500 cfm (0.236 m^3/s) in accordance with UL 710B.~~

Add new standard(s) as follows:

UL

Underwriters Laboratories LLC
333 Pfingsten Road
Northbrook, IL 60062

197—2010	Commercial Electric Cooking Appliances—with Revisions through January 2018
2162—2014	Commercial Wood-Fired Baking Ovens—Refractory Type—with Revisions through August 2019

Staff Analysis: The proposed referenced standards, UL 197 and UL 2162, are currently referenced in the IMC. The proposed referenced standard, NFPA 96, is currently referenced in the IMC and IFC.

Reason: This proposal is an editorial cleanup of the code change proposals M40-21 through M46-21 that were approved as submitted for the 2024 codes. This clean-up is necessary to address one of the primary reasons for these proposals, which was to clarify all the exceptions to Type 1 and Type 2 hoods.

For the IMC, exception 1 was always intended to remain as an exception for exhaust hoods listed and labeled to UL 710 (not recirculating systems listed and labeled to UL 710B). This proposal reverts exception 1 back to what was originally in the 2021 code. Also, the current exceptions 3, 4, 5, and 6 were intended to be sub items of Exception 2.

In addition, the exceptions added to Section 507.1 in the IMC that applied to the requirement for Type 1 hoods were also intended to be done in Section 606.2 of the IFC. This proposal aligns the IFC exceptions with the IMC exceptions.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is an editorial cleanup of the code change proposals M40-21 through M46-21 that were approved as submitted for the 2024 codes. It does not add new requirements it simply relocates existing requirements to another section of the codes.

M42-24

M43-24

IMC®: 507.1, 507.1.5, 507.1.6, 507.2; IFC: [M] 606.2

Proponents: Jonathan Roberts, UL Solutions, UL Solutions (jonathan.roberts@ul.com)

2024 International Mechanical Code

Revise as follows:

507.1 General. Commercial kitchen exhaust hoods shall comply with the requirements of this section. Hoods shall be Type I or II and shall be designed to capture and confine cooking vapors and residues. A Type I hood shall be installed at or above appliances in accordance with Section 507.2. A Type II hood shall be installed at or above *appliances* in accordance with Section 507.3. Where any cooking *appliance* under a single hood requires a Type I hood, a Type I hood shall be installed. Where a Type II hood is required, a Type I or Type II hood shall be installed.

Exceptions:

~~1.~~ ~~Factory-built commercial cooking recirculating systems that are and *labeled* in accordance with UL 710B, and installed in accordance with Section 304.1, shall not be required to comply with Sections 507.1.5, 507.1.6, 507.2.3, 507.2.5, 507.2.8, 507.2.10 and 507.3.1, Spaces in which such systems are located shall be considered to be kitchens and shall be ventilated in accordance with Table 403.3.1.1. For the purpose of determining the floor area required to be ventilated, each individual *appliance* shall be considered as occupying not less than 100 square feet (9.3 m^2).~~

~~2~~ 1. A hood shall not be required at or above any of the following:

~~2.1~~ 1.1. Factory-built commercial cooking recirculating systems *listed* and *labeled* in accordance with UL 710B, and installed in accordance with Section 304.1 . Spaces in which such systems are located shall be considered to be kitchens and shall be ventilated in accordance with Table 403.3.1.1. For the purpose of determining the floor area required to be ventilated, each individual *appliance* shall be considered as occupying not less than 100 square feet (9.3 m^2).

~~2.2~~ 1.2. Cooking *appliances* equipped with integral down-draft exhaust systems are *listed* and *labeled* for the application in accordance with NFPA 96.

~~2.3~~ 1.3. Smoker ovens with the integral exhaust systems are *listed* and tested for the application.

4~~3~~. Ovens *listed* and *labeled* for use with wood fuel in accordance with UL 2162 and vented in accordance with the manufacturer's instructions.

5~~4~~. An electric cooking *appliance listed* and *labeled* in accordance with UL 197 for reduced grease emissions.

6~~5~~. Commercial electric dishwashers incorporating a self-contained condensing system *listed* and *labeled* in accordance with UL 921.

7~~6~~. Where the heat and moisture loads from dishwashers and *appliances* that produce heat or moisture and do not produce grease or smoke as a result of the cooking process are incorporated into the HVAC system design or into the design of a separate removal system. Spaces containing such cooking *appliances*that do not require Type II hoods shall be provided with exhaust at a rate of 0.70 cfm per square foot [0.00356 m^3/(s × m^2)]. For the purpose of determining the floor area required to be exhausted, each individual *appliance*that is not required to be installed under a Type II hood shall be considered as occupying not less than 100 square feet (9.3 m^2). Such additional square footage shall be provided with exhaust at a rate of 0.70 cfm per square foot [0.00356 m^3/(s × m^2)].

507.1.5 Exhaust outlets. Exhaust outlets located within the hood shall be located so as to optimize the capture of particulate matter. Each outlet shall serve not more than a 12-foot (3658 mm) section of hood.

Exception: Exhaust outlets within hoods *listed* and *labeled* in accordance with UL 710 installed in accordance with the listing and the manufacturer's installation instructions.

507.1.6 Hood size and location. Hoods shall comply with the overhang, setback and height requirements in accordance with Sections 507.1.6.1 and 507.1.6.2, based on the type of hood.

Exception: Exhaust hoods *listed* and *labeled* in accordance with UL 710 installed in accordance with the listing and the manufacturer's installation instructions.

507.2 Type I hoods. Type I hoods shall be installed where cooking *appliances* produce grease or smoke as a result of the cooking process. Type I hoods shall be installed over *medium-duty, heavy-duty* and *extra-heavy-duty cooking appliances*. Type I hoods shall comply with one of the following:

1. Constructed and installed in accordance with Sections 507.2.1 through 507.2.11
2. *Listed* and *labeled* in accordance with UL 710, and installed in accordance with the listing, the manufacturer's installation instructions, and Sections 507.2.2, 507.2.4, 507.2.7 and 507.2.11.

2024 International Fire Code

Revise as follows:

[M] 606.2 Where required.

A Type I hood shall be installed at or above all commercial cooking appliances and domestic cooking appliances used for commercial purposes that produce grease vapors.

Exceptions:

~~1.~~ ~~Factory-built commercial exhaust hoods that are *listed* and *labeled* in accordance with UL 710, and installed in accordance with Section 304.1 of the International Mechanical Code, shall not be required to comply with Sections 507.1.5, 507.2.3, 507.2.5, 507.2.8, 507.3.1, 507.3.3, 507.1.6 and 507.2.10 of the International Mechanical Code.~~

~~2~~ 1. Factory-built commercial cooking recirculating systems that are *listed* and *labeled* in accordance with UL 710B, and installed in accordance with Section 304.1 ~~of the International Mechanical Code, shall not be required to comply with Sections 507.1.5, 507.2.3, 507.2.5, 507.2.8, 507.3.1, 507.3.3, 507.1.6 and 507.2.10~~ of the International Mechanical Code. Spaces in which such systems are located shall be considered to be kitchens and shall be ventilated in accordance with Table 403.3.1.1 of the International Mechanical Code. For the purpose of determining the floor area required to be ventilated, each individual appliance shall be considered as occupying not less than 100 square feet (9.3 m^2).

~~3~~ 2. Where cooking appliances are equipped with integral down-draft exhaust systems and such appliances and exhaust systems are *listed* and *labeled* for the application in accordance with NFPA 96, a hood shall not be required at or above them.

~~4~~ 3. A Type I hood shall not be required for an electric cooking appliance where an *approved* testing agency provides documentation that the appliance effluent contains 5 mg/m^3 or less of grease when tested at an exhaust flow rate of 500 cfm (0.236 m^3/s) in accordance with UL 710B.

Reason: This proposal recognizes two code compliance paths for Type I hoods. One path is to construct in accordance with the prescriptive code requirements and the other in accordance with requirements found within UL 710. As noted in the scope of UL 710, "These requirements cover Type I commercial kitchen exhaust hoods intended for placement over commercial cooking equipment". UL 710 is not an exception for exhaust hoods, but is the standard used to test and certify factory-built exhaust hoods. Most of the prescriptive requirements in the code for Type I hoods do not apply, because UL 710 is a performance method, which is an alternative means for determining the suitability of the exhaust hood for the installation. The previous exceptions found in the code for UL 710 hoods have not changed they have just been reformatted for clarity.

The first exception to IFC 606.2 is not an appropriate exception to the requirement, because a Type I hood is required to be placed over these cooking appliances, regardless of whether it is constructed in accordance with the code prescribed requirements or is tested and listed in accordance with UL 710. Also, IFC 606.2 is updated to align with the IMC Section 507.2.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This clarifies that code permits two different methods for construction and installation of a Type I exhaust hood. The certification of a factory-built exhaust hood has always been permitted as an alternative method to the prescriptive requirements in the code. Also aligns the IFC with the IMC installation requirements.

M43-24

M44-24 Part I

IMC®: 513.1

Proponents: Jonathan Roberts, UL Solutions, UL Solutions (jonathan.roberts@ul.com)

2024 International Mechanical Code

Revise as follows:

513.1 General. Energy <u>and heat</u> recovery ventilation systems shall be installed in accordance with this section. Where required for purposes of energy conservation, energy <u>and heat</u> recovery ventilation systems shall <u>also</u> comply with the *International Energy Conservation Code* . Ducted <u>energy and</u> heat recovery ventilators shall be *listed* and *labeled* in accordance with UL 1812. Nonducted <u>energy and</u> heat recovery ventilators shall be *listed* and *labeled* in accordance with UL 1815.

Staff Analysis: Staff Analysis: The proposed referenced standards, UL 1812 and UL 1815, are currently referenced in the IMC.

M44-24 Part I

M44-24 Part II

IRC: SECTION M1905 (New), M1905.1 (New), UL Chapter 44 (New)

Proponents: Jonathan Roberts, UL Solutions, UL Solutions (jonathan.roberts@ul.com)

2024 International Residential Code

Add new text as follows:

SECTION M1905 ENERGY AND HEAT RECOVERY VENTILATION SYSTEMS

M1905.1 General. Energy and heat recovery ventilation systems shall be installed in accordance with this section. Where required for purposes of energy conservation, energy and heat recovery ventilation systems shall also comply with Chapter 11. Ducted energy and heat recovery ventilators shall be *listed* and *labeled* in accordance with UL 1812. Nonducted energy and heat recovery ventilators shall be listed and labeled in accordance with UL 1815.

Add new standard(s) as follows:

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062

1812-2013	Ducted Heat Recovery Ventilators - with revisions through May 3, 2022
1815-2012	Nonducted Heat Recovery Ventilators - with revisions December 7, 2021

Staff Analysis: The proposed referenced standards, UL 1812 and UL 1815, are currently referenced in the IMC.

Reason: The common industry terms for the equipment covered by these requirements are “Energy Recovery Ventilators (ERVs)” and “Heat Recovery Ventilators (HRVs)”. The primary difference is that ERVs have moisture permeable heat exchangers to facilitate both sensible and latent heat transfer between the air streams. HRV’s have nonpermeable heat exchangers, and thus only facilitate sensible heat transfer. Both ERVs and HRVs are in scope of the referenced standards. This proposal aligns the code terminology with industry, the IECC, and the IRC to improve clarity. This clarifies that safety requirements always apply independently of energy conservation requirements of IECC. This clarifies that this section does not mandate installation, but provides requirements where installed.

Correlates IRC with mechanical code requirements (Section 514). Chapter 11 of IRC contains energy efficiency related requirements for this equipment (see N1103.6.1), however the main body of code does not contain safety requirements for this equipment.

This equipment is becoming more common in construction. M1301.1 already requires that equipment not covered by this code refer to the IMC. This equipment is covered by 514.1 of the IMC. By also adding these requirements into the body of the IRC, it assists the user in applying code requirements.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Editorial, clarifies existing requirements in the IMC, and also incorporates the updated text into the IRC for ease of use.

For the IRC: E3403.3 already requires listing of electrical equipment, while this proposal clarifies the specific listing standards. IRC M1301.1 points to the IMC for requirements for equipment not covered, and the IMC already includes these requirements. Additionally the IRC, Section M1302.1, requires appliances regulated by the IRC be listed and labeled for the application.

M44-24 Part II

M45-24

IMC®: 601.5

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Mechanical Code

Revise as follows:

601.5 Return air openings. Return air openings for heating, ventilation and air-conditioning systems shall comply with all of the following:

1. Openings shall not be located less than 10 feet (3048 mm) measured in any direction from an open combustion chamber or draft hood of another *appliance* located in the same room or space.
2. Return air for heating or air-conditioning systems shall not be taken from a hazardous or insanitary location or a refrigeration room as defined in this code.
3. The amount of return air taken from any room or space shall be not greater than the flow rate of supply air delivered to such room or space.
4. Return and transfer openings shall be sized in accordance with the *appliance* or *equipment* manufacturer's installation instructions, ACCA Manual D or the design of the *registered design professional*.
5. Return air taken from one *dwelling unit* shall not be discharged into another *dwelling unit*.
6. Taking return air from a crawl space shall not be accomplished through a direct connection to the return side of a forced air furnace. Transfer openings in the crawl space enclosure shall not be prohibited.
7. Return air for heating or air-conditioning systems shall not be taken from a bathroom, toilet room, kitchen, garage, boiler room, furnace room or unconditioned attic.
8. ~~Return air from a closet shall serve only the closet and shall not require a dedicated closet supply duct.~~Where return ~~Return~~ air taken from a closet smaller than 30 square feet (2.8 m^2) in area ~~shall require~~ the closet door shall be undercut not less than 1$^1/_2$ inches (38 mm)~~ or~~, shall have ~~either~~ a louvered door or shall include an air transfer grille, each with a net free area of not less than 30 square inches (19 355 mm^2.) Where return air is taken from a closet 30 ft^2 or larger in area, the closet shall comply with Item 4. Return air taken from closets shall serve only the closet space.
9. Return air taken from a closet smaller than 30 square feet (2.8 m^2) shall require the closet door be undercut not less than 1$^1/_2$ inches (38 mm) or have either a louvered door or an air transfer grille, each with a net free area of not less than 30 square inches (19 355 mm^2).
10. Return air for heating or air-conditioning systems shall not be taken from indoor swimming pool enclosures and associated deck areas.

    Exceptions:

    1. Where the air from such spaces is dehumidified in accordance with Section 403.2.1, Item 2.
    2. Dedicated HVAC systems serving only such spaces.

Exceptions:

1. Taking return air for heating or air-conditioning systems from a kitchen is not prohibited where such return air openings serve the kitchen and are located not less than 10 feet (3048 mm) from the cooking *appliances*.
2. Taking return air for heating or air-conditioning systems from a kitchen is not prohibited in a *dwelling unit* where the kitchen and living spaces are in a single room and the cooking *appliance* is electric and located not less than 5 feet (1524 mm) in any direction from the return air intake opening.
3. Dedicated forced air systems serving only the garage shall not be prohibited from obtaining return air from the garage.

Reason: This proposal simply fixes poor language of M53-21 to give the reader a better idea of what it required by the language.

This proposal is submitted by the ICC Plumbing Mechanical Gas Code Action Committee (PMGCAC)

PMGCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 PMGCAC has held 26 virtual meetings open to any interested party. In addition, there were several virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the PMGCAC website at PMGCAC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposal clarifies the intent of M53-21.

M45-24

M46-24

IMC®: 602.1.1

Proponents: Thomas Allen, Orange County - Division of Building Safety, Self (thomas.allen@ocfl.net)

2024 International Mechanical Code

Revise as follows:

602.1.1 Locations limited.
Plenums shall be limited to uninhabited crawl spaces, above a ceiling or below the floor, attic spaces, mechanical equipment rooms and the framing cavities addressed in Section 602.2.

Exception: Finished Mechanical rooms in a dwelling unit only serving that dwelling unit.

Reason: The Mechanical code has made great strides to define the plenum locations, "*Plenums* shall be limited to uninhabited crawl spaces, above a ceiling or below the floor, attic spaces, mechanical equipment rooms and the framing cavities addressed in Section 602.2." and further defines the requirements for within stud spaces and joist. The finished mechanical equipment room within a dwelling unit serving only that unit should be exempted from plenum construction requirements, it does not serve another fire area, a finished equipment room would have the rough framing space behind the finish. The current mechanical equipment room brings to mind the HVAC closets of the past that are a rough stud space with a door.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The exception for a finished equipment room not being considered a plenum is a clarification that many jurisdictions already apply this code section.

M46-24

M47-24 Part I

IMC®: 603.9.1 (New), UL Chapter 15 (New)

Proponents: Jonathan Roberts, UL Solutions, UL Solutions (jonathan.roberts@ul.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE MECHANICAL CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Mechanical Code

Add new text as follows:

603.9.1 Collars and sleeves. Nonmetallic collars and sleeves used to join or attach flexible air ducts and air connectors shall be *listed* and *labeled* in accordance with UL 181C

Add new standard(s) as follows:

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062-2096

181C-2020	Outline of Investigation for Non-Metal Joining Accessories for Flexible Air Ducts and Air Connectors

M47-24 Part I

M47-24 Part II

IRC: M1601.1.1, UL Chapter 44 (New)

Proponents: Jonathan Roberts, UL Solutions, UL Solutions (jonathan.roberts@ul.com)

2024 International Residential Code

Revise as follows:

M1601.1.1 Above-ground duct systems.
Above-ground *duct systems* shall conform to the following:

1. *Equipment* connected to *duct systems* shall be designed to limit discharge air temperature to not greater than 250°F (121°C).
2. Factory-made ducts shall be *listed* and *labeled* in accordance with UL 181 and installed in accordance with the manufacturer's instructions.
3. Nonmetallic collars and sleeves used to join or attach flexible air ducts shall be *listed* and *labeled* in accordance with UL 181C
4. Fibrous glass duct construction shall conform to the *SMACNA Fibrous Glass Duct Construction Standards or NAIMA Fibrous Glass Duct Construction Standards.*
~~4~~5. Field-fabricated and shop-fabricated metal and flexible duct constructions shall conform to the *SMACNA HVAC Duct Construction Standards—Metal and Flexible* except as allowed by Table M1601.1.1. Galvanized steel shall conform to ASTM A653.
~~5~~ 6. The use of gypsum products to construct return air ducts or plenums is permitted, provided that the air temperature does not exceed 125°F (52°C) and exposed surfaces are not subject to condensation.
~~6~~ 7. *Duct systems* shall be constructed of materials having a *flame spread index* of not greater than 200.
~~7~~ 8. Stud wall cavities and the spaces between solid floor joists to be used as air plenums shall comply with the following conditions:
    - ~~7~~8.1. These cavities or spaces shall not be used as a plenum for supply air.
    - ~~7~~8.2. These cavities or spaces shall not be part of a required fire-resistance-rated assembly.
    - ~~7~~8.3. Stud wall cavities shall not convey air from more than one floor level.
    - ~~7~~8.4. Stud wall cavities and joist-space plenums shall be isolated from adjacent concealed spaces by tight-fitting *fireblocking* in accordance with Section R302.11. *Fireblocking* materials used for isolation shall comply with Section R302.11.1.
    - ~~7~~8.5. Stud wall cavities in the outside walls of building envelope assemblies shall not be utilized as air plenums.
    - ~~7~~8.6. Building cavities used as plenums shall be sealed.
~~8~~ 9. Volume dampers, equipment and other means of supply, return and exhaust air adjustment used in system balancing shall be provided with access.

Add new standard(s) as follows:

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062

181C-2020 Outline of Investigation for Non-Metal Joining Accessories for Flexible Air Ducts and Air Connectors

Reason: UL 181C, Outline of Investigation for Non-Metal Joining Accessories for Flexible Air Ducts and Air Connectors, was developed to evaluate non-metal accessories, such as collars and sleeves, used to join or attach flexible air ducts and air connectors that comply with the requirements of UL 181, Factory-Made Air Ducts and Air Connectors.

As defined in UL 181C, a collar is a non-metal accessory used to join flexible air ducts and air connectors at their terminations to other portions of the air duct system. A sleeve is defined as a non-metal accessory used to join sections of flexible air ducts or air connectors.

The requirements for these collars and sleeves include all the applicable requirements that would be applied to factory-made air ducts (UL 181) and discrete products within plenums (UL 2043).

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This does not increase of decrease cost. This does not mandate the use of these collars and sleeves. This is providing an alternative to existing methods for connecting flexible air ducts and air connectors. The proposal sets the base safety and performance requirements if these nonmetallic collars and sleeves are used.
Listing for heat pump heaters regulated by this section of the code is currently required by this code, so there is no cost impact. The proposal is a simple editorial revision to the correct (current) product standard.

M47-24 Part II

M48-24

IMC®: 603.17

Proponents: Kevin Gebke, DuctSox, DuctSox/Engineering Manager (kgebke@ductsox.com)

2024 International Mechanical Code

Revise as follows:

603.17 Air dispersion systems. Air dispersion systems shall:

1. Be installed entirely in exposed locations.

~~2. Be utilized in systems under positive pressure.~~

2.~~3.~~ Not pass through or penetrate fire-resistant-rated construction.

3.~~4.~~ Be *listed* and *labeled* in compliance with UL 2518.

Reason: UL 2518 Standard for Air Dispersion Systems was updated and published on April 6, 2023. The update recognized that Air Dispersion Systems can be operated in both positive and negative pressure modes if the correct products are specified. This proposal looks to align the IMC and the UL 2518 standard.

Bibliography: UL 2518 Standard for Air Dispersion Systems - April 6, 2023

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal simply aligns the UL 2518 standard and the IMC and has no impact on cost of construction.

M48-24

M49-24

IMC®: [F] 606.4

Proponents: William Koffel, Koffel Associates, Inc., Semiconductor Industry Association (wkoffel@koffel.com)

THIS PROPOSAL WILL BE HEARD BY THE IFC CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEE.

2024 International Mechanical Code

Revise as follows:

[F] 606.4 Controls operation. Upon activation, the smoke detectors shall shut down all operational capabilities of the air distribution system in accordance with the listing and labeling of *appliances* used in the system. Air distribution systems that are part of a smoke control system shall switch to the smoke control mode upon activation of a detector.

> <u>**Exception:** In a Group H-5 occupancy, automatic shutdown of the air distribution system shall not be required where a smoke detection system, with remote indication and manual shutdown capability at the emergency control station, is provided.</u>

Reason: The 2024 Edition of the IBC permits an increased travel distance in Group H-5 occupancies based upon computer modeling. One of the assumptions in the modeling, which is a requirement in the IBC, is that the ventilation system continues to operate. A proposal has been submitted to require the annunciation and manual shutdown capability at the emergency control station. This proposal correlates with the 2024 Edition of the IBC and the revisions proposed this cycle.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposal correlates with 2024 IBC provisions and proposed changes related to the increased travel distance in Group H-5 occupancies.

M49-24

M50-24

IMC®: CHAPTER 6, SECTION 608, 608.1, CHAPTER 15, 15 SMACNA, SMACNA Chapter 15 (New)

Proponents: Eli Howard, SMACNA, SMACNA (ehoward@smacna.org)

2024 International Mechanical Code

CHAPTER 6 DUCT SYSTEMS

SECTION 608
BALANCING

Revise as follows:

608.1 Balancing. Air distribution, ventilation and exhaust systems shall be provided with means to adjust the system to achieve the design airflow rates and shall be balanced by an *approved* method in accordance with SMACNA HVAC Systems Testing, Adjusting, and Balancing Manual, or equivalent.. *Ventilation air* distribution shall be balanced by an *approved* method in accordance with SMACNA HVAC Systems Testing, Adjusting, and Balancing Manual, or equivalent. and such balancing shall verify that the air distribution system is capable of supplying and exhausting the airflow rates required by Chapter 4.

CHAPTER 15 REFERENCED STANDARDS

Revise as follows:

SMACNA

Sheet Metal and Air Conditioning Contractors' National Association, Inc.
4201 Lafayette Center Drive
Chantilly, VA 20151-1219

2023 HVAC SYSTEMS TESTING, ADJUSTING & BALANCING, FOURTH EDITION

Staff Analysis: *New Standard

A review of the standard proposed for inclusion in the code, SMACNA HVAC Systems Testing, Adjusting, and Balancing Manual, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: Balancing is currently required by the IMC, and this document would provide proper procedures for compliance to the code requirements.

Bibliography: SMACNA HVAC Testing, Adjusting & Balancing Manual 4th edition 2023.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Balancing of HVAC Systems is currently required by the IMC, and this would just provide a specific standard of procedure to follow.

M50-24

M51-24

IMC®: 801.20

Proponents: Abraham MURRA, Abraham Murra Consulting, Abraham Murra Consulting

2024 International Mechanical Code

Revise as follows:

801.20 Plastic vent joints. Plastic pipe and fittings used to vent *appliances* shall be installed in accordance with the *appliance* manufacturer's installation instructions <u>and with the installation instructions of the manufacturer of the venting pipe and fittings.</u>

Reason: As part of the certification process, venting piping systems must include installation instructions, as required by UL 1738. Therefore, the proposed new text is making users of the IMC, including tradespersons, aware that the pipe and fittings used for venting must be installed in accordance with the installation instructions of the piping manufacturer.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposal only adds a statement for clarity.

M51-24

M52-24 Part I

IMC®: 803.6

Proponents: Jonathan Roberts, UL Solutions, UL Solutions (jonathan.roberts@ul.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE MECHANICAL CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Mechanical Code

Revise as follows:

803.6 Automatic dampers.
Automatic dampers shall be *listed* and *labeled* in accordance with ~~UL 17~~ UL 378 for oil-fired heating *appliances*. The dampers shall be installed in accordance with the manufacturer's instructions. An automatic vent damper device shall not be installed on an existing *appliance* unless the *appliance* is *listed* and *labeled* and the device is installed in accordance with the terms of its listing. The name of the installer and date of installation shall be marked on a label affixed to the damper device.

Staff Analysis: The proposed referenced standard, UL 378, is currently referenced in the IMC and IRC.

M52-24 Part I

M52-24 Part II

IRC: M1802.2.2

Proponents: Jonathan Roberts, UL Solutions, UL Solutions (jonathan.roberts@ul.com)

2024 International Residential Code

Revise as follows:

M1802.2.2 Automatically operated.
Automatically operated dampers shall conform to ~~UL 17~~ UL 378 and be installed in accordance with the terms of their *listing* and *label*. The installation shall prevent firing of the burner when the damper is not opened to a safe position.

Staff Analysis: The proposed referenced standard, UL 378, is currently referenced in the IMC and IRC.

Reason: UL 17 has been withdrawn by UL Standards & Engagement February 28, 2019. UL 378 contains appropriate listing requirements for the products referenced by these requirements. There are currently at least seven manufacturers with listed products to these requirements.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Editorial change to clarify correct and current listing standard in relation to existing requirements.

M52-24 Part II

M53-24

IMC®: SECTION 905, 905.1, TABLE 905.1 (New), UL Chapter 15 (New)

Proponents: Jonathan Roberts, UL Solutions, UL Solutions (jonathan.roberts@ul.com)

2024 International Mechanical Code

Revise as follows:

SECTION 905
FIREPLACE STOVES, FIREPLACE INSERTS, AND ROOM HEATERS

905.1 General. Fireplace stoves, ~~and~~ solid-fuel-type room heaters, and fireplace inserts shall be *listed* and *labeled* in accordance with the requirements of table 905.1 and shall be installed in accordance with the ~~conditions of the~~ listing and the manufacturer's instructions. ~~Fireplace stoves shall be tested in accordance with UL 737. Solid-fuel-type room heaters shall be tested in accordance with UL 1482. Fireplace inserts intended for installation in fireplaces shall be *listed* and *labeled* in accordance with the requirements of UL 1482 and shall be installed in accordance with the manufacturer's instructions.~~ New wood-burning residential hydronic heaters shall be EPA certified.

Add new text as follows:

TABLE 905.1 FIREPLACE STOVES, FIREPLACE INSERTS, AND ROOM HEATERS STANDARDS

Stove/Heater Type	Standard
Fireplace stoves	UL 737
Solid-fuel room heaters	UL 1482
Solid-fuel fireplace inserts installed in masonry fireplaces	UL 1390
Solid-fuel fireplace inserts installed in factory-built fireplaces	UL 1391

Add new standard(s) as follows:

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062-2096

1390-2024 Solid Fuel Fireplace Inserts and Hearth-Mounted Stoves for Installation into Masonry Fireplaces

1391-2024 Solid-Fuel Space Heaters for Installation into Factory-Built Fireplaces

Reason: This proposal creates a table with the information formerly found in paragraph form. Additionally since fireplace inserts are not in the scope of UL 1482 this proposal introduces two new UL standards which are the correct references for the requirements related to fireplace inserts. This proposal does not address gas-fired fireplace inserts which are covered by the IFGC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The cost for obtaining listed fireplace inserts may or may not represent increased product costs over obtaining non-listed products that ha

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btaining and maintaining a listing for a listed fireplace insert involves both product investigation costs and costs for periodic inspection of p

M53-24

M54-24 Part I

IMC®: 908.1, 918.1, 918.2, TABLE 1101.2, 1101.2.1, UL Chapter 15 (New)

Proponents: Jonathan Roberts, UL Solutions, UL Solutions (jonathan.roberts@ul.com)

THIS IS A 3 PART CODE CHANGE. PART I WILL BE HEARD BY THE MECHANICAL CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. PART III WILL BE HEARD BY THE POOL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Mechanical Code

Revise as follows:

908.1 General. A cooling tower used in conjunction with an air-conditioning *appliance* shall be installed in accordance with the manufacturer's instructions. Factory-built cooling towers shall be *listed* in accordance with ~~UL 1995 or~~ UL/CSA60335-2-40.

918.1 Forced-air furnaces. Oil-fired furnaces shall be tested in accordance with UL 727. Electric furnaces shall be tested in accordance with ~~UL 1995 or~~ UL/CSA 60335-2-40. Solid fuel furnaces shall be tested in accordance with UL 391. Forced-air furnaces shall be installed in accordance with the listings and the manufacturer's instructions.

918.2 Heat pumps. Electric heat pumps shall be tested in accordance with ~~UL 1995~~ or UL/CSA60335-2-40.

TABLE 1101.2 FACTORY-BUILT EQUIPMENT AND APPLIANCES

EQUIPMENT	STANDARDS
Air-conditioning equipment	~~UL 1995 or~~ UL/CSA 60335-2-40
Packaged terminal air conditioners and heat pumps	~~UL 484 or~~ UL/CSA 60335-2-40
Split-system air conditioners and heat pumps	~~UL 1995 or~~ UL/CSA 60335-2-40
Dehumidifiers	~~UL 474 or~~ UL/CSA 60335-2-40
Unit coolers	~~UL 412 or~~ UL/CSA 60335-2-89
Commercial refrigerators, freezers, beverage coolers and walk-in coolers	~~UL 471 or~~ UL/CSA 60335-2-89
Refrigerating units and walk-in coolers	~~UL 427 or~~ UL 60335-2-89
Refrigerant-containing components and accessories	UL 207
Drinking water coolers	UL 399
Refrigerated vending machines	UL 541
Ice makers	UL 563
Residential refrigerators, freezers, beverage coolers and walk-in coolers	UL 60335-2-24

Delete without substitution:

~~**1101.2.1 Group A2L, A2, A3 and B1 high-probability equipment.**~~
~~High-probability equipment using Group A2L, A2, A3 or B1 refrigerant shall comply with UL 484, UL/CSA 60335-2-40 or UL/CSA 60335-2-89.~~

Add new standard(s) as follows:

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062-2096

399-2017 Drinking Water Coolers - with revisions through July 2023

541-2016 Refrigerated Vending Machines - with revisions through November 2020

563-2009 Ice Makers - with revisions through May 2021

60335-2-24-2022 Household and Similar Electrical Appliances – Safety – Part 2-24: Particular Requirements for Refrigerating Appliances, Ice-Cream Appliances and Ice-Makers

Reason: This proposal updates the standards used for various factory-built equipment and appliances. UL 412, UL 427, UL 471, UL 474, UL 484, and UL 1995 will be sunset in 2024. The applicable requirements from these standards are now in the harmonized standards UL 60335-2-40 and UL 60335-2-89. EPA sell-through date for products certified to these older standards will be effective before the 2027 codes will be adopted by any jurisdiction, see https://www.epa.gov/climate-hfcs-reduction/technology-transitions-hfc-restrictions-sector. Section 1101.2.1 is not necessary, because it is already covered in Table 1101.2.

This proposal further identifies the standards used for listing drinking water coolers, refrigerated vending machines, ice makers. It also provides the standard for residential refrigerators, freezers, beverage coolers and walk-in coolers.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Listing for factory-built cooling towers, oil-fired furnaces, electric heat pumps and other equipment regulated by this section of the code is currently required by this code, so there is no cost impact. The proposal is a simple editorial revision to the correct (current) product standard.

Staff Analysis: A review of the standard proposed for inclusion in the code, UL 399-2017 *Drinking Water Coolers - with revisions through July 2023*, UL541-2016 *Refrigerated Vending Machines - with revisions through November 2020,* UL 563-2009 *Ice Makers - with revisions through May 2021*, UL 60335-2-24-2022 *Household and Similar Electrical Appliances – Safety – Part 2-24: Particular Requirements for Refrigerating Appliances, Ice-Cream Appliances and Ice-Makers,*with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

M54-24 Part I

M54-24 Part II

IRC: M1402.1, M1403.1, M1412.1, M1413.1, M2006.1

Proponents: Jonathan Roberts, UL Solutions, UL Solutions (jonathan.roberts@ul.com)

2024 International Residential Code

Revise as follows:

M1402.1 General.
Oil-fired central furnaces shall be *listed* and *labeled* in accordance with UL 727. Electric *furnaces* shall be *listed* and *labeled* in accordance with ~~UL 1995 or~~ UL/CSA 60335-2-40.

M1403.1 Heat pumps.
Electric *heat pumps* shall be *listed* and *labeled* in accordance with ~~UL 1995 or~~ UL/CSA 60335-2-40.

M1412.1 Listed equipment.
Absorption systems shall be installed in accordance with the manufacturer's instructions. Absorption *equipment* shall be *listed* and *labeled* in accordance with ~~UL 1995 or~~ UL/CSA 60335-2-40.

M1413.1 General.
Evaporative cooling *equipment* and *appliances* shall comply with ~~UL 1995 or~~ UL/CSA 60335-2-40, and shall be installed:

1. In accordance with the manufacturer's instructions.
2. On level platforms in accordance with Section M1305.1.3.1.
3. So that openings in exterior walls are flashed in accordance with Section R703.4.
4. So as to protect the potable water supply in accordance with Section P2902.
5. So that air intake opening locations are in accordance with Section R325.4.1.

M2006.1 General.
Pool and spa heaters shall be installed in accordance with the manufacturer's installation instructions. Oil-fired pool heaters shall be *listed* and *labeled* in accordance with UL 726. Electric pool and spa heaters shall be listed and *labeled* in accordance with UL 1261. Pool and spa *heat pump* water heaters shall be *listed* and *labeled* in accordance with ~~UL 1995 or~~ UL/CSA~~/ANCE~~ 60335-2-40.

> **Exception:** Portable residential spas and portable residential exercise spas shall be *listed* and *labeled* in accordance with UL 1563 or CSA C22.2 No. 218.1.

Reason: This proposal updates the standards used for various furnace and heat pump and evaporative cooling equipment. The UL 1995 Standard will be sunset in 2024 and the applicable requirements from these standards are now in the harmonized standards UL 60335-2-40, therefore the reference to UL 1995 in this section is being removed by this proposal.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Listing for oil-fired central furnaces, electric furnaces, electric heat pumps, pool and spa heaters and other equipment regulated by this section of the code is currently required by this code, so there is no cost impact. The proposal is a simple editorial revision to the correct (current) product standard.

M54-24 Part II

M54-24 Part III

ISPSC: TABLE 317.2(1)

Proponents: Jonathan Roberts, UL Solutions, UL Solutions (jonathan.roberts@ul.com)

2024 International Swimming Pool and Spa Code

Revise as follows:

TABLE 317.2(1) WATER HEATERS

DEVICE	STANDARD
Electric water heater	UL 1261, UL 1563 or CSA C22.2 No. 218.1
Gas-fired water heater	ANSI Z21.56/CSA 4.7a
Heat exchanger	AHRI 400
Heat pump water heater	AHRI 1160 and one of the following: CSA C22.2 No. 236, ~~UL 1995,~~ or UL/CSA 60335-2-40

Reason: This proposal updates the standards used for various pool heaters. The UL 1995 Standard will be sunset in 2024 and the applicable requirements from this standard is now in the harmonized standard UL 60335-2-40, therefore the reference to UL 1995 in this section is being removed by this proposal.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Listing for heat pump heaters regulated by this section of the code is currently required by this code, so there is no cost impact. The proposal is a simple editorial revision to the correct (current) product standard.

M54-24 Part III

M55-24

IMC®: 913.1

Proponents: Jonathan Roberts, UL Solutions, UL Solutions (jonathan.roberts@ul.com)

2024 International Mechanical Code

Revise as follows:

913.1 General. Clothes dryers shall be installed in accordance with the manufacturer's instructions. Electric ~~residential~~ clothes dryers, including heat pump and condensing-type dryers, for residential use or commercial use by the general public shall be tested in accordance with UL 2158. Electric industrial and institutional ~~coin-operated~~ clothes dryers for use only by trained personnel shall be *listed* and *labeled* ~~tested in accordance with UL 2158. Electric commercial clothes dryers shall be tested~~ in accordance with UL 1240.

Reason: This proposal clarifies three things:

1. The requirements for heat pump clothes dryers: Heat pump clothes-dryers are becoming more common in the marketplace. UL 2158 was revised in 2021 to include these appliances within the scope of the standard. EPA Significant New Alternative Policy Program (SNAP) rules regarding low-GWP refrigerants will essentially require the use of refrigerants with higher flammability safety classifications per ASHRAE 34. These refrigerants introduce new hazards compared to those used previously. These concerns are addressed in the standards used to evaluate this equipment for listing.
2. The scope of the referenced standards: The scope of UL 2158 includes clothes-dryers for both home and commercial installations (such as a laundromat) where no special training is need for the operator. The scope of UL 1240 is for industrial clothes dryers not intended for use by the general public.
3. The third party certification requirements: Replaced "tested" with "listed and labeled" consistent with the requirements of 301.7 which more simply describes the compliance mechanism for code officials.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Clarifies scope of standards as part of existing listing requirements already applicable to all electric- powered dryers.

M55-24

M56-24

IMC®: 930.1

Proponents: Amanda Hickman, The Hickman Group, Air Movement and Control Association International, Inc. (AMCA) (amanda@thehickmangroup.com)

2024 International Mechanical Code

Revise as follows:

930.1 General. Where provided, large-diameter ceiling fans shall be ~~tested~~*listed* and *labeled* in accordance with AMCA 230, *listed* and *labeled* in accordance with UL 507, and installed in accordance with the manufacturer's instructions.

Reason:

The IMC already requires compliance and *labeling* with AMCA 230. This proposal harmonizes the requirement for listing consistent with both standards that are already referenced in this section. Additionally, the *listing* requirement also will make it easier for code officials to enforce this provision. Other benefits include making it more likely that products will perform as rated, specified products will meet U.S. Department of Energy efficiency regulations for ceiling fans, and engineers will have standardized performance data they need to design and specify products for life-safety application.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This section already requires a label and therefore inherently also requires the product to be *listed*. Typically, certification bodies provide a listing when providing a product labeling service. This proposal is meant to provide clarification to the language that listing is also required for the product, consistent with numerous other sections and products requiring them to be listed and labeled. There is no cost associated due to labeling already being a requirement in this section.

M56-24

M57-24 Part I

IMC®: SECTION 931 (New), 931.1 (New)

Proponents: Jonathan Roberts, UL Solutions, UL Solutions (jonathan.roberts@ul.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE MECHANICAL CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Mechanical Code

Add new text as follows:

SECTION 931
GERMICIDAL UV IRRADIATION SYSTEMS AND EQUIPMENT

931.1 General.
Where germicidal UV irradiation systems and equipment are installed in air ducts, plenums, or within the enclosure of heating and cooling equipment, they shall be *listed* and *labeled* in accordance with UL 60335-2-40 and shall conform to all of the following requirements:

1. Shall be installed in accordance with the manufacturer's instructions.
2. Shall be installed with interlock devices and markings in accordance with the listing and the manufacturer's instructions to prevent accidental UV radiation exposure by service personnel.
3. Where field installed within the enclosure of heating and cooling equipment, the equipment listing shall identify the germicidal UV system as a field installable accessory.

M57-24 Part I

M57-24 Part II

IRC: M1416 (New), M1416.1 (New)

Proponents: Jonathan Roberts, UL Solutions, UL Solutions (jonathan.roberts@ul.com)

2024 International Residential Code

Add new text as follows:

M1416
GERMICIDAL UV IRRADIATION SYSTEMS AND EQUIPMENT

M1416.1 General.
Where germicidal UV irradiation systems and equipment are installed in air ducts, plenums, or within the enclosure of heating and cooling equipment, they shall be *listed* and *labeled* in accordance with UL 60335-2-40 and shall conform to all of the following requirements:

1. Shall be installed in accordance with the manufacturer's instructions.
2. Shall be installed with interlock devices and markings in accordance with the listing and the manufacturer's instructions to prevent accidental UV radiation exposure by service personnel.
3. Where field installed within the enclosure of heating and cooling equipment, the equipment listing shall identify the germicidal UV system as a field installable accessory.

Reason: Germicidal UV systems and equipment are becoming increasingly common for indoor air quality and equipment protection. The listing standard includes specific requirements to protect personnel from accidental exposure during maintenance and servicing. Some of these features, as referenced in item 2, are installation dependent and thus rely upon instructions to provide the protection. Unique requirements apply to the scenario where the systems are duct or plenum installed, or factory or field installed within listed heating and cooling equipment.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The cost of obtaining listed germicidal UV irradiation systems and equipment may or may not represent increased product costs over obta

Obtaining and maintaining a listing for a listed germicidal UV irradiation system or equipment involves both product investigation costs an

M58-24

IMC®: 1001.1

Proponents: Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C., Daikin U.S. (jbengineer@aol.com)

2024 International Mechanical Code

Revise as follows:

1001.1 Scope. This chapter shall govern the installation, *alteration* and repair of boilers, water heaters and pressure vessels.

Exceptions:

1. Pressure vessels used for unheated water supply.
2. Portable unfired pressure vessels and Interstate Commerce Commission containers.
3. Containers for bulk oxygen and medical gas.
4. Unfired pressure vessels having a volume of 5 cubic feet (0.14 m^3) or less operating at pressures not exceeding 250 pounds per square inch (psi) (1724 kPa) and located within *occupancies* of Groups B, F, H, M, R, S and U.
5. Pressure vessels used in *refrigeration systems* that are regulated by Chapter 11 of this code.
6. Pressure tanks used in conjunction with coaxial cables, telephone cables, power cables and other similar humidity control systems.
7. Any boiler or pressure vessel subject to inspection by federal or state inspectors.
8. Pressure vessels used in specific *appliances* and *equipment* that are regulated by ~~Chapter~~Chapters 9 and 11 of this code.

Reason: This exception was added prior to the Table in Chapter 11 being added to the code. There are many referenced standards in Table 1101.2 that regulate the pressure vessel within the appliance. This will added the reference to Chapter 11 to this exception. It should be noted that many of the standards listed in Table 1101.2 are also referenced in Chapter 9.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This change is basically editorial in nature since it will add Chapter 11 to the exception. The standards listed in Chapter 9 also appear in Chapter 11. This will simply clarify that both chapters have standards that regulate pressure vessels.

M58-24

M59-24 Part I

IMC®: 1101.2.1 (New)

Proponents: Jonathan Roberts, UL Solutions, UL Solutions (jonathan.roberts@ul.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE MECHANICAL CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Mechanical Code

Add new text as follows:

1101.2.1 Field installed auxiliary electric heaters. Where auxiliary electric resistance heaters are field installed within the enclosure of listed heating and cooling equipment, the equipment shall be labeled to indicate that the heater is a field installable accessory as part of the equipment listing. The auxiliary electric resistance heater shall be listed and labeled in accordance with UL 60335-2-40 and be installed in accordance with the listing and the manufacturer's instructions.

Staff Analysis: The proposed referenced standard, UL 60335-2-40, is currently referenced in the IMC.

M59-24 Part I

M59-24 Part II

IRC: M1411.10 (New)

Proponents: Jonathan Roberts, UL Solutions, UL Solutions (jonathan.roberts@ul.com)

2024 International Residential Code

Add new text as follows:

M1411.10 Field installed auxiliary electric heater kits. Where auxiliary electric resistance heaters are field installed within the enclosure of *listed* heating and cooling equipment, the equipment shall be labeled to indicate that the heater is a field installable accessory as part of the equipment listing. The auxiliary electric resistance heater shall be *listed* and *labeled* in accordance with UL 60335-2-40 and be installed in accordance with the listing and the manufacturer's instructions.

Staff Analysis: The proposed referenced standard, UL 60335-2-40, is currently referenced in the IRC.

Reason: Field installed electric heaters within the enclosure of listed air-conditioning equipment and heat pumps are covered by the scope of the end product standard (UL 60335-2-40). The heaters are required to be evaluated and tested as part of the equipment. The product standard requires that the equipment be marked to identify which field installed accessories are approved as part of the equipment listing.
The HVAC industry has seen an increase in installation of third-party manufactured electric heaters. These heaters are not approved by the equipment manufacturer and are not evaluated by the listing of the equipment. As a result, manufacturers have received numerous reports of fire incidents resulting from these installations.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal clarifies that existing listing requirements of air conditioning and heat pump equipment. For IMC reference 1102.1, and general listing requirements 301.7. For IRC reference M1302.1, M1401.1, M1403 and general listing requirements M3404.3. Both codes already require installation per the listing and manufacturer's instructions so this highlights and brings attention to what is already required by the code.

M59-24 Part II

M60-24 Part I

IMC®: 1002.1, TABLE 1002.1 (New)

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

THIS IS A 3 PART CODE CHANGE. PART I WILL BE HEARD BY THE MECHANICAL CODE COMMITTEE. PART II WILL BE HEARD BY THE PLUMBING CODE COMMITTEE, PART III WILL BE HEARD BY THE IRC MECHANICAL and PLUMBING CODE COMMITTEE

2024 International Mechanical Code

Revise as follows:

1002.1 General. Potable water heaters and hot water storage tanks shall be *listed* and *labeled* ~~and installed~~ in accordance with the standards in Table 1002.1, and installed in accordance with the listing, the manufacturer's instructions, the *International Plumbing Code* and this code.Gas-fired storage tank and tankless instantaneous water heaters shall be listed and labeled and installed in accordance with the *International Fuel Gas Code.* Water heaters shall be capable of being removed without first removing a permanent portion of the *building* structure. The potable water connections and relief valves for all water heaters shall conform to the requirements of the *International Plumbing Code* . ~~Domestic electric water heaters shall comply with UL 174 or UL 1453. Commercial electric water heaters shall comply with UL 1453. Oil-fired water heaters shall comply with UL 732. Solid-fuel-fired water heaters shall comply with UL 2523. Solar thermal water heating systems shall comply with Chapter 14 and ICC 900/SRCC 300.~~

Add new text as follows:

TABLE 1002.1 WATER HEATER STANDARDS

APPLIANCE/EQUIPMENT	STANDARDS
Domestic storage tank electric water heaters	UL 174
Commercial storage tank electric and commercial booster water heaters	UL 1453
Heat pump water heaters	UL 60335-2-40
Electric tankless instantaneous and booster water heaters	UL 499
Oil-fired water heaters	UL 732
Solid-fuel-fired water heaters	UL 2523
Solar thermal water heating systems	ICC 900/SRCC 300

Staff Analysis: The proposed referenced standards referenced in Table 1002.1(new) are currently referenced in the IMC.

M60-24 Part I

M60-24 Part II

IPC: 502.1, TABLE 502.1 (New), ICC Chapter 15 (New), UL Chapter 15 (New)

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Plumbing Code

Revise as follows:

502.1 General.
Water heaters shall be *listed* and *labeled* in accordance with the standards in Table 502.1, and installed in accordance with the listing, the manufacturer's instructions, *the International Mechanical Code* and this code. Gas-fired storage tank and tankless instantaneous water heaters shall be listed and labeled and installed in accordance with the *International Fuel Gas Code.* ~~Oil-fired water heaters shall conform to the requirements of this code and the *International Mechanical Code.*~~ Electric water heaters, heat pump water heaters, and electric circuits associated with other types of water heaters shall conform to the requirements ~~of this code and provisions~~ of NFPA 70. ~~Gas-fired water heaters shall conform to the requirements of the *International Fuel Gas Code.* Solar thermal water heating systems shall conform to the requirements of the *International Mechanical Code* and ICC 900/SRCC 300.~~

Add new text as follows:

TABLE 502.1 WATER HEATER STANDARDS

APPLIANCE/EQUIPMENT	STANDARDS
Domestic storage tank electric water heaters	UL 174
Commercial storage tank electric and commercial booster water heaters	UL 1453
Heat pump water heaters	UL 60335-2-40
Electric tankless instantaneous and booster water heaters	UL 499
Oil-fired water heaters	UL 732
Solid-fuel-fired water heaters	UL 2523
Solar thermal water heating systems	ICC 900/SRCC 300

Add new standard(s) as follows:

ICC

International Code Council, Inc.
200 Massachusetts Avenue, NW, Suite 250
Washington, DC 20001

ICC 900/SRCC Standard 300—2020 Solar Thermal System Standard

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062-2096

174-2004 Household Electric Storage Tank Water Heaters—with Revisions through October 2021

499-2014 Standard for Electric Heating Appliances—with Revisions through February 2017

732-2018 Oil-fired Storage Tank Water Heaters—with Revisions through August 2018

1453-2016 Electric Booster and Commercial Storage Tank Water Heaters—with Revisions through May 2018

2523-2009 Solid Fuel-fired Hydronic Heating Appliances, Water Heaters, and Boilers—with Revisions through March 2018

UL 60335-2-40—2022	Household and Similar Electrical Appliances—Safety—Part 2-40: Particular Requirements for Electrical Heat Pumps, Air-Conditioners and Dehumidifiers

Staff Analysis: The proposed referenced standards referenced in new Table are referenced in the current edition of the IMC.

M60-24 Part II

M60-24 Part III

IRC: M2005.1, TABLE M2005.1 (New), UL Chapter 44 (New)

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Residential Code

Revise as follows:

M2005.1 General.
Water heaters shall be installed in accordance with Chapter 28, the manufacturer's instructions and the requirements of this code. Water heaters installed in an *attic* shall comply with the requirements of Section M1305.1.2. ~~Gas-fired water heaters shall comply with the requirements in Chapter 24. Domestic electric water heaters shall comply with UL 174. Oiled-fired water heaters shall comply with UL 732. Solar thermal water heating systems shall comply with Chapter 23 and ICC 900/SRCC 300. Solid fuel-fired water heaters shall comply with UL 2523~~. Water heaters shall comply with the requirements of standards in Table M2005.1, and the referenced chapters of this code.

Add new text as follows:

TABLE M2005.1 WATER HEATER STANDARDS/IRC CHAPTERS

APPLIANCE/EQUIPMENT	STANDARDS	IRC CHAPTER
Domestic storage tank electric water heaters	UL 174	Chapters 34-43
Heat pump water heaters	UL 60335-2-40	Chapter 14, Chapters 34-43
Electric tankless instantaneous and booster water heaters	UL 499	Chapters 34-43
Oil-fired water heaters	UL 732	
Solid-fuel-fired water heaters	UL 2523	Chapter 10
Gas-fired storage tank and tankless instantaneous water heaters	Chapter 24	Chapter 24
Solar thermal water heating systems	ICC 900/SRCC 300	Chapter 23

Add new standard(s) as follows:

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062

UL 499-2014 Electric Heating Appliances (with revisions through May 31, 2023)

Staff Analysis: The proposed referenced standards referenced in Table are currently referenced in the IMC.

Reason: Reformats existing requirements into table format for clarity. Adds product standards for heat pump water heaters, electric tankless, and commercial electric booster water heaters. Provide pointer for gas heaters. Water heater installation requirements are spread across several different codes. This new language is intended to clarify and simplify the pointers. This proposed language gives guidance in one place to help navigate the various requirements.

The reference to the IMC is appropriate for all water heater installations since the IMC contains the following unique information not found elsewhere 1) product standard requirements (1002.1), 2) distinction from appliances requiring ASME BPVC certification (1001, 1003), 3) Refrigerant-based heater requirements (1002.3 and Chapter 11) and 4) Hydronic heating requirements (Chapter 12) and 5) clarification of scope of IFGC requirements (101.2).
This proposal is submitted by the ICC Plumbing Mechanical Gas Code Action Committee (PMGCAC)

PMGCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 PMGCAC has held 26 virtual meetings open to any interested party. In addition, there were several virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the PMGCAC website at PMGCAC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposal does not mandate which type of water heater is to be installed. These changes only clarify the standards for which water heaters must comply with once the type of water heater is chosen by the designer. Listing is already required for this equipment. This change only clarifies the appropriate product standards for code usability.

M60-24 Part III

M61-24

IMC®: 1002.3

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Mechanical Code

Revise as follows:

1002.3 Refrigerant-based supplemental ~~Supplemental~~ water-heating devices. Potable supplemental water-heating devices that utilize refrigerant-to-water heat exchangers shall be ~~approved~~ listed and labeled in accordance with UL 60335-2-40 and installed in accordance with the *International Plumbing Code* and the manufacturer's instructions.

Staff Analysis: The proposed referenced standard, UL 60335-40, is currently referenced in the IMC.

Reason: The concerns associated with A2L and other flammable refrigerants increase the need to provide standard requirements and third party certification. This is consistent with requirements of IMC 1101.2 for factory-built equipment. The title has been clarified to reflect the content of this section.

This proposal is submitted by the ICC Plumbing Mechanical Gas Code Action Committee (PMGCAC)

PMGCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 PMGCAC has held 26 virtual meetings open to any interested party. In addition, there were several virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the PMGCAC website at PMGCAC.

Cost Impact: Increase

Estimated Immediate Cost Impact:

Impact: $0

Estimated Immediate Cost Impact Justification (methodology and variables):

This proposal requires listing instead of approval by the code official. Therefore, in principle, it has potential to increase costs due to overhead and product features that may be required for certification. However, in practice a cost increase is unlikely as a result of this change, and also impractical to calculate, for the following reasons:

1. The committee is unaware of any manufacturer of these devices on the market which does not currently have listing, so it is impractical to compare the costs of a listed and not-listed product.
2. The most typical installation scenario for these devices known to the committee is that they are already a component of listed equipment.
3. The existing approval process most typically already relies on listing, but requires the code official to independently determine the appropriate requirements. This change is intended to simplify enforcement.

M61-24

M62-24

IMC®: CHAPTER 11, SECTION 1101, 1101.1, 1101.1.1, 1107.4, 1107.5, 1109.2.7, 1109.3.2, ASHRAE Chapter 15 (New)

Proponents: Emily Toto, ASHRAE, ASHRAE (etoto@ashrae.org)

2024 International Mechanical Code

CHAPTER 11 REFRIGERATION

SECTION 1101 GENERAL

1101.1 Scope. This chapter shall govern the design, installation, construction and repair of *refrigeration systems* . Permanently installed refrigerant storage systems and other components shall be considered as part of the *refrigeration system* to which they are attached.

Revise as follows:

1101.1.1 Refrigerants other than ammonia. *Refrigeration systems* using a refrigerant other than ammonia shall comply with this chapter, the International Fire Code, and either ASHRAE 15 or ASHRAE 15.2, as applicable~~and the *International Fire Code*~~. *Refrigeration systems* containing carbon dioxide as the refrigerant shall also comply with IIAR CO2 .

1107.4 Piping materials standards. Refrigerant pipe shall conform to one or more of the standards *listed* in Table 1107.4. For refrigeration systems used in residential occupancies serving only a single dwelling unit or sleeping unit, refrigerant piping and tubing shall be limited to aluminum, copper, and copper alloy. The exterior of the pipe shall be protected from corrosion and degradation.

1107.5 Pipe fittings. Refrigerant pipe fittings shall be *approved* for installation with the piping materials to be installed, and shall conform to one of more of the standards listed in Table 1107.5 or shall be *listed* and *labeled* as complying with UL 207. For refrigeration systems used in residential occupancies serving only a single dwelling unit or sleeping unit, refrigerant fittings shall be limited to aluminum, copper, copper alloys, stainless steel, and steel.

1109.2.7 Pipe identification. Refrigerant pipe located in areas other than the room or space where the refrigerating *equipment* is located shall be identified. The pipe identification shall be located at intervals not exceeding 20 feet (6096 mm) on the refrigerant piping or pipe insulation. The minimum height of lettering of the identification label shall be $^1/_2$ inch (12.7 mm). The identification shall indicate the *refrigerant designation* and safety group classification of refrigerant used in the piping system. For Group A2L and B2L refrigerants, the identification shall also include the following statement: “WARNING—Risk of Fire. Flammable Refrigerant.” For Group A2, A3, B2 and B3 refrigerants, the identification shall also include the following statement: “DANGER—Risk of Fire or Explosion. Flammable Refrigerant.” For any Group B refrigerant, the identification shall also include the following statement: “DANGER—Toxic Refrigerant.”

Exception: For refrigeration systems used in residential occupancies serving only a single dwelling unit or sleeping unit pipe identification shall not be required.

1109.3.2 Shaft ventilation. Refrigerant pipe shafts with systems using Group A2L or B2L refrigerant shall be naturally or mechanically ventilated. Refrigerant pipe shafts with one or more systems using any Group A2, A3, B2 or B3 refrigerant shall be continuously mechanically ventilated and shall include a refrigerant detector. The shaft ventilation exhaust outlet shall comply with Section 501.3.1. Naturally ventilated shafts shall have a pipe, duct or conduit not less than 4 inches (102 mm) in diameter that connects to the lowest point of the shaft and extends to the outdoors. The pipe, duct or conduit shall be level or pitched downward to the outdoors. Mechanically ventilated shafts shall have a minimum airflow velocity in accordance with Table 1109.3.2. The mechanical ventilation shall be continuously operated or activated by a refrigerant detector. Systems utilizing a refrigerant detector shall activate the mechanical ventilation at a maximum refrigerant concentration of 25 percent of the lower flammable limit of the refrigerant. The detector, or a sampling tube that draws air to the detector, shall be located in an area where refrigerant from a leak will concentrate. The shaft shall not be required to be ventilated for double-wall refrigerant pipe where the interstitial space of the double-wall pipe is vented to the outdoors. For refrigeration systems used in residential occupancies serving only a single dwelling unit or sleeping unit, shaft ventilation shall not be required where the pipe or tube is continuous without fittings in the shaft.

Add new standard(s) as follows:

ASHRAE

ASHRAE
180 Technology Parkway
Peachtree Corners, GA 30092

15.2-2022 Safety Standard for Refrigeration Systems in Residential Applications

Staff Analysis: A review of the standard proposed for inclusion in the code, ASHREA 15.2 Safety Standard for Refrigeration Systems in Residential Applications, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: This code change proposal adds the reference to ASHRAE 15.2, the installation standard for residential air conditioning systems used for a single dwelling or sleeping unit. This addition addresses a gap created in the Code when ASHRAE 15 split its scope between standards 15 and 15.2. As some systems covered by the scope of ASHRAE 15.2 are also covered by the IMC, its inclusion within the IMC is necessary.With the separation between ASHRAE 15 and ASHRAE 15.2, there were certain changes that impact the refrigerant piping requirements. For residential systems, the piping material is limited to aluminum, copper, and copper alloy pipe or tube. The fitting requirements are similar material requirements with the addition of stainless steel and steel.

Pipe identification is not required for piping system regulated by ASHRAE 15.2. The reason for this is that the refrigerant piping is obvious not needing to be individually identified. Whereas in commercial buildings there are often multiple piping systems where the type of piping system is not obvious.

For shaft ventilation, there is an allowance in residential systems to eliminate the ventilation of the shaft when the piping system is continuous without fittings in the shaft. This provision was added to the end of the section.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The inclusion of ASHRAE 15.2 into the IMC is editorial in nature, and as such will not impact the cost of construction. Changes to piping for ASHRAE 15.2 may actually reduce the cost of construction, by not requiring shaft ventilation when no joints are present in the shaft.

M62-24

M63-24

IMC®: 1101.1.1

Proponents: Emily Toto, ASHRAE, ASHRAE (etoto@ashrae.org)

2024 International Mechanical Code

Revise as follows:

1101.1.1 Refrigerants other than ammonia. *Refrigeration systems* using a refrigerant other than ammonia shall comply with this chapter, ASHRAE 15 and the *International Fire Code*. *Refrigeration systems* containing carbon dioxide as the refrigerant shall also comply with IIAR CO2 <u>or be part of listed and labeled equipment</u>.

Reason: The scope of IIAR CO2 specifically excludes “Listed equipment or systems.” There are many listed refrigeration systems using carbon dioxide as the refrigerant. Field erected systems may also be evaluated by NRTLs to existing industry safety standards, such as UL 60335-2-40, UL 60335-2-89, and UL 471.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This change is only meant to address an inconsistency in order to maintain the intent of the scope.

M63-24

M64-24

IMC®: TABLE 1103.1

Proponents: Emily Toto, ASHRAE, ASHRAE (etoto@ashrae.org)

2024 International Mechanical Code

Revise as follows:

TABLE 1103.1 REFRIGERANT CLASSIFICATION, AMOUNT AND OEL

CHEMICAL REFRIGERANT	FORMULA	CHEMICAL NAME OF BLEND	REFRIGERANT SAFETY GROUP CLASSIFICATION	AMOUNT OF REFRIGERANT PER OCCUPIED SPACE							(F) DEGREES OF HAZARD[a]
				RCL			LFL[f]			OEL[d]	
				lb/~~MCf~~ 1000 ft^3	ppm	g/m^3	lb/~~MCf~~ 1000 ft^3	ppm	g/m^3	ppm	
R-11[c]	CCl_3F	trichlorofluoromethane	A1	0.39	1,100	6.1	—	—	—	1,000	2-0-0[b]
R-12[c]	CCl_2F_2	dichlorodifluoromethane	A1	5.6	18,000	90	—	—	—	1,000	2-0-0[b]
R-13[c]	$CClF_3$	chlorotrifluoromethane	A1	—	—	—	—	—	—	1,000	2-0-0[b]
R-13B1[c]	$CBrF_3$	bromotrifluoromethane	A1	—	—	—	—	—	—	1,000	2-0-0[b]
R-13I1	CF_3I	trifluoroiodomethane	A1	1.0	2,000	16	—	—	—	500	—
R-14	CF_4	tetrafluoromethane (carbon tetrafluoride)	A1	25	110,000	400	—	—	—	1,000	2-0-0[b]
R-22	$CHClF_2$	chlorodifluoromethane	A1	13	59,000	210	—	—	—	1,000	2-0-0[b]
R-23	CHF_3	trifluoromethane (fluoroform)	A1	7.3	41,000	120	—	—	—	1,000	2-0-0[b]
R-30	CH_2Cl_2	dichloromethane (methylene chloride)	B1	—	—	—	—	—	—	—	—
R-31	CH_2ClF	chlorofluoromethane	—	—	—	—	—	—	—	—	—
R-32	CH_2F_2	difluoromethane (methylene fluoride)	A2L	4.8	36,000	77	19.1	144,000	306	1,000	1-4-0
R-40	CH_3Cl	chloromethane (methyl chloride)	B2	—	—	—	—	—	—	—	—
R-41	CH_3F	fluoromethane (methyl fluoride)	—	—	—	—	—	—	—	—	—
R-50	CH_4	methane	A3	—	—	—	—	50,000	—	1,000	—
R-113[c]	CCl_2FCClF_2	1,1,2-trichloro-1,2,2-trifluoroethane	A1	1.2	2,600	20	—	—	—	1,000	2-0-0[b]
R-114[c]	$CClF_2CClF_2$	1,2-dichloro-1,1,2,2-tetrafluoroethane	A1	8.7	20,000	140	—	—	—	1,000	2-0-0[b]
R-115	$CClF_2CF_3$	chloropentafluoroethane	A1	47	120,000	760	—	—	—	1,000	—
R-116	CF_3CF_3	hexafluoroethane	A1	34	97,000	550	—	—	—	1,000	1-0-0
R-123	$CHCl_2CF_3$	2,2-dichloro-1,1,1-trifluoroethane	B1	3.5	9,100	57	—	—	—	50	2-0-0[b]
R-124	$CHClFCF_3$	2-chloro-1,1,1,2-tetrafluoroethane	A1	3.5	10,000	56	—	—	—	1,000	2-0-0[b]
R-125	CHF_2CF_3	pentafluoroethane	A1	23	75,000	370	—	—	—	1,000	2-0-0[b]
R-134a	CH_2FCF_3	1,1,1,2-tetrafluoroethane	A1	13	50,000	210	—	—	—	1,000	2-0-0[b]
R-141b	CH_3CCl_2F	1,1-dichloro-1-fluoroethane	—	0.78	2,600	12	17.8	60,000	287	500	2-1-0
R-142b	CH_3CClF_2	1-chloro-1, 1-difluoroethane	A2	5.1	20,000	82	20.4	80,000	329	1,000	2-4-0
R-143a	CH_3CF_3	1,1,1-trifluoroethane	A2L	4.4	21,000	70	17.5	82,000	282	1,000	2-0-0[b]
R-152a	CH_3CHF_2	1,1-difluoroethane	A2	2.0	12,000	32	8.1	48,000	130	1,000	1-4-0
R-170	CH_3CH_3	ethane	A3	0.54	7,000	8.6	2.4	31,000	38	1,000	2-4-0
R-E170	CH_3OCH_3	Methoxymethane (dimethyl ether)	A3	1.0	8,500	16	4.0	34,000	64	1,000	—
R-218	$CF_3CF_2CF_3$	octafluoropropane	A1	43	90,000	690	—	—	—	1,000	2-0-0[b]
R-227ea	CF_3CHFCF_3	1,1,1,2,3,3,3-heptafluoropropane	A1	36	84,000	580	—	—	—	1,000	—
R-236fa	$CF_3CH_2CF_3$	1,1,1,3,3,3-hexafluoropropane	A1	21	55,000	340	—	—	—	1,000	2-0-0[b]
R-245fa	$CHF_2CH_2CF_3$	1,1,1,3,3-pentafluoropropane	B1	12	34,000	190	—	—	—	300	2-0-0[b]
R-290	$CH_3CH_2CH_3$	propane	A3	0.59	5,300	9.5	2.4	21,000	38	1,000	2-4-0
R-C318	$-(CF_2)_4-$	octafluorocyclobutane	A1	41	80,000	650	—	—	—	1,000	—
R-400[c]	zeotrope	R-12/114 (50.0/50.0)	A1	10	28,000	160	—	—	—	1,000	2-0-0[b]
R-400[c]	zeotrope	R-12/114 (60.0/40.0)	A1	11	30,000	170	—	—	—	1,000	—
R-401A	zeotrope	R-22/152a/124 (53.0/13.0/34.0)	A1	6.6	27,000	110	—	—	—	1,000	2-0-0[b]
R-401B	zeotrope	R-22/152a/124 (61.0/11.0/28.0)	A1	7.2	30,000	120	—	—	—	1,000	2-0-0[b]
R-401C	zeotrope	R-22/152a/124 (33.0/15.0/52.0)	A1	5.2	20,000	84	—	—	—	1,000	2-0-0[b]
R-402A	zeotrope	R-125/290/22 (60.0/2.0/38.0)	A1	17	66,000	270	—	—	—	1,000	2-0-0[b]
R-402B	zeotrope	R-125/290/22 (38.0/2.0/60.0)	A1	15	63,000	240	—	—	—	1,000	2-0-0[b]
R-403A	zeotrope	R-290/22/218 (5.0/75.0/20.0)	A2	7.6	33,000	120	—	—	—	1,000	2-0-0[b]
R-403B	zeotrope	R-290/22/218 (5.0/56.0/39.0)	A1	18	68,000	290	—	—	—	1,000	2-0-0[b]
R-404A	zeotrope	R-125/143a/134a (44.0/52.0/4.0)	A1	31	130,000	500	—	—	—	1,000	2-0-0[b]
R-405A	zeotrope	R-22/152a/142b/C318 (45.0/7.0/5.5/42.5)	—	16	57,000	260	—	—	—	1,000	—
R-406A	zeotrope	R-22/600a/142b (55.0/4.0/41.0)	A2	4.7	21,000	75	18.8[g]	82,000[g]	301.9[g]	1,000	—
R-407A	zeotrope	R-32/125/134a (20.0/40.0/40.0)	A1	19	83,000	300	—	—	—	1,000	2-0-0[b]
R-407B	zeotrope	R-32/125/134a (10.0/70.0/20.0)	A1	21	79,000	330	—	—	—	1,000	2-0-0[b]
R-407C	zeotrope	R-32/125/134a (23.0/25.0/52.0)	A1	18	81,000	290	—	—	—	1,000	2-0-0[b]
R-407D	zeotrope	R-32/125/134a (15.0/15.0/70.0)	A1	16	68,000	250	—	—	—	1,000	2-0-0[b]
R-407E	zeotrope	R-32/125/134a (25.0/15.0/60.0)	A1	17	80,000	280	—	—	—	1,000	2-0-0[b]

CHEMICAL REFRIGERANT	FORMULA	CHEMICAL NAME OF BLEND	REFRIGERANT SAFETY GROUP CLASSIFICATION	AMOUNT OF REFRIGERANT PER OCCUPIED SPACE							(F) DEGREES OF HAZARD
				RCL			LFL			OEL	
				lb/~~MCf~~ 1000 ft	ppm	g/m	lb/~~MCf~~ 1000 ft	ppm	g/m	ppm	
R-407F	zeotrope	R-32/125/134a (30.0/30.0/40.0)	A1	20	95,000	320	—	—	—	1,000	—
R-407G	zeotrope	R-32/125/134a (2.5/2.5/95.0)	A1	13	52,000	210	—	—	—	1,000	—
R-407H	zeotrope	R-32/125/134a (32.5/15.0/52.5)	A1	19	92,000	300	—	—	—	1,000	—
R-407I	zeotrope	R-32/125/124a (19.5/8.5/72.0)	A1	16	71,100	250	—	—	—	1,000	—
R-408A	zeotrope	R-125/143a/22 (7.0/46.0/47.0)	A1	21	94,000	330	—	—	—	1,000	2-0-0[b]
R-409A	zeotrope	R-22/124/142b (60.0/25.0/15.0)	A1	7.1	29,000	110	—	—	—	1,000	2-0-0[b]
R-409B	zeotrope	R-22/124/142b (65.0/25.0/10.0)	A1	7.3	30,000	120	—	—	—	1,000	2-0-0[b]
R-410A	zeotrope	R-32/125 (50.0/50.0)	A1	26	140,000	420	—	—	—	1,000	2-0-0[b]
R-410B	zeotrope	R-32/125 (45.0/55.0)	A1	27	140,000	430	—	—	—	1,000	2-0-0[b]
R-411A	zeotrope	R-127/22/152a (1.5/87.5/11.0)	A2	2.9	14,000	46	11.6~~[f]~~	55,000~~[f]~~	185.6~~[f]~~	970	—
R-411B	zeotrope	R-1270/22/152a (3.0/94.0/3.0)	A2	2.8	13,000	45	14.8~~[f]~~	70,000~~[f]~~	238.3~~[f]~~	940	—
R-412A	zeotrope	R-22/218/142b (70.0/5.0/25.0)	A2	5.1	22,000	82	20.5~~[f]~~	87,000~~[f]~~	328.6~~[f]~~	1,000	—
R-413A	zeotrope	R-218/134a/600a (9.0/88.0/3.0)	A2	5.8	22,000	93	23.4~~[f]~~	88,000~~[f]~~	374.9~~[f]~~	1,000	—
R-414A	zeotrope	R-22/124/600a/142b (51.0/28.5/4.0/16.5)	A1	6.4	26,000	100	—	—	—	1,000	—
R-414B	zeotrope	R-22/124/600a/142b (50.0/39.0/1.5/9.5)	A1	6.0	23,000	96	—	—	—	1,000	—
R-415A	zeotrope	R-22/152a (82.0/18.0)	A2	2.9	14,000	47	11.7~~[g]~~	56,000~~[g]~~	187.9~~[g]~~	1,000	—
R-415B	zeotrope	R-22/152a (25.0/75.0)	A2	2.1	12,000	34	—	—	—	1,000	—
R-416A	zeotrope	R-134a/124/600 (59.0/39.5/1.5)	A1	3.9	14,000	62	—	—	—	1,000	2-0-0[b]
R-417A	zeotrope	R-125/134a/600 (46.6/50.0/3.4)	A1	3.5	13,000	55	—	—	—	1,000	2-0-0[b]
R-417B	zeotrope	R-125/134a/600 (79.0/18.3/2.7)	A1	4.3	15,000	69	—	—	—	1,000	—
R-417C	zeotrope	R-125/134a/600 (19.5/78.8/1.7)	A1	5.4	21,000	87	—	—	—	1,000	—
R-418A	zeotrope	R-290/22/152a (1.5/96.0/2.5)	A2	4.8	22,000	77	19.2~~[g]~~	89,000~~[g]~~	308.4~~[g]~~	1,000	—
R-419A	zeotrope	R-125/134a/E170 (77.0/19.0/4.0)	A2	4.2	15,000	67	16.7~~[g]~~	60,000~~[g]~~	268.6~~[g]~~	1,000	—
R-419B	zeotrope	R-125/134a/E170 (48.5/48.0/3.5)	A2	4.6	17,000	74	18.5~~[g]~~	69,000~~[g]~~	297.3~~[g]~~	1,000	—
R-420A	zeotrope	R-134a/142b (88.0/12.0)	A1	12	44,000	180	—	—	—	1,000	2-0-0[b]
R-421A	zeotrope	R-125/134a (58.0/42.0)	A1	17	61,000	280	—	—	—	1,000	2-0-0[b]
R-421B	zeotrope	R-125/134a (85.0/15.0)	A1	21	69,000	330	—	—	—	1,000	2-0-0[b]
R-422A	zeotrope	R-125/134a/600a (85.1/11.5/3.4)	A1	18	63,000	290	—	—	—	1,000	2-0-0[b]
R-422B	zeotrope	R-125/134a/600a (55.0/42.0/3.0)	A1	16	56,000	250	—	—	—	1,000	2-0-0[b]
R-422C	zeotrope	R-125/134a/600a (82.0/15.0/3.0)	A1	18	62,000	290	—	—	—	1,000	2-0-0[b]
R-422D	zeotrope	R-125/134a/600a (65.1/31.5/3.4)	A1	16	58,000	260	—	—	—	1,000	2-0-0[b]
R-422E	zeotrope	R-125/134a/600a (58.0/39.3/2.7)	A1	16	57,000	260	—	—	—	1,000	—
R-423A	zeotrope	R-134a/227ea (52.5/47.5)	A1	19	59,000	300	—	—	—	1,000	2-0-0[b]
R-424A	zeotrope	R-125/134a/600a/600/601a (50.5/47.0/0.9/1.0/0.6)	A1	6.2	23,000	100	—	—	—	990	2-0-0[b]
R-425A	zoetrope	R-32/134a/227ea (18.5/69.5/12.0)	A1	16	72,000	260	—	—	—	1,000	2-0-0[b]
R-426A	zeotrope	R-125/134a/600a/601a (5.1/93.0/1.3/0.6)	A1	5.2	20,000	83	—	—	—	990	—
R-427A	zeotrope	R-32/125/143a/134a (15.0/25.0/10.0/50.0)	A1	18	79,000	290	—	—	—	1,000	2-1-0
R-428A	zeotrope	R-125/143a/290/600a (77.5/20.0/0.6/1.9)	A1	23	84,000	370	—	—	—	1,000	—
R-429A	zeotrope	R-E170/152a/600a (60.0/10.0/30.0)	A3	0.81	6,300	13	3.2	25,000	83.8	1,000	—
R-430A	zeotrope	R-152a/600a (76.0/24.0)	A3	1.3	8,000	21	5.2	32,000	44.0	1,000	—
R-431A	zeotrope	R-290/152a (71.0/29.0)	A3	0.68	5,500	11	2.7	22,000	38.6	1,000	—
R-432A	zeotrope	R-1270/E170 (80.0/20.0)	A3	0.13	1,200	2.1	2.4	22,000	39.2	550	—
R-433A	zeotrope	R-1270/290 (30.0/70.0)	A3	0.34	3,100	5.5	2.4	20,000	32.4	750	—
R-433B	zeotrope	R-1270/290 (5.0-95.0)	A3	0.39	3,500	6.3	2.0	18,000	32.1	950	—
R-433C	zeotrope	R-1270/290 (25.0-75.0)	A3	0.41	3,700	6.5	2.0	18,000	83.8	790	—
R-434A	zeotrope	R-125/143a/600a (63.2/18.0/16.0/2.8)	A1	20	73,000	320	—	—	—	1,000	—
R-435A	zeotrope	R-E170/152a (80.0/20.0)	A3	1.1	8,500	17	4.3	34,000	68.2	1,000	—
R-436A	zeotrope	R-290/600a (56.0/44.0)	A3	0.50	4,000	8.1	2.0	16,000	32.3	1,000	—
R-436B	zeotrope	R-290/600a (52.0/48.0)	A3	0.51	4,000	8.2	2.0	16,000	32.7	1,000	—
R-436C	zeotrope	R-290/600a (95.0/5.0)	A3	0.57	5,000	9.1	2.3	20,000	36.5	1,000	—
R-437A	zeotrope	R-125/134a/600/601 (19.5/78.5/1.4/0.6)	A1	5.1	19,000	82	—	—	—	990	—
R-438A	zeotrope	R-32/125/134a/600/601a (8.5/45.0/44.2/1.7/0.6)	A1	4.9	20,000	79	—	—	990	—	
R-439A	zeotrope	R-32/125/600a (50.0/47.0/3.0)	A2	4.7	26,000	76	18.9	104,000	303.3	1,000	—
R-440A	zeotrope	R-290/134a/152a (0.6/1.6/97.8)	A2	1.9	12,000	31	7.8~~[h]~~	46,000~~[h]~~	124.7~~[h]~~	1,000	—
R-441A	zeotrope	R-170/290/600a/600 (3.1/54.8/6.0/36.1)	A3	0.39	3,200	6.3	2.0	16,000	31.7	1,000	—
R-442A	zeotrope	R-32/125/134a/152a/227ea (31.0/31.0/30.0/3.0/5.0)	A1	21	100,000	330	—	—	1,000	—	
R-443A	zeotrope	R-1270/290/600a (55.0/40.0/5.0)	A3	0.19	1,700	3.1	2.2	20,000	35.6	640	—
R-444A	zeotrope	R-32/152a/1234ze(E) (12.0/5.0/83.0)	A2L	~~5.1~~5.0	21,000	~~81~~80	19.9	82,000	~~324.8~~ 319.4	850	—
R-444B	zeotrope	R-32/152a/1234ze(E) (41.5/10.0/48.5)	A2L	4.3	23,000	~~69~~70	17.3	93,000	~~277.3~~ 278.1	930	—
R-445A	zeotrope	R-744/134a/1234ze(E) (6.0/9.0/85.0)	A2L	~~4.2~~5.4	16,000	~~67~~87	~~2.7~~21.6	63,000	347.4	930	—
R-446A	zeotrope	R-32/1234ze(E)/600 (68.0/29.0/3.0)	A2L	~~2.5~~3.7	~~16,000~~ 23,000	~~39~~59	~~13.5~~14.8	~~62,000~~ 93,000	~~217.4~~ 237.7	960	—

CHEMICAL REFRIGERANT	FORMULA	CHEMICAL NAME OF BLEND	REFRIGERANT SAFETY GROUP CLASSIFICATION	AMOUNT OF REFRIGERANT PER OCCUPIED SPACE							(F) DEGREES OF HAZARD
				RCL			LFL			OEL	
				lb/~~MCf~~ 1000 ft	ppm	g/m	lb/~~MCf~~ 1000 ft	ppm	g/m	ppm	
R-447A	zeotrope	R-32/125/1234ze(E) (68.0/3.5/28.5)	A2L	~~2.6~~5.2	~~16,000~~ 32,000	~~42~~83	~~18.9~~20.6	~~65,000~~ 128,000	~~303.5~~ 331.4	960	—
R-447B	zeotrope	R-32/125/1234ze(E) (68.0/8.0/24.0)	A2L	~~2.6~~4.8	~~16,000~~ 30,000	~~42~~78	~~20.6~~19.5	121,000	312.7	970	—
R-448A	zeotrope	R-32/125/1234yf/134a/1234ze(E) (26.0/26.0/20.0/21.0/7.0)	A1	24	110,000	390	—	—	860	—	
R-449A	zeotrope	R-32/125/1234yf/134a (24.3/24.7/25.3/25.7)	A1	23	100,000	370	—	—	—	840	—
R-449B	zeotrope	R-32/125/1234yf/134a (25.2/24.3/23.2/27.3)	A1	23	100,000	370	—	—	—	850	—
R-449C	zeotrope	R-32/125/1234yf/134a (20.0/20.0/31.0/29.0)	A1	23	98,000	360	—	—	800	—	
R-450A	zeotrope	R-134a/1234ze(E) (42.0/58.0)	A1	20	72,000	320	—	—	—	880	—
R-451A	zeotrope	R-1234yf/134a (89.8/10.2)	A2L	~~5.0~~5.3	18,000	81	~~20.3~~21.3	~~70,000~~ 74,000	~~326.6~~ 341	530	—
R-451B	zeotrope	R-1234yf/134a (88.8/11.2)	A2L	5.0	18,000	81	~~20.3~~21.3	~~70,000~~ 74,000	~~326.6~~ 341.6	530	—
R-452A	zeotrope	R-32/125/1234yf (11.0/59.0/30.0)	A1	27	100,000	440	—	—	790	—	
R-452B	zeotrope	R-32/125/1234yf (67.0/7.0/26.0)	A2L	4.8	30,000	77	19.3	119,000	310.5	870	—
R-452C	zeotrope	R-32/125/1234yf (12.5/61.0/26.5)	A1	27	100,000	430	—	—	—	810	—
R-453A	zeotrope	R-32/125/134a/227ea/600/601a (20.0/20.0/53.8/5.0/0.6/0.6)	A1	7.8	34,000	120	—	—	1,000	—	
R-454A	zeotrope	R-32/1234yf (35.0/65.0)	A2L	~~3.2~~4.4	~~16,000~~ 21,000	~~52~~70	~~18.3~~17.5	~~63,000~~ 84,000	~~293.9~~ 281.4	690	—
R-454B	zeotrope	R-32/1234yf (68.9/31.1)	A2L	~~3.1~~4.6	~~19,000~~ 29,000	~~49~~74	~~22.0~~18.5	~~77,000~~ 115,000	~~352.6~~ 296.8	850	—
R-454C	zeotrope	R-32/1234yf (21.5/78.5)	A2L	~~4.4~~4.6	19,000	~~71~~73	~~18,0~~18.2	~~62,000~~ 77,000	~~289.5~~ 291.7	620	—
R-455A	zeotrope	R-744/32/1234yf (3.0/21.5/75.5)	A2L	~~4.9~~6.8	~~22,000~~ 30,000	~~79~~ 108	26.9	118,000	432.1	650	—
R-456A	zeotrope	R-32/134a/1234ze(E) (6.0/45.0/49.0)	A1	20	77,000	320	—	—	—	900	—
R-457A	zeotrope	R-32/1234yf/152a (18.0/70.0/12.0)	A2L	3.4	15,000	54	13.5	60,000	216.3	650	—
R-457B	zeotrope	R-32/1234yf/152a (35.0/55.0/10.0)	A2L	3.7	19,000	59	14.9	76,000	239	730	—
R-457C	zeotrope	R-32/1234yf/152a (7.5/78.0/14.5)	A2L	3.4	13,800	54	13.6	55,000	215	610	
R-457D	zeotrope	R-32/1234yf/152a (4.0/82.0/14.0)	A2L	3.6	14,000	58	14.9	57,000	235	580	
R-458A	zeotrope	R-32/125/134a/227ea/236fa (20.5/4.0/61.4/13.5/0.6)	A1	18	76,000	280	—	—	1,000	—	
R-459A	zeotrope	R-32/1234yf/1234ze(E) (68.0/26.0/6.0)	A2L	4.3	27,000	69	17.4	107,000	278.7	870	—
R-459B	zeotrope	R-32/1234yf/1234ze(E) (21.0/69.0/10.0)	A2L	~~30~~5.8	25,000	92	23.3	99,000	373.5	640	—
R-460A	zeotrope	R-32/125/134a/1234ze(E) (12.0/52.0/14.0/22.0)	A1	24	92,000	380	—	—	—	950	—
R-460B	zeotrope	R-32/125/134a/1234ze(E) (28.0/25.0/20.0/27.0)	A1	25	120,000	400	—	—	—	950	—
R-460C	zeotrope	R-32/125/134a/1234ze(E) (2.5/2.5/46.0/49.0)	A1	20	73,000	310	—	—	—	900	—
R-461A	zeotrope	R-125/143a/134a/227ea/600a (55.0/5.0/32.0/5.0/3.0)	A1	17	61,000	270	—	—	—	1,000	—
R-462A	zeotrope	R-32/125/143a/134a/600 (9.0/42.0/2.0/44.0/3.0)	A2	3.9	16,000	62	16.6[f]	105,000 [f]	265.8[f]	1,000	—
R-463A	zeotrope	R-744/32/125/1234yf/134a (6.0/36.0/30.0/14.0/14.0)	A1	19	98,000	300	—	—	—	990	—
R-464A	zeotrope	R-32/125/1234ze(E)/227ea (27.0/27.0/40.0/6.0)	A1	27	120,000	430	—	—	—	930	—
R-465A	zeotrope	R-32/290/1234yf (21.0/7.9/71.1)	A2	2.5	12,000	40	10.0	98,000	160.9	660	—
R-466A	zeotrope	R-32/125/13I1 (49.0/11.5/39.5)	A1	6.2	30,000	99	—	—	860	—	
R-467A	zeotrope	R-32/125/134a/600a (22.0/5.0/72.4/0.6)	A2L	6.7	31,000	110	—	—	1,000	—	
R-468A	zeotrope	R-1132a/32/1234yf (3.5/21.5/75.0)	A2L	4.1	18,000	66	—	—	—	610	—
R-468B	zeotrope	R-1132a/32/1234yf (6.0/13.0/81.0)	A2L	4.4	18,000	70	570				
R-468C	zeotrope	R-1132a/32/1234yf (6.0/42.0/52.0)	A2L	4.3	23,000	69	710				
R-469A	zeotrope	R-744/R-32/R-125 (35.0/32.5/32.5)	A1	8	53,000	—	—	—	1,600	—	
R-470A	zeotrope	R-744/32/125/134a/1234ze(E)/227ea (10.0/17.0/19.0/7.0/44.0/3.0)	A1	17	77,000	270	—	—	—	1,100	—
R-470B	zeotrope	R-744/32/125/134a/1234ze(E)/227ea (10.0/17.0/19.0/7.0/44.0/3.0)	A1	16	72,000	270	—	—	—	1,100	—
R-471A	zeotrope	R-1234ze(E)/227ea/1336mzz(E) (78.7/4.3/17.0)	A1	9.7	31,000	160	—	—	710	—	
R-472A	zeotrope	R-744/32/134a (69.0/12.0/19.0)	A1	4.5	35,000	72	—	—	—	2,700	—
R-472B	zeotrope	R-744/32/134a (58.0/10.0/32.0)	A1	5.0	36,000	80	2,400				
R-473A	zeotrope	R-1132a/23/744/125 (20.0/10.0/60.0/10.0)	A1	4.8	36,000	77	1,700				
R-474A	zeotrope	R-1132(E)/1234yf (23.0/77.0)	A2L	3.3	13,000	53	13	53,000	209	440	
R-475A	zeotrope	R-1234yf/134a/1234ze(E) (45.0/43.0/12.0)	A1	20.0	73,000	320	690				

CHEMICAL REFRIGERANT	FORMULA	CHEMICAL NAME OF BLEND	REFRIGERANT SAFETY GROUP CLASSIFICATION	AMOUNT OF REFRIGERANT PER OCCUPIED SPACE							(F) DEGREES OF HAZARD
				RCL			LFL			OEL	
				lb/~~MCf~~ 1000 ft	ppm	g/m	lb/~~MCf~~ 1000 ft	ppm	g/m	ppm	
R-476A	zeotrope	R-134a/1234ze(E)/1336mzz(E) (10.0/78.0/12.0)	A1	11	38,000	180	750				
R-477A	zeotrope	R-1270/600a (84.0/16.0)	A3	0.13	1,100	2.0	2.4	21,000	38	530	
R-477B	zeotrope	R-1270/600a (38.0/62.0)	A3	0.27	2,100	4.3	2.3	18,000	37	690	
R-478A	zeotrope	R-744/32/125/134a/152a/1234ze(E)/227ea (7.0/26.0/15.0/15.0/3.0/30.0/4.0)	A2L	4.8	24,000	77	17.1~~[f]~~	95,000~~[f]~~	270~~[f]~~	1,100	
R-479A	zeotrope	R-1132(E)/32/1234yf (28.0/21.5/50.5)	A2L	3.0	15,000	48	12.0	61,000	193	510	
R-480A	zeotrope	R-744/1234ze(E)/227ea (5.0/86.0/9.0)	A1	16	59,000	260	900				
R-481A	zeotrope	R-32/125/134a/1233zd(E)/601a (16.9/6.3/74.4/1.8/0.6)	A1	10	45,000	160	1,000				
R-482A	zeotrope	R-134a/1234ze(E)/1224yd(Z) (10.0/83.5/6.5)	A1	18	62,000	290	830				
R-484A	zeotrope	R-1270/600 (12.0/88.0)	A3	0.14	1,000	2.3	2.6	18,000	41	860	
R-500~~[d]~~[c]	azeotrope	R-12/152a (73.8/26.2)	A1	7.4	29,000	120	—	—	—	1,000	2-0-0[b]
R-501[c]	azeotrope	R-22/12 (75.0/25.0)	A1	13	54,000	210	—	—	—	1,000	—
R-502~~[d]~~[c]	azeotrope	R-22/115 (48.8/51.2)	A1	21	73,000	330	—	—	—	1,000	2-0-0[b]
R-503~~[d]~~[c]	azeotrope	R-23/13 (40.1/59.9)	—	—	—	—	—	—	—	1,000	2-0-0[b]
R-504[c]	azeotrope	R-32/115 (48.2/51.8)	—	28	140,000	450	—	—	—	1,000	—
R-507A	azeotrope	R-125/143a (50.0/50.0)	A1	32	130,000	510	—	—	—	1,000	2-0-0[b]
R-508A	azeotrope	R-23/116 (39.0/61.0)	A1	14	55,000	220	—	—	—	1,000	2-0-0[b]
R-508B	azeotrope	R-23/116 (46.0/54.0)	A1	13	52,000	200	—	—	—	1,000	2-0-0[b]
R-509A	azeotrope	R-22/218 (44.0/56.0)	A1	24	75,000	380	—	—	—	1,000	2-0-0[b]
R-510A	azeotrope	R-E170/600a (88.0/12.0)	A3	0.87	7,300	14	3.5	29,000	56.1	1,000	—
R-511A	azeotrope	R-290/E170 (95.0/5.0)	A3	0.59	5,300	9.5	2.4	21,000	38.0	1,000	—
R-512A	azeotrope	R-134a/152a (5.0/95.0)	A2	1.9	11,000	31	7.7	45,000	123.9	1,000	—
R-513A	azeotrope	R-1234yf/134a (56.0/44.0)	A1	20	72,000	320	—	—	—	650	—
R-513B	azeotrope	R-1234yf/134a (58.5/41.5)	A1	21	74,000	330	—	—	—	640	—
R-514A	azeotrope	R-1336mzz(S)/1130(E) (74.7/25.3)	B1	0.86	2,400	14	—	—	—	320	—
R-515A	azeotrope	R-1234ze(E)/227ea (88.0/12.0)	A1	19	63,000	300	—	—	—	810	—
R-515B	azeotrope	R-1234ze(E)/227ea (91.1/8.9)	A1	18	61,000	290	—	—	810		
R-516A	azeotrope	R-1234yf/134a/152a (77.5/8.5/14.0)	A2	3.2	13,000	5 2	13.1	50,000	210.1	590	—
R-600	$CH_3CH_2CH_2CH_3$	butane	A3	0.15	1,000	2.4	3.0	20,000	48	1,000	1-4-0
R-600a	$CH(CH_3)_2CH_3$	2-methylpropane (isobutane)	A3	0.59	4,000	9.5	2.4	16,000	38	1,000	2-4-0
R-601	$CH_3CH_2CH_2$ CH_2CH_3	pentane	A3	0.18	1,000	2.9	2.2	12,000	35	600	—
R-601a	$(CH_3)_2CHCH_2CH_3$	2-methylbutane (isopentane)	A3	0.18	1,000	2.9	2.4	13,000	38	600	—
R-610	$CH_3CH_2OCH_2CH_3$	ethoxyethane (ethyl ether)	—	—	—	—	—	—	—	400	—
R-611	$HCOOCH_3$	methyl formate	B2	—	—	—	—	—	—	100	—
R-717	NH_3	ammonia	B2L	0.014	320	0.22	7.2	167,000	116	25	3-3-0[c]
R-718	H_2O	water	A1	—	—	—	—	—	—	—	0-0-0
R-744	CO_2	carbon dioxide	A1	~~4.5~~3.4	~~40,000~~ 30,000	~~72~~54	—	—	—	5,000	2-0-0[b]
R-1130(E)	CHCl=CHCl	trans-1,2-dichloroethene	B2	0.25	1,000	4	16	65,000	258	200	—
R-1132a	$CF_2=CH_2$	1,1-difluoro~~ethylene~~ethene	A2	2.0	13,000	33	8.1	50,000	131	500	—
R-1132(E)	(E)-CFH=CFH	Trans-1,2-difluoroethene	B2	1.8	11,000	28	7.0	43,000	113	350	
R-1150	$CH_2=CH_2$	ethene (ethylene)	~~A3~~B3	—	—	—	2.2	31,000	36	200	1-4-2
R-1224yd(Z)	$CF_3CF=CHCl$	(Z)-1-chloro-2,3,3,3-tetrafluoroethylene	A1	23	60,000	370	—	—	—	1,000	—
R-1233zd(E)	$CF_3CH=CHCl$	trans-1-chloro-3,3,3-trifluoro-1-propene	A1	5.3	16,000	85	—	—	—	800	—
R-1234yf	$CF_3CF=CH_2$	2,3,3,3-tetrafluoro-1-propene	A2L	4.5	16,000	75	18.0	62,000	289	500	—
R-1234ze(E)	$CF_3CH=CFH$	trans-1,3,3,3-tetrafluoro-1 -propene	A2L	4.7	16,000	76	18.8	65,000	303	800	—
R-1270	$CH_3CH=CH_2$	Propene (propylene)	A3	0.11	1,000	1.7	—	—	—	500	1-4-1
R-1336mzz(E)	$CF_3CHCHCF_3$	trans 1,1,1,4,4,4-hexafluoro-2- butene	A1	3.0	7,200	48	—	—	—	400	
R-1336mzz(Z)	$CF_3CHCHCF_3$	cis-1,1,1,4,4,4-hexaflouro-2-butene	A1	5.2	13,000	84	—	—	—	500	—

For SI: 1 pound = 0.454 kg, 1 cubic foot = 0.0283 m^3.

a. Degrees of hazard are for health, fire, and reactivity, respectively, in accordance with NFPA 704.

b. Reduction to 1-0-0 is allowed if analysis satisfactory to the code official shows that the maximum concentration for a rupture or full loss of refrigerant charge would not exceed the IDLH, considering both the refrigerant quantity and room volume.

c. Class I ozone depleting substance; prohibited for new installations.

d. Occupational Exposure Limit based on the OSHA PEL, ACGIH TLV-TWA, the TERA WEEL or consistent value on a time-weighed average (TWA) basis (unless noted C for ceiling) for an 8 hr/d and 40 hr/wk.

e. LFL is based on WCF @ 73.4°F (23°C) unless otherwise noted.

f. WCFF LFL @ 140°F (60°C).

g. WCFF LFL @ 73.4°F (23°C).

h. WCF LFL @ 212°F (100°C).

Reason: The Refrigerant Classifications (except Degrees of Hazard) are determined by ASHRAE SSPC 34 and published in ASHRAE Standard 34. This proposal seeks to update the refrigerant table with the new refrigerants added to Standard 34 since the last code cycle. The reasons for the additions of new refrigerants can be found at https://www.ashrae.org/standards-research--technology/standards-addenda. All proposed changes are either incorporated into ASHRAE Standard 34-2022 or the published addenda to ASHRAE Standard 34-2022 located at the link above.

Bibliography: ASHRAE Standard 34-2022, Addenda a, b, c, d, e, f, g, h, j, k, m, ac, ah to ASHRAE Standard 34-2022 - https://www.ashrae.org/standards-research--technology/standards-addenda

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Updating the table of refrigerants that could be used in systems does not add labor or material costs because the choice of refrigerant is up to the owner and designer.

M64-24

M65-24

IMC®: 1103.1

Proponents: Emily Toto, ASHRAE, ASHRAE (etoto@ashrae.org)

2024 International Mechanical Code

Revise as follows:

1103.1 Refrigerant classification. Refrigerants shall be classified in accordance with ASHRAE 34 as listed in Table 1103.1. <u>Refrigerants without a refrigerant number designation or without a safety group classification in the referenced edition of ASHRAE Standard 34 shall be classified in accordance with the criteria in ASHRAE Standard 34 as a single-compound refrigerant blend of two or more compounds. Such safety classifications not assigned by ASHRAE Standard 34 shall be submitted for approval to the code official. Compliance with the requirements of this code is contingent upon use of approved safey classifications where not assigned by the referenced edition of ASHRAE Standard 34.</u>

Staff Analysis: The standard referenced within the new code text is in the current edition of the IMC.

Reason: This change accounts for the fact that new refrigerants will be approved during continuous maintenance of ASHRAE 34 that cannot all be reflected in the latest edition of the IMC due to timing. It offers flexibility to use approved refrigerants even though they are not yet specified in the IMC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal will provide more choice to the user and, thus, direct costs could ultimately be lower. In general, this change is not expected to have a bearing on cost.

M65-24

M66-24

IMC®: 1104.3.1

Proponents: Emily Toto, ASHRAE, ASHRAE (etoto@ashrae.org)

2024 International Mechanical Code

Revise as follows:

1104.3.1 ~~Air conditioning for human comfort~~High-probability air conditioners, heat pumps, and dehumidifiers. High-probability ~~systems used for human comfort~~ air conditioners, heat pumps, and dehumidifiers shall use Group A1 or A2L refrigerant.

Exceptions:

1. Equipment *listed* for and used in residential *occupancies* containing a maximum of 6.6 pounds (3 kg) of refrigerant.
2. Equipment *listed* for and used in commercial *occupancies* containing a maximum of 22 pounds (10 kg) of refrigerant.
3. Industrial *occupancies* .

Reason: This code change proposal is for correlation with provisions in Addendum e of ASHRAE 15-2022. ASHRAE 15 has removed the term "human comfort" from the standard, as it did not adequately describe the applications it covered, and replaced it with "air conditioners, heat pumps, and dehumidifiers". This proposal better aligns the IMC with the current language in ASHRAE 15.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

These changes will have no impact on the cost of construction. They simply provide better clarity on what applications are intended by this section of the code.

M66-24

M67-24

IMC®: 1104.3.2

Proponents: Emily Toto, ASHRAE, ASHRAE (etoto@ashrae.org)

2024 International Mechanical Code

Revise as follows:

1104.3.2 Group A2, A3, B2 and B3 refrigerants. Group A2 and B2 refrigerants shall not be used in high-probability systems. Group A3 and B3 refrigerants shall not be used except where *approved*.

Exceptions: ~~This section does not apply to:~~

1. Laboratories where the floor area per occupant is not less than 100 square feet (9.3 m^2).
2. *Listed* self-contained systems having a maximum of 0.331 pounds (150 g) of Group A3 refrigerant.
3. Industrial *occupancies*.
4. *Equipment listed* for and used in residential *occupancies* containing a maximum of 6.6 pounds (3 kg) of Group A2 or B2 refrigerant.
5. *Equipment listed* for and used in commercial occupancies containing a maximum of 22 pounds (10 kg) of Group A2 or B2 refrigerant.
6. <u>Self-contained *equipment* using Groups A3 and B3 refrigerants that are listed to UL 60335-2-89 and installed in accordance with the listing, the manufacturer's installation instructions, and ASHRAE 15.</u>
7. <u>Self-contained *equipment* using Groups A3 and B3 refrigerants that are listed to UL 60335-2-40 and installed in accordance with the listing, the manufacturer's installation instructions, and ASHRAE 15.</u>

Staff Analysis: The proposed referenced standard, ASHRAE 15, is currently referenced in the IMC.

Reason: This code change proposal better aligns the IMC with Addendum l of ASHRAE 15, 2019 edition (which was incorporated into the 2022 edition), which allows for larger charge sizes of Group A3 refrigerants in commercial refrigeration applications.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal involves optional equipment choices.

M67-24

M68-24

IMC®: TABLE 1107.4, ASTM Chapter 15 (New)

Proponents: Lance MacNevin, Director of Engineering, The Plastics Pipe Institute, The Plastics Pipe Institute (lmacnevin@plasticpipe.org)

2024 International Mechanical Code

Revise as follows:

TABLE 1107.4 REFRIGERANT PIPE

PIPING MATERIAL	STANDARD
Aluminum tube	ASTM B210 , ASTM B491/B491M
Brass (copper alloy) pipe	ASTM B43
Copper linesets	ASTM B280, ASTM B1003
Copper pipe	ASTM B42, ASTM B302
Copper tube[a]	ASTM B68 , ASTM B75, ASTM B88, ASTM B280, ASTM B819
Polyethylene of Raised Temperature/ Aluminum/Polyethylene of Raised Temperature (PE-RT/AL/PE-RT) pipe	ASTM F3346
Steel pipe[b]	ASTM A53, ASTM A106 , ASTM A333
Steel tube	ASTM A254, ASTM A334

a. Soft annealed copper tubing larger than $1^3/_8$ inch (35 mm) O.D. shall not be used for field-assembled refrigerant piping unless it is protected from mechanical damage.

b. ASTM A53, Type F steel pipe shall only be permitted for discharge lines in pressure relief systems.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

ASTM F3346-19 Standard Specification for Polyethylene of Raised Temperature/Aluminum/Polyethylene of Raised Temperature (PE-RT/AL/PE-RT) Composite Pressure Pipe

Staff Analysis: A review of the standard proposed for inclusion in the code, ASTM F3346-19 Standard Specification for Polyethylene of Raised Temperature/Aluminum/Polyethylene of Raised Temperature (PE-RT/AL/PE-RT) Composite Pressure Pipe, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: Piping produced according to ASTM F3346 “Standard Specification for Polyethylene of Raised Temperature/Aluminum/Polyethylene of Raised Temperature (PE-RT/AL/PE-RT) Composite Pressure Pipe” is intended for the applications referred to in Section 1107.4 of the code and in Table 1107.4. It is proposed to add this piping material to Table 1107.4 to provide installers with a high-performance corrosion-resistant option for this application.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

Including PE-RT/AL/PE-RT piping in Table 1107.4 provides an alternative piping option for refrigerant applications. PE-RT/AL/PE-RT piping is less expensive than some of the existing materials (e.g., copper, brass, or steel), but may be more expensive than certain other piping materials. This code change proposal may decrease the cost of construction by 0% to 10% if PE-RT/AL/PE-RT piping is selected by users, or it may increase the cost of construction by 0% to 10% if selected, or it may have no impact on the cost of construction if PE-RT/AL/PE-RT piping is not selected. It depends on which of the seven existing approved materials is used for this comparison.

To assign dollar values to this proposal, the use of PE-RT/AL/PE-RT piping could decrease construction costs over a range from $1 to $10,000, depending on the size of the project, size of piping, etc. or it could increase construction costs over a range from $1 to $10,000, depending on the size of the project, size of piping, etc., or it could have no effect on construction costs if users do not select to use PE-RT/AL/PE-RT piping. This proposal simply provides another material option.

Estimated Immediate Cost Impact Justification (methodology and variables):

Seven (7) piping materials produced according to seventeen (17) listed standards are already approved in Table 1107.4.. This proposal simply provides another material option. The amount of the cost decrease or increase is highly dependent on exact comparisons for specific piping materials and sizes plus assembly and construction costs which vary for each individual project. Therefore, only a range of cost decreases or increases can be provided in this format.

Estimated Life Cycle Cost Impact:

Seven (7) piping materials produced according to seventeen (17) listed standards are already approved in Table 1107.4. This proposal simply provides another material option. The impact to Life Cycle Cost is highly dependent on exact comparisons for specific piping materials and sizes plus assembly and construction costs which vary for each individual project. PE-RT/AL/PE-RT piping has a corrosion-resistant plastic inner and outer liner for long life.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

Seven (7) piping materials produced according to seventeen (17) listed standards are already approved in Table 1107.4. This proposal simply provides another material option. The impact to Life Cycle Cost is highly dependent on exact comparisons for specific piping materials and sizes plus assembly and construction costs which vary for each individual project. PE-RT/AL/PE-RT piping has a corrosion-resistant plastic inner and outer liner for long life.

M68-24

M69-24

IMC®: TABLE 1107.4, ASTM Chapter 15 (New)

Proponents: Lance MacNevin, Director of Engineering, The Plastics Pipe Institute, The Plastics Pipe Institute (lmacnevin@plasticpipe.org)

2024 International Mechanical Code

Revise as follows:

TABLE 1107.4 REFRIGERANT PIPE

PIPING MATERIAL	STANDARD
Aluminum tube	ASTM B210 , ASTM B491/B491M
Brass (copper alloy) pipe	ASTM B43
Copper linesets	ASTM B280, ASTM B1003
Copper pipe	ASTM B42, ASTM B302
Copper tube[a]	ASTM B68 , ASTM B75, ASTM B88, ASTM B280, ASTM B819
Polyethylene of Raised Temperature/ Aluminum/Polyethylene of Raised Temperature (PE-RT/AL/PE-RT)pipe	ASTM F3506
Steel pipe[b]	ASTM A53, ASTM A106 , ASTM A333
Steel tube	ASTM A254, ASTM A334

a. Soft annealed copper tubing larger than $1^3/_8$ inch (35 mm) O.D. shall not be used for field-assembled refrigerant piping unless it is protected from mechanical damage.

b. ASTM A53, Type F steel pipe shall only be permitted for discharge lines in pressure relief systems.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

F3506-21e1 Standard Specification for Polyethylene of Raised Temperature/Aluminum/Polyethylene of Raised Temperature (PE-RT/AL/PE-RT) Composite Pressure Pipe based on Inner Diameter (ID) for use in Air Conditioning and Refrigeration Line Set Systems

Staff Analysis: A review of the standard proposed for inclusion in the code, ASTM 3506 tandard Specification for Polyethylene of Raised Temperature/Aluminum/Polyethylene of Raised Temperature (PE-RT/AL/PE-RT) Composite Pressure Pipe based on Inner Diameter (ID) for use in Air Conditioning and Refrigeration Line Set Systems, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: Piping produced according to ASTM F3506 "Standard Specification for Polyethylene of Raised Temperature/Aluminum/Polyethylene of Raised Temperature (PE-RT/AL/PE-RT) Composite Pressure Pipe based on Inner Diameter (ID) for use in Air Conditioning and Refrigeration Line Set Systems" is intended specifically for the applications referred to in Section 1107.4 of the code and in Table 1107.4. It is proposed to add this piping material to Table 1107.4 to provide installers with a high-performance corrosion-resistant option for this application.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

Including PE-RT/AL/PE-RT piping produced according to ASTM F3506 in Table 1107.4 provides an alternative piping option for refrigerant applications. PE-RT/AL/PE-RT piping is less expensive than some of the existing materials (e.g., copper, brass, or steel), but may be more expensive than certain other piping materials. This code change proposal may decrease the cost of construction by 0% to 10% if PE-RT/AL/PE-RT piping is selected by users, or it may increase the cost of construction by 0% to 10% if selected, or it may have no impact on the cost of construction if PERT/ AL/PE-RT piping is not selected. It depends on which of the seven existing approved materials is used for this comparison.

To assign dollar values to this proposal, the use of PE-RT/AL/PE-RT piping could decrease construction costs over a range from $1 to $10,000, depending on the size of the project, size of piping, etc. or it could increase construction costs over a range from $1 to $10,000, depending on the size of the project, size of piping, etc., or it could have no effect on construction costs if users do not select to use PERT/AL/PE-RT piping. This proposal simply provides another material option.

Estimated Immediate Cost Impact Justification (methodology and variables):

Seven (7) piping materials produced according to seventeen (17) listed standards are already approved in Table 1107.4.. This proposal simply provides another material option. The amount of the cost decrease or increase is highly dependent on exact comparisons for specific piping materials and sizes plus assembly and construction costs which vary for each individual project. Therefore, only a range of cost decreases or increases can be provided in this format.

Estimated Life Cycle Cost Impact:

Seven (7) piping materials produced according to seventeen (17) listed standards are already approved in Table 1107.4. This proposal simply provides another material option. The impact to Life Cycle Cost is highly dependent on exact comparisons for specific piping materials and sizes plus assembly and construction costs which vary for each individual project. PE-RT/AL/PE-RT piping has a corrosion-resistant plastic inner and outer liner for long life.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

Seven (7) piping materials produced according to seventeen (17) listed standards are already approved in Table 1107.4. This proposal simply provides another material option. The impact to Life Cycle Cost is highly dependent on exact comparisons for specific piping materials and sizes plus assembly and construction costs which vary for each individual project. PE-RT/AL/PE-RT piping has a corrosion-resistant plastic inner and outer liner for long life.

M69-24

M70-24

IMC®: TABLE 1107.4, TABLE 1107.5, 1108.7 (New), 1108.8 (New), ASTM Chapter 15 (New)

Proponents: Emily Toto, ASHRAE, ASHRAE (etoto@ashrae.org)

2024 International Mechanical Code

Revise as follows:

TABLE 1107.4 REFRIGERANT PIPE

PIPING MATERIAL	STANDARD
Aluminum tube	ASTM B210 , ASTM B491/B491M
Brass (copper alloy) pipe	ASTM B43
Copper linesets	ASTM B280, ASTM B1003
Copper pipe	ASTM B42, ASTM B302
Copper tube[a]	ASTM B68 , ASTM B75, ASTM B88, ASTM B280, ASTM B819
Steel pipe[b]	ASTM A53, ASTM A106, ASTM A333
Steel tube	ASTM A254, ASTM A334
Stainless Steel Pipe	ASTM A312/A312M
Stainless Steel Tube	ASTM A269/A269M, ASTM A632

a. Soft annealed copper tubing larger than $1^3/_8$ inch (35 mm) O.D. shall not be used for field-assembled refrigerant piping unless it is protected from mechanical damage.

b. ASTM A53, Type F steel pipe shall only be permitted for discharge lines in pressure relief systems.

TABLE 1107.5 REFRIGERANT PIPE FITTINGS

FITTING MATERIAL	STANDARD
Aluminum	ASTM B361
Copper and copper alloy (brass)	ASME B16.15, ASME B16.18, ASME B16.22, ASME B16.24, ASME B16.26, ASME B16.50
Steel	ASTM A105, ASTM A181, ASTM A193, ASTM A234, ASTM A420, ASTM A707
Stainless Steel	ASTM A403/A403M, ASME B16.11

Add new text as follows:

1108.7 Stainless steel pipe. Joints between stainless steel pipe or fittings shall be brazed, mechanical, threaded, press-connect, or welded joints conforming to Section 1108.3.

1108.8 Stainless steel tube. Joints between stainless steel tube or fittings shall be brazed, flared, mechanical, press-connect, or welded joints conforming to Section 1108.3.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

ASTM A632-19 Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing (Small-Diameter) for General Service

ASTM A403/A403M-20 Standard Specification for Wrought Austenitic Stainless Steel Piping Fittings

Staff Analysis: A review of the standard proposed for inclusion in the code, ASTM A632 and A403/A403M, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: ASHRAE 15 includes the use of stainless steel pipe and stainless steel tube for refrigerant piping. This proposed change adds the requirements for stainless steel pipe and tube. The appropriate standards are listed in Table 1107.4 for the pipe and tube and Table 1107.5 for the fittings.

Section 1108.7 and 1108.8 added the joining methods. ASHRAE 15 allows brazed, mechanical, threaded, press-connect, or welded joints for stainless steel pipe and brazed, flared, mechanical, press-connect, or welded joints for stainless steel tube.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The use of stainless steel pipe or tube is optional, therefore not impacting the cost of construction.

M70-24

M71-24

IMC®: 1107.4.1

Proponents: Emily Toto, ASHRAE, ASHRAE (etoto@ashrae.org)

2024 International Mechanical Code

Delete without substitution:

~~**1107.4.1 Steel pipe Groups A2, A3, B2 and B3.** The minimum weight of steel pipe for Group A2, A3, B2 and B3 refrigerants shall be Schedule 80 for sizes 1 1/2 inches or less in diameter.~~

Reason: ASHRAE 15 does not restrict the use of steel pipe to Schedule 80 for Group A2, A3, B2, and B3 refrigerants. By deleting this section, the requirements are consistent with ASHRAE 15.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

The allowance for Schedule 40 steel pipe will lower the cost of the refrigerant piping system.
Schedule 40 (thinner) will cost less than Schedule 80 (thicker) due to material. Based on Grainger's website, use of Schedule 40 will reduce cost by $0.78 – $2.75 per foot, depending on the length installed.

	3/4" diameter unthreaded, welded Cost (Cost/ft)	
Length	Schedule 40	Schedule 80
1 foot (12 inch)	$9.00 ($9.00/ft)	$9.78 ($9.78/ft)
3 foot	$18.47 ($6.16/ft)	$26.74 ($8.91/ft)
5 foot	$30.35 ($6.07/ft)	
6 foot		$53.09 ($8.84/ft)

Estimated Immediate Cost Impact Justification (methodology and variables):

This is based on the current pricing of Schedule 40.

M71-24

M72-24

IMC®: 1107.5.1, TABLE 1107.5.1

Proponents: Emily Toto, ASHRAE, ASHRAE (etoto@ashrae.org)

2024 International Mechanical Code

Revise as follows:

1107.5.1 Copper ~~brazed~~ field swaged. The minimum and maximum cup depth of field-fabricated copper ~~brazed~~ swaged fitting connections shall comply with Table 1107.5.1.

TABLE 1107.5.1 COPPER ~~BRAZED~~ SWAGED CUP DEPTHS

	Brazed Cup Depths		Solder Cup Depths
FITTING SIZE (inch)	MINIMUM ~~DEPTH~~ (inch)	MAXIMUM ~~DEPTH~~ (inch)	MINIMUM (inch)
$^1/_8$	0.15	0.23	0.25
$^3/_{16}$	0.16	0.24	0.31
$^1/_4$	0.17	0.26	0.31
$^3/_8$	0.20	0.30	0.38
$^1/_2$	0.22	0.33	0.50
$^5/_8$	0.24	0.36	0.62
$^3/_4$	0.25	0.38	0.75
1	0.28	0.42	0.91
1 $^1/_4$	0.31	0.47	0.97
1 $^1/_2$	0.34	0.51	1.09
2	0.40	0.60	1.34
2 $^1/_2$	0.47	0.71	1.47
3	0.53	0.80	1.66
3 $^1/_2$	0.59	0.89	1.91
4	0.64	0.96	2.16

For SI: 1 inch = 25.4 mm.

Reason: ASHRAE 15 added the minimum cup depth for copper solder swaged joint since solder joints are permitted for lower pressure Group A1 refrigerant systems. By striking the word “brazed” in the title and the section, the table results in regulations for both brazed and soldered field made swaged joints. The information on cup depth for solder joints was provided by the Copper Development Association which lists minimum depths for proper solder joints.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The use of field made swaged solder joints is optional.

M72-24

M73-24

IMC®: 1108.7, 1108.8

Proponents: Emily Toto, ASHRAE, ASHRAE (etoto@ashrae.org)

2024 International Mechanical Code

Revise as follows:

1108.7 Steel pipe. Joints between steel pipe or fittings shall be brazed, mechanical ~~joints~~, threaded, press-connect or welded joints conforming to Section 1108.3.

1108.8 Steel tube. Joints between steel tubing or fittings shall be brazed, flared, mechanical, press-connect or welded joints conforming to Section 1108.3.

Reason: ASHRAE 15 includes the allowance of brazed joints for both steel pipe and steel tube. This change adds the allowance of these joining methods to the Mechanical Code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The use of brazed joints is optional.

M73-24

M74-24

IMC®: 1108.9 (New)

Proponents: Lance MacNevin, Director of Engineering, The Plastics Pipe Institute, The Plastics Pipe Institute (lmacnevin@plasticpipe.org)

2024 International Mechanical Code

Add new text as follows:

1108.9 PE-RT/AL/PE-RT pipe. Joints between PE-RT/AL/PE-RT pipe or fittings shall be mechanical or press-connect joints conforming to Section 1108.3.

Reason: Following the proposal to add new standards ASTM F3346 and ASTM F3506 to Table 1107.4, this proposed new Section 1108.9 provides mandatory language regarding joints for PE-RT/AL/PE-RT pipes consistent with requirements for other piping materials found in this section. Therefore, the new section 1108.9 should be added to include these mandatory requirements.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Following the proposals to add standards ASTM F3346 and ASTM F3506 to Table 1107.4, this proposed new Section provides mandatory language regarding joints for PE-RT/AL/PE-RT pipes consistent with requirements for other piping materials found in this section. The user has several choices for refrigeration piping materials, and the addition of this new section clarifies requirements for PE-RT/AL/PE-RT joints without decreasing or increasing the cost of construction.

M74-24

M75-24

IMC®: 1109.2.5

Proponents: Greg Johnson, Johnson & Associates Consulting Services, National Multifamily Housing Council (gjohnsonconsulting@gmail.com); Vladimir G. Kochkin, National Association of Home Builders - NAHB, NAHB (vkochkin@nahb.org); Andrew Klein, A S Klein Engineering, PLLC, BOMA International (andrew@asklein.com); Emily Toto, ASHRAE, ASHRAE (etoto@ashrae.org)

2024 International Mechanical Code

Revise as follows:

1109.2.5 Refrigerant pipe shafts. Refrigerant piping that penetrates two or more floor/ceiling assemblies shall be enclosed in a fire-resistance-rated shaft enclosure. The fire-resistance-rated shaft enclosure shall comply with Section 713 of the International Building Code.

Exceptions:

1. *Refrigeration* systems using R-718 refrigerant (water).
2. Piping in a direct refrigeration system ~~using Group A1 refrigerant~~ where the refrigerant quantity does not exceed the limits of Table 1103.1 for the smallest occupied space through which the piping passes.
3. Piping located on the exterior of the *building* where vented to the outdoors.

Reason: JOHNSON: This will make the IMC consistent with Section 9.12.1.5 of ASHRAE 15-2022. Note that IMC Section 1109.2.2 still requires piping protection, either within building elements or protective enclosures.

TOTO: This section was added to the IMC before the completion of the changes to ASHRAE 15. ASHRAE 15 removed the limitation in exception 2 as applying only to Group A1 refrigerants. It was determined that any refrigerant meeting the limitations of Table 1103.1 are safe to install without a shaft enclosure. This modification is consistent with ASHRAE 15-2022.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

JOHNSON: Costs are estimated to be reduced by roughly $1,000 per piping run per floor of an R-2 multifamily building.
TOTO: This may reduce the cost of construction by eliminating the shaft requirements for all refrigerants that do not exceed the safe limitations in the code. $22,400 estimated avoided total cost per mechanical room.

Estimated Immediate Cost Impact Justification (methodology and variables):

JOHNSON: Lineal feet of shaft-wall system avoided estimated to be 20 feet. Height of ceiling estimated to be 9 feet. Cost of installed shaft system estimated to be $7.00 per square foot. 20 X 9 X $7 = $960. $960 was rounded to $1,000.
TOTO: This change provides a lower cost alternative to the installation of a pipe shaft. Assumed area of avoided shaft wall system = 10 ft high X 40 lineal ft ($ sided enclosure) = 400 sf of shaft wall area. Assume shaft liner wall board is $34 per sf (kamcoboston.com), assume shaft framing materials are $8 per sf (schillings.com), assume $4 per sf labor (forbes.com), = $56 per sf for installed shaft wall without finishing. $56 per sf X 400 sf = **$22,400 estimated avoided total cost per mechanical room.**

Estimated Life Cycle Cost Impact:

JOHNSON: N/A

Estimated Life Cycle Cost Impact Justification (methodology and variables):

JOHNSON: N/A

M75-24

M76-24

IMC®: 1109.3.1

Proponents: Lance MacNevin, Director of Engineering, The Plastics Pipe Institute, The Plastics Pipe Institute (lmacnevin@plasticpipe.org)

2024 International Mechanical Code

Revise as follows:

1109.3.1 Protection against physical damage. In addition to the requirements of Section 305.5, aluminum, copper, multilayer composite, and and steel tube used for Group A2, A3, B2 and B3 refrigerants and located in concealed locations where tubing is installed in studs, joists, rafters or similar member spaces, and located less than $1^1/_4$ inches (32 mm) from the nearest edge of the member, shall be continuously protected by shield plates. Protective steel shield plates shall cover the area of the tube plus the area extending not less than 2 inches (51 mm) beyond both sides of the tube.

Reason: Following the proposals to add new refrigeration piping standards ASTM F3346 and ASTM F3506 to Table 1107.4, this proposed revision to Section 1109.3.1 provides mandatory language regarding protection for PE-RT/AL/PE-RT pipes, consistent with requirements for other piping materials found in this section.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Following the proposals to add new refrigeration piping standards ASTM F3346 and ASTM F3506 to Table 1107.4, this proposed revision to Section 1109.3.1 provides mandatory language regarding protection for PE-RT/AL/PE-RT pipes, consistent with requirements for other piping materials found in this section. The user has several choices for refrigeration piping materials, and this revision clarifies requirements for protection of PERT/AL/PE-RT piping without decreasing or increasing the cost of construction.

M76-24

M77-24

IMC®: 1109.4

Proponents: Howard Ahern, Airex, Manufacturing (howard.ahern@airexmfg.com)

2024 International Mechanical Code

Revise as follows:

1109.4 Refrigerant pipe penetrations.
The annular space between the outside of a refrigerant pipe and the inside of a pipe sleeve or opening in a *building* envelope wall, floor or ceiling assembly penetrated by a refrigerant pipe shall be sealed in an *approved* manner with caulking material or ~~foam~~ sealant or closed with a gasketing system. The caulking material, ~~foam~~ sealant or gasketing system shall be designed for the conditions at the penetration location and shall be compatible with the pipe, sleeve and *building* materials in contact with the sealing materials.<u>Sealing shall allow for expansion and contraction of materials and mechanical vibration.</u> Refrigerant pipes penetrating fire-resistance-rated assemblies or membranes of fire-resistance-rated assemblies shall be sealed or closed in accordance with Section 714 of the International Building Code. Rodent Proofing shall comply with Section 301.17

Reason: The **2018 IECC Commerical code Air Barrier Construction C402.5.1.1 (3), and 2021 IECC C402.5.1.1 (3) , R402.4.1.1 Air Barrier, Air Sealing and Insulation Installation, 2021 IRC Table N1102.4.1.1 Air Barrier, Air Sealing and Insulation Installation states for Penetrations sealing that "sealing shall allow for expansion, contraction of materials and mechanical vibration"**.

Refrigeration Piping does have vibration. Condenser manufactures have installation instruction to isolate the refrigeration piping for vibration. Codes and standards have instruction for care to be taken in construction of refrigeration piping and joints to avoid stress from the vibration.
The US Department of Energy states on their website Caulking | Department of <u>Energy for</u> sealing. On Expanding foam " **Use in non friction areas, as material can become dry and powdery over time". as the friction caused by the vibration turns the foam into powder.**
The HVAC industry is well aware of going back to jobs where the foam has degraded substantially or is completely gone from the vibration. In Addition, it renders the pipe penetration nearly impractical for future modifications or maintenance.

Also, a serious concern is the utilization of isocyanates, particularly MDI (Methylene Diphenyl Diisocyanate), a hazardous component prevalent in numerous polyurethane foams. MDI is acknowledged for its potential as a respiratory and skin irritant, with prolonged exposure carrying the risk of severe health issues. Inhaling MDI fumes or direct skin contact can result in sensitization, allergic reactions, and potentially long-term health problems. Consequently, the inclusion of MDI in expanding foam introduces an avoidable health hazard for workers involved in its application. Plus, manufactures warn of foam getting into water were it kills aquatic life and to not allow it to lay on the ground as well

This proposal will keep with requirements from the IECC for penetration sealing and remove foam for refrigerant pipe penetration sealing only due to vibration.

Bibliography: Caulking | Department of Energy

DIY Foam Failures: The Pitfalls of Expanding Polyurethane in Cable Ducts | by Carl Pike - The Duct Sealing Man | Nov, 2023 | Medium

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This change should not increase the cost of construction as these sealing requirements are already in the 2018,2021 IECC and IRC. The upcoming 2024 IECC commercial and residential had no code proposals pertain to this requirement and is unchallenged. Any cost of construction increase has already been approved in two and now almost three code cycles. There are a variety of low-cost compounds, caulking, sealants and gaskets used extensively by contractors already. There is no research or data available that was searchable on pipe penetration sealing cost that could be found.

M77-24

M78-24

IMC®: TABLE 1202.4, ASTM Chapter 15 (New)

Proponents: Lance MacNevin, Director of Engineering, The Plastics Pipe Institute, The Plastics Pipe Institute (lmacnevin@plasticpipe.org)

2024 International Mechanical Code

Revise as follows:

TABLE 1202.4 HYDRONIC PIPE

MATERIAL	STANDARD (see Chapter 15)
Acrylonitrile butadiene styrene (ABS) plastic pipe	ASTM F2806
Chlorinated polyvinyl chloride (CPVC) plastic pipe	ASTM D2846; ASTM F441; ASTM F442
Chlorinated polyvinyl chloride/aluminum/chlorinated polyvinyl chloride (CPVC/AL/CPVC)	ASTM F2855
Copper or copper-alloy pipe	ASTM B42; ASTM B43; ASTM B302
Copper or copper-alloy tube (Type K, L or M)	ASTM B75; ASTM B88; ASTM B135; ASTM B251
Cross-linked polyethylene/aluminum/cross-linked polyethylene (PEX-AL-PEX) pressure pipe	ASTM F1281; CSA CAN/CSA-B-137.10
Cross-linked polyethylene (PEX) tubing	ASTM F876; ASTM F3253; CSA B137.5
Ductile iron pipe	AWWA C115/A21.15; AWWA C151/A21.51
High-density Polyethylene (HDPE) pipe	ASTM D2737; ASTM D3035; ASTM F714; ASTM F2165; AWWA C901; CSA B137.1
Polyethylene/aluminum/polyethylene (PE-AL-PE) pressure pipe	ASTM F1282; CSA B137.9
Polypropylene (PP) plastic pipe	ASTM F2389
Polyvinyl chloride (PVC) plastic pipe	ASTM D1785; ASTM D2241
Raised temperature polyethylene (PE-RT)	ASTM F2623; ASTM F2769; CSA B137.18
Stainless steel pipe	ASTM A269; ASTM A312; ASTM A778
Stainless steel tubing	ASTM A269; ASTM A312; ASTM A778
Steel pipe	ASTM A53; ASTM A106
Steel tubing	ASTM A254

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

ASTM F2165-19 — Standard Specification for Flexible Pre-Insulated Plastic Piping

ASTM D2683-20 — Standard Specification for Socket-Type Polyethylene Fittings for Outside Diameter-Controlled Polyethylene Pipe and Tubing

Staff Analysis: A review of the standard proposed for inclusion in the code, ASTM F2165-19 Standard Specification for Flexible Pre-Insulated Plastic Piping, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: Certain hydronic systems operate at temperatures of 140°F or lower and are suitable for High-density Polyethylene (HDPE) piping systems. Examples include chilled water piping, indoor geothermal piping, and low temperature hydronic distribution. HDPE is often used for these applications and is approved in other codes. The six industry standards in the proposal are for HDPE pipe and tubing and are all current and up-to-date and represent piping materials that are suitable for several hydronic applications. .

Cost Impact: Decrease

Estimated Immediate Cost Impact:

Including HDPE piping in Table 1202.4 provides an alternative piping option for hydronic applications. HDPE piping is less expensive than existing materials such as copper, iron, steel, or PEX piping, but HDPE is more expensive than certain other piping materials. This code change proposal may decrease the cost of construction by 0% to 50% if HDPE piping is selected by users, or it may increase the cost of construction by 0% to 25% if selected, or it may have no impact on the cost of construction if HDPE is not selected.

To assign dollar values to this proposal, the use of HDPE piping could decrease construction costs over a range from $1 to $100,000, depending on the size of the project, size of piping, etc. or it could increase construction costs over a range from $1 to $50,000, depending on the size of the project, size of piping, etc., or it could have no effect on construction costs if users do not select to use HDPE piping. This proposal simply provides another material option.

Estimated Immediate Cost Impact Justification (methodology and variables):

Sixteen piping materials are already approved in Table 1202.4. This proposal simply provides another material option. The amount of the cost decrease or increase is highly dependent on exact comparisons for specific piping materials and sizes plus assembly and construction costs which vary for each individual project. Therefore, only a range of cost decreases or increases can be provided in this format.

Estimated Life Cycle Cost Impact:

Sixteen piping materials are already approved in Table 1202.4. This proposal simply provides another material option. The impact to Life Cycle Cost is highly dependent on exact comparisons for specific piping materials and sizes plus assembly and construction costs which vary for each individual project. Published LCA studies indicate a reduced life cycle cost when using HDPE instead of several metallic materials.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

This proposal simply provides another material option. A summary of a LCA that compares HDPE to ductile iron pipe is available at

https://www.teppfa.eu/sustainability/environmental-footprint/lca/pe-vs-di-pipe-systems-for-pressurised-water-supply/

M78-24

M79-24

IMC®: TABLE 1202.5

2024 International Mechanical Code

Revise as follows:

TABLE 1202.5 HYDRONIC PIPE FITTINGS

MATERIAL	STANDARD (see Chapter 15)
Copper and copper alloys	ASME B16.15; ASME B16.18; ASME B16.22; ASME B16.24; ASME B16.26; ASME B16.51; ASSE 1061; ASTM F1974 ; ASTM F3226
CPVC	ASSE 1061; ASTM D2846; ASTM F438; ASTM F439
Ductile iron and gray iron	ANSI/AWWA C110/A21.10; ASTM A395; ASTM A536; ASTM F1476; ASTM F1548; AWWA C153/A21.53
Ductile iron	ANSI/AWWA C153/A21.53
Gray iron	ASTM A126
HDPE fittings	ASTM D2683; ASTM D3261; ASTM F1055; CSA B137.1
Malleable iron	ASME B16.3
PE-RT fittings	ASSE 1061; ASTM D3261; ASTM F1807; ASTM F2098; ASTM F2159; ASTM F2735; ASTM F2769; ASTM F3347; ASTM F3348; CSA B137.1; CSA B137.18
PEX fittings	ASSE 1061; ASTM F877; ASTM F1807; ASTM F1960; ASTM F2080; ASTM F2159; ASTM F3253 ; ASTM F3347; ASTM F3348
Plastic	ASTM D2466; ASTM D2467; ASTM D2846; ASTM F877; ASTM F2389; ASTM F2735
Stainless steel	ASTM A269; ASTM A312; ASTM A778; ASTM F3226
Steel	ASME B16.5; ASME B16.9; ASME B16.11; ASME B16.28; ASTM A53; ASTM A106; ASTM A234; ASTM A395; ASTM A420; ASTM A536; ASTM F1476; ASTM F1548 ; ASTM F3226

Staff Analysis: The proposed referenced standards, ASTM D2683, D3261, F1055, and CSA B137.1, are currently referenced in the IMC.

Reason: Certain hydronic systems operate at temperatures of 140°F or lower and are suitable for High-density Polyethylene (HDPE) piping systems. Examples include chilled water piping, indoor geothermal piping, and low temperature hydronic distribution. HDPE is often used for these applications and is approved in other codes. The four industry standards in the proposal are for different styles of HDPE fittings which are suitable for certain hydronic applications and are all current and up-to-date.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

This proposal is related to a proposal to add HDPE piping to Table 1202.4 as an alternative piping option for hydronic applications. If HDPE piping is approved for Table 1202.4, then suitable HDPE fittings should be added to Table 1202.5.

HDPE piping is less expensive than existing materials such as copper, iron, steel, or PEX piping, but HDPE is more expensive than certain other piping materials. This code change proposal may decrease the cost of construction by 0% to 50% if HDPE piping is selected by users, or it may increase the cost of construction by 0% to 25% if selected, or it may have no impact on the cost of construction if HDPE is not selected.

To assign dollar values to this proposal, the use of HDPE piping could decrease construction costs over a range from $1 to $100,000, depending on the size of the project, size of piping, etc. or it could increase construction costs over a range from $1 to $50,000, depending on the size of the project, size of piping, etc., or it could have no effect on construction costs if users do not select to use HDPE piping. This proposal simply provides another material option.

Estimated Immediate Cost Impact Justification (methodology and variables):

Fittings for eleven (11) piping materials are already approved in Table 1202.5. This proposal simply provides another material option.

The amount of the cost decrease or increase is highly dependent on exact comparisons for specific piping materials and sizes plus assembly and construction costs which vary for each individual project. Therefore, only a range of cost decreases or increases can be provided in this format.

Estimated Life Cycle Cost Impact:

Fittings for eleven (11) piping materials are already approved in Table 1202.5. This proposal simply provides another material option.

The impact to Life Cycle Cost is highly dependent on exact comparisons for specific piping materials and sizes plus assembly and construction costs which vary for each individual project. Published LCA studies indicate a reduced life cycle cost when using HDPE instead of several metallic materials.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

This proposal simply provides another material option. A summary of a LCA that compares HDPE to ductile iron pipe is available at https://www.teppfa.eu/sustainability/environmental-footprint/lca/pe-vs-di-pipe-systems-for-pressurised-water-supply/

M79-24

M80-24

IMC®: TABLE 1202.5, ANSI Chapter 15 (New)

Proponents: Christopher Adam Smith, Viega, LLC, Codes and Standards Manager for Viega, LLC

2024 International Mechanical Code

Revise as follows:

TABLE 1202.5 HYDRONIC PIPE FITTINGS

MATERIAL	STANDARD (see Chapter 15)
Copper and copper alloys	ASME B16.15; ASME B16.18; ASME B16.22; ASME B16.24; ASME B16.26; ASME B16.51; ASSE 1061; ASTM F1974 ; ASTM F3226; IAPMO/ANSI/CAN Z1117
CPVC	ASSE 1061; ASTM D2846; ASTM F438; ASTM F439
Ductile iron and gray iron	ANSI/AWWA C110/A21.10; ASTM A395; ASTM A536; ASTM F1476; ASTM F1548; AWWA C153/A21.53
Ductile iron	ANSI/AWWA C153/A21.53
Gray iron	ASTM A126
Malleable iron	ASME B16.3
PE-RT fittings	ASSE 1061; ASTM D3261; ASTM F1807; ASTM F2098; ASTM F2159; ASTM F2735; ASTM F2769; ASTM F3347; ASTM F3348; CSA B137.1; CSA B137.18
PEX fittings	ASSE 1061; ASTM F877; ASTM F1807; ASTM F1960; ASTM F2080; ASTM F2159; ASTM F3253 ; ASTM F3347; ASTM F3348
Plastic	ASTM D2466; ASTM D2467; ASTM D2846; ASTM F877; ASTM F2389; ASTM F2735
Stainless steel	ASTM A269; ASTM A312; ASTM A778; ASTM F3226; IAPMO/ANSI/CAN Z1117
Steel	ASME B16.5; ASME B16.9; ASME B16.11; ASME B16.28; ASTM A53; ASTM A106; ASTM A234; ASTM A395; ASTM A420; ASTM A536; ASTM F1476; ASTM F1548 ; ASTM F3226; IAPMO/ANSI/CAN Z1117

Add new standard(s) as follows:

ANSI

American National Standards Institute
25 West 43rd Street, 4th Floor
New York, NY 10036

IAPMO/ANSI/CAN Z1117-2022 Standard for Press Connections

Staff Analysis: A review of the standard proposed for inclusion in the code, IAPMO/ANSI/CAN Z1117-2022 Standard for Press Connections, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: IAPMO/ANSI/CAN Z1117 is a harmonized standard for press-connect fittings used across North America. It is recognized and enforced in both the United States and Canada and encompasses multiple press-connect materials such as copper, steel, and stainless steel 304 and 316.

This addition to the Referenced Standards Chapter is in support of Proposal # 9274 that adds IAPMO/ANSI/CAN Z1117 to Table 1202.5 of the IMC.

ANSI/CAN Z1117 is a harmonized standard for all of North America recognized and enforced in both the United States and Canada. This standard encompasses multiple press-connect materials such as copper, steel, and stainless steel 304 and 316. There are already several press connect standards within the code, the addition of Z1117 seeks to add a harmonized version that makes adoption and enforcement easier across North America.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The addition of this standard does not increase the cost of construction. The addition of this standard allows for a wider selection of materials but does not make their use mandatory. By including this standard in the code, the options for installers will increase while the cost of construction should stay the same or even decrease.

M80-24

M81-24

IMC®: TABLE 1202.5

Proponents: Lance MacNevin, Director of Engineering, The Plastics Pipe Institute, The Plastics Pipe Institute (lmacnevin@plasticpipe.org)

2024 International Mechanical Code

Revise as follows:

TABLE 1202.5 HYDRONIC PIPE FITTINGS

MATERIAL	STANDARD (see Chapter 15)
Copper and copper alloys	ASME B16.15; ASME B16.18; ASME B16.22; ASME B16.24; ASME B16.26; ASME B16.51; ASSE 1061; ASTM F1974 ; ASTM F3226
CPVC	ASSE 1061; ASTM D2846; ASTM F438; ASTM F439
Ductile iron and gray iron	ANSI/AWWA C110/A21.10; ASTM A395; ASTM A536; ASTM F1476; ASTM F1548; AWWA C153/A21.53
Ductile iron	ANSI/AWWA C153/A21.53
Gray iron	ASTM A126
Malleable iron	ASME B16.3
PE-RT fittings	ASSE 1061; ASTM D3261; ASTM F1807; ASTM F2098; ASTM F2159; ASTM F2735; ASTM F2769; ASTM F3347; ASTM F3348; CSA B137.1; CSA B137.18; <u>ASTM F1960; ASTM F2623</u>
PEX fittings	ASSE 1061; ASTM F877; ASTM F1807; ASTM F1960; ASTM F2080; ASTM F2159; ASTM F3253 ; ASTM F3347; ASTM F3348
Plastic	ASTM D2466; ASTM D2467; ASTM D2846; ASTM F877; ASTM F2389; ASTM F2735
Stainless steel	ASTM A269; ASTM A312; ASTM A778; ASTM F3226
Steel	ASME B16.5; ASME B16.9; ASME B16.11; ASME B16.28; ASTM A53; ASTM A106; ASTM A234; ASTM A395; ASTM A420; ASTM A536; ASTM F1476; ASTM F1548 ; ASTM F3226

Staff Analysis: The proposed referenced standards, ASTM F1960 and F2623, are currently referenced in the IMC.

Reason: This proposal is to add two industry standards for fittings for PE-RT tubing to Table 1202.5.

ASTM F1960 "Standard Specification for Cold Expansion Fittings with PEX Reinforcing Rings for Use with Cross-linked Polyethylene (PEX) and Polyethylene of Raised Temperature (PE-RT) Tubing" is for a fitting system which has recently been approved for use with PE-RT tubing (PE-RT and PEX have identical dimensions and share most of the same fitting systems).

ASTM F2623 "Standard Specification for Polyethylene of Raised Temperature (PE-RT) Systems for Non-Potable Water Applications" is a PE-RT system standard for non-potable applications, including hydronics, and includes requirements for fittings intended for use with PE-RT tubing.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

Including these fitting standards for PE-RT tubing in Table 1202.5 provides alternative fitting options for hydronic applications. The fittings covered by these standards are slightly less expensive than certain existing fitting standards, but also might be slightly more expensive than other existing fitting standards. It depends on which fittings are being compared.

This code change proposal may decrease the cost of construction by 0% to 10% if these fitting standards are selected by users, or it may increase the cost of construction by 0% to 10% if these fitting standards are selected, or it may have no impact on the cost of construction if these fitting standards are not selected by users.

To assign dollar values to this proposal, the use of the fittings covered by these proposed standards could decrease construction costs over a range from $1 to $5 per fitting, depending on the size of the piping, or it could increase construction costs over a range from $1 to $5 per fitting, depending on the size of the piping, etc., or it could have no effect on construction costs if users do not select to use one of these fitting standards. This proposal simply provides other fitting options.

Estimated Immediate Cost Impact Justification (methodology and variables):

Eleven (11) fitting standards for use with PE-RT tubing are already approved in Table 1202.5. This proposal simply provides additional options. The amount of the cost decrease or increase is highly dependent on exact comparisons for specific fitting materials and sizes, plus assembly and construction costs which vary for each individual project. Therefore, only a range of cost decreases or increases can be provided in this format.

Estimated Life Cycle Cost Impact:

Eleven (11) fitting standards for use with PE-RT tubing are already approved in Table 1202.5. This proposal simply provides additional options. The amount of the cost decrease or increase is highly dependent on exact comparisons for specific fitting materials and sizes, plus assembly and construction costs which vary for each individual project.

The impact to Life Cycle Cost is highly dependent on exact comparisons for specific fitting materials and sizes plus assembly and construction costs which vary for each individual project.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

Eleven (11) fitting standards for use with PE-RT tubing are already approved in Table 1202.5. This proposal simply provides additional options. The amount of the cost decrease or increase is highly dependent on exact comparisons for specific fitting materials and sizes, plus assembly and construction costs which vary for each individual project.

The impact to Life Cycle Cost is highly dependent on exact comparisons for specific fitting materials and sizes plus assembly and construction costs which vary for each individual project.

M81-24

M82-24

IMC®: TABLE 1202.5

Proponents: Michael Cudahy, PPFA Plastic Pipe and Fittings Association, PPFA Plastic Pipe and Fittings Association (mikec@cmservices.com)

2024 International Mechanical Code

Revise as follows:

TABLE 1202.5 HYDRONIC PIPE FITTINGS

MATERIAL	STANDARD (see Chapter 15)
Copper and copper alloys	ASME B16.15; ASME B16.18; ASME B16.22; ASME B16.24; ASME B16.26; ASME B16.51; ASSE 1061; ASTM F1974 ; ASTM F3226
CPVC	ASSE 1061; ASTM D2846; ASTM F438; ASTM F439
Ductile iron and gray iron	ANSI/AWWA C110/A21.10; ASTM A395; ASTM A536; ASTM F1476; ASTM F1548; AWWA C153/A21.53
Ductile iron	ANSI/AWWA C153/A21.53
Gray iron	ASTM A126
Malleable iron	ASME B16.3
PE-RT fittings	ASSE 1061; ASTM D3261; ASTM F1807; ASTM F2098; ASTM F2159; ASTM F2735; ASTM F2769; ASTM F3347; ASTM F3348; CSA B137.1; CSA B137.18
PEX fittings	ASSE 1061; ASTM F877; ASTM F1807; ASTM F1960; ASTM F2080; ASTM F2159; ASTM F2735; ASTM F3253 ; ASTM F3347; ASTM F3348
Polypropylene	ASTM F2389;
~~Plastic~~ PVC	ASTM D2466; ASTM D2467; ~~ASTM D2846; ASTM F877; ASTM F2389; ASTM F2735~~
Stainless steel	ASTM A269; ASTM A312; ASTM A778; ASTM F3226
Steel	ASME B16.5; ASME B16.9; ASME B16.11; ASME B16.28; ASTM A53; ASTM A106; ASTM A234; ASTM A395; ASTM A420; ASTM A536; ASTM F1476; ASTM F1548 ; ASTM F3226

Reason: This table looks like it had "plastic" as a legacy row, and there are already rows for other modern plastic materials, and some were missing, like PVC and PP. This proposal attempts to improve the table by reorganizing the rows with proper material names and proper standards.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposal is a reorganization of a table and is not expected to change the costs of construction.

M82-24

M83-24

IMC®: 1208.1

Proponents: Michael Cudahy, PPFA Plastic Pipe and Fittings Association, PPFA Plastic Pipe and Fittings Association (mikec@cmservices.com)

2024 International Mechanical Code

Revise as follows:

1208.1 General. Hydronic piping systems shall be tested hydrostatically at one and one-half times the maximum system design pressure, but not less than 100 psi (689 kPa). The duration of each test shall be not less than 15 minutes.

> **Exception:** For PEX <u>and PERT</u> piping systems, testing with a compressed gas shall be an alternative to hydrostatic testing where compressed air or other gas pressure testing is specifically authorized by all of the manufacturers' instructions for the PEX <u>and PERT</u> pipe and fitting products installed at the time the system is being tested, and compressed air or other gas testing is not otherwise prohibited by applicable codes, laws or regulations outside of this code.

Reason: Current PEX and PERT manufacturers may allow for the practice of air testing.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

This proposal offers an alternative for pressure testing PERT tubing materials using compressed gas, potentially reducing the cost of testing pipes in these systems by $1 to $10,000. In situations with available water and no freezing risk, the cost decrease may be minimal, around $1 or less, as compressed gas testing is unnecessary.

If water is unavailable during pipe installation, the cost reduction could range from $1 to $1,000 by eliminating the need to transport water for testing.

In cold weather, when compressed air isn't an option, providing temporary heat to prevent freezing may cost $100 to $10,000, depending on building size and completion status. For instance, if a partially enclosed building requires temporary insulation during cold-weather testing, or occupancy is delayed due to conditions, allowing the use of compressed gas could yield a +$10,000 cost reduction.

Estimated Immediate Cost Impact Justification (methodology and variables):

This proposal offers an alternative for pressure testing PERT tubing materials using compressed gas, potentially reducing the cost of testing pipes in these systems by $1 to $10,000. In situations with available water and no freezing risk, the cost decrease may be minimal, around $1 or less, as compressed gas testing is unnecessary.

If water is unavailable during pipe installation, the cost reduction could range from $1 to $1,000 by eliminating the need to transport water for testing.

In cold weather, when compressed air isn't an option, providing temporary heat to prevent freezing may cost $100 to $10,000, depending on building size and completion status. For instance, if a partially enclosed building requires temporary insulation during cold-weather testing, or occupancy is delayed due to conditions, allowing the use of compressed gas could yield a +$10,000 cost reduction.

Estimated Life Cycle Cost Impact:

No life cycle cost impacts are expected to occur using air or water testing during the life of the building or project.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

No life cycle cost impacts are expected to occur using air or water testing during the life of the building or project.

M83-24

M84-24

IMC®: TABLE 1210.4, TABLE 1210.5, 1210.6.4

Proponents: Greg Kurtz Technical Director, The International Ground Source Heat Pump Association (IGSHPA), The International Ground Source Heat Pump Association (IGSHPA) (gkurtz@igshpa.org)

2024 International Mechanical Code

Revise as follows:

TABLE 1210.4 GROUND-SOURCE LOOP PIPE

MATERIAL	STANDARD (see Chapter 15)
~~Chlorinated polyvinyl chloride (CPVC)~~	~~ASTM D2846; ASTM F441; ASTM F442~~
Cross-linked polyethylene (PEX)	ASTM F876; ASTM F3253; CSA B137.5; CSA C448; NSF 358-3
Polyethylene/aluminum/polyethylene (PE-AL-PE) pressure pipe	ASTM F1282; CSA B137.9
High-density polyethylene (HDPE)	ASTM D2737; ASTM D3035; ASTM F714; AWWA C901; CSA B137.1; CSA C448; NSF 358-1
Polypropylene (PP-R)	ASTM F2389; CSA B137.11; NSF 358-2
Polyvinyl chloride (PVC)	ASTM D1785; ASTM D2241
Raised temperature polyethylene (PE-RT)	ASTM F2623; ASTM F2769; CSA B137.18; CSA C448; NSF 358-4

TABLE 1210.5 GROUND-SOURCE LOOP PIPE FITTINGS

PIPE MATERIAL	STANDARD (see Chapter 15)
~~Chlorinated polyvinyl chloride (CPVC)~~	~~ASTM D2846; ASTM F437; ASTM F438; ASTM F439; CSA B137.6~~
Cross-linked polyethylene (PEX)	ASTM F877; ASTM F1807; ASTM F1960; ASTM F2080; ASTM F2159; ASTM F2434; ASTM F3347; ASTM F3348; CSA B137.5; CSA C448; NSF 358-3
Polyethylene/aluminum/polyethylene (PE-AL-PE)	ASTM F1282; ASTM F2434; CSA B137.9
High-density polyethylene (HDPE)	ASTM D2683; ASTM D3261; ASTM F1055; CSA B137.1; CSA C448; NSF 358-1
Polypropylene (PP-R)	ASTM F2389; CSA B137.11; NSF 358-2
Polyvinyl chloride (PVC)	ASTM D2464; ASTM D2466; ASTM D2467; CSA B137.2; CSA B137.3
Raised temperature polyethylene (PE-RT)	ASTM D3261; ASTM F1807; ASTM F2098; ASTM F2159; ASTM F2735; ASTM F2769; ASTM F3347; ASTM F3348; CSA B137.1; CSA B137.18; CSA C448; NSF 358-4

Delete without substitution:

~~**1210.6.4 CPVC plastic pipe.** Joints between CPVC plastic pipe or fittings shall be solvent-cemented or threaded joints complying with Section 1203.3.~~

Reason: CPVC is a rigid piping material supplied only in short lengths of 10-20 feet and joined via solvent cement or various types of mechanical fittings (e.g., flanges). This pipe is not suitable for ground loop piping because of its lack of flexibility and requirement for many joints over a typical pipe length of 400 or more feet in a ground loop piping system. In addition, the time required for solvent cement joints to cure is not suitable for installation of pipes in a vertical borehole, which often requires more than 400 feet of two vertical pipes to be installed as quickly as possible to prevent the drilled hole from collapsing. Also, CPVC is not suitable for use with propylene glycol in the higher concentrations which are sometimes required in geothermal ground loop systems. The International Ground Source Heat Pump Association (IGSHPA), founded in 1987, has never recommended CPVC for ground source loop piping. Failures have occurred in the field when installers attempted to use CPVC piping for these applications many years ago. The *ANSI / CSA / IGSHPA C448 Series 16 Bi-National Standard for the design and installation of ground source heat pump systems for commercial and residential buildings* does not list CPVC rigid piping as an acceptable material for Geothermal ground loop installations. Additionally, the piping Task Force for the New Edition (2024) of the *ANSI / CSA / IGSHPA C448 Bi- National Standard* have reviewed all suitable piping materials for Geothermal ground loop installations and continue to NOT list CPVC material as suitable piping material for Geothermal installations.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

CPVC is one of seven (7) piping materials listed in Table 1210.4 for ground loop piping and the user has several choices of better materials for this application, which are approved by IGSHPA or listed in the ANSI / CSA / IGSHPA Bi – National C448 Standard, and commonly used for this purpose. Because CPVC is known in the industry to be not suitable for these applications and is not recommended for this purpose by IGSHPA or the ANSI / CSA / IGSHPA Bi – National C448 Standard, it is rarely, if ever, used for this purpose. Therefore, the removal of CPVC piping from Table 1210.4 will neither decrease nor increase the cost of construction.

M85-24

IMC®: TABLE 1210.4, TABLE 1210.5, 1210.6.9

Proponents: Greg Kurtz Technical Director, The International Ground Source Heat Pump Association (IGSHPA), The International Ground Source Heat Pump Association (IGSHPA) (gkurtz@igshpa.org)

2024 International Mechanical Code

Revise as follows:

TABLE 1210.4 GROUND-SOURCE LOOP PIPE

MATERIAL	STANDARD (see Chapter 15)
Chlorinated polyvinyl chloride (CPVC)	ASTM D2846; ASTM F441; ASTM F442
Cross-linked polyethylene (PEX)	ASTM F876; ASTM F3253; CSA B137.5; CSA C448; NSF 358-3
Polyethylene/aluminum/polyethylene (PE-AL-PE) pressure pipe	ASTM F1282; CSA B137.9
High-density polyethylene (HDPE)	ASTM D2737; ASTM D3035; ASTM F714; AWWA C901; CSA B137.1; CSA C448; NSF 358-1
Polypropylene (PP-R)	ASTM F2389; CSA B137.11; NSF 358-2
~~Polyvinyl chloride (PVC)~~	~~ASTM D1785; ASTM D2241~~
Raised temperature polyethylene (PE-RT)	ASTM F2623; ASTM F2769; CSA B137.18; CSA C448; NSF 358-4

TABLE 1210.5 GROUND-SOURCE LOOP PIPE FITTINGS

PIPE MATERIAL	STANDARD (see Chapter 15)
Chlorinated polyvinyl chloride (CPVC)	ASTM D2846; ASTM F437; ASTM F438; ASTM F439; CSA B137.6
Cross-linked polyethylene (PEX)	ASTM F877; ASTM F1807; ASTM F1960; ASTM F2080; ASTM F2159; ASTM F2434; ASTM F3347; ASTM F3348; CSA B137.5; CSA C448; NSF 358-3
Polyethylene/aluminum/polyethylene (PE-AL-PE)	ASTM F1282; ASTM F2434; CSA B137.9
High-density polyethylene (HDPE)	ASTM D2683; ASTM D3261; ASTM F1055; CSA B137.1; CSA C448; NSF 358-1
Polypropylene (PP-R)	ASTM F2389; CSA B137.11; NSF 358-2
~~Polyvinyl chloride (PVC)~~	~~ASTM D2464; ASTM D2466; ASTM D2467; CSA B137.2; CSA B137.3~~
Raised temperature polyethylene (PE-RT)	ASTM D3261; ASTM F1807; ASTM F2098; ASTM F2159; ASTM F2735; ASTM F2769; ASTM F3347; ASTM F3348; CSA B137.1; CSA B137.18; CSA C448; NSF 358-4

Delete without substitution:

~~**1210.6.9 PVC plastic pipe.** Joints between PVC plastic pipe and fittings shall be solvent-cemented or threaded joints complying with Section 1203.3.~~

Reason: PVC is a rigid piping material supplied only in short lengths of 10-20 feet and joined via solvent cement or various types of mechanical fittings (e.g., flanges). This pipe is not suitable for ground loop piping because of its lack of flexibility and requirement for many joints over a typical pipe length of 400 or more feet in a ground loop piping system. In addition, the time required for solvent cement joints to cure is not suitable for installation of pipes in a vertical borehole, which often requires more than 400 feet of two vertical pipes to be installed as quickly as possible to prevent the drilled hole from collapsing. The International Ground Source Heat Pump Association (IGSHPA), founded in 1987, has never recommended PVC for ground source loop piping. Failures have occurred in the field when installers attempted to use PVC piping for these applications many years ago. The *ANSI / CSA / IGSHPA C448 Series 16 Bi-National Standard for the design and installation of ground source heat pump systems for commercial and residential buildings* does not list PVC rigid piping as an acceptable material for Geothermal ground loop installations. Additionally, the piping Task Force for the New Edition (2024) of the *ANSI / CSA / IGSHPA C448 Bi- National Standard* have reviewed all suitable piping materials for Geothermal ground loop installations and continue to NOT list PVC material as suitable piping material for Geothermal installations.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

PVC is one of seven (7) piping materials listed in Table 1210.4 for ground loop piping and the user has several choices of better materials for this application, which are approved by IGSHPA or listed in the ANSI / CSA / IGSHPA Bi – National C448 Standard, and commonly used for this purpose. Because PVC is known in the industry to be not suitable for these applications and is not recommended for this purpose by IGSHPA, or the ANSI / CSA / IGSHPA Bi – National C448 Standard it is rarely, if ever, used for this purpose. Therefore, the removal of PVC piping from Table 1210.4 will neither decrease nor increase the cost of construction.

M86-24

IMC®: TABLE 1210.5

Proponents: Lance MacNevin, Director of Engineering, The Plastics Pipe Institute, The Plastics Pipe Institute (lmacnevin@plasticpipe.org)

2024 International Mechanical Code

Revise as follows:

TABLE 1210.5 GROUND-SOURCE LOOP PIPE FITTINGS

PIPE MATERIAL	STANDARD (see Chapter 15)
Chlorinated polyvinyl chloride (CPVC)	ASTM D2846; ASTM F437; ASTM F438; ASTM F439; CSA B137.6
Cross-linked polyethylene (PEX)	ASTM F877; ASTM F1807; ASTM F1960; ASTM F2080; ASTM F2159; ASTM F2434; ASTM F3347; ASTM F3348; CSA B137.5; CSA C448; NSF 358-3
Polyethylene/aluminum/polyethylene (PE-AL-PE)	ASTM F1282; ASTM F2434; CSA B137.9
High-density polyethylene (HDPE)	ASTM D2683; ASTM D3261; ASTM F1055; CSA B137.1; CSA C448; NSF 358-1
Polypropylene (PP-R)	ASTM F2389; CSA B137.11; NSF 358-2
Polyvinyl chloride (PVC)	ASTM D2464; ASTM D2466; ASTM D2467; CSA B137.2; CSA B137.3
Raised temperature polyethylene (PE-RT)	ASTM D3261; ASTM F1807; <u>ASTM F1960;</u> ASTM F2098; ASTM F2159; <u>ASTM F2623;</u> ASTM F2735; ASTM F2769; ASTM F3347; ASTM F3348; CSA B137.1; CSA B137.18; CSA C448; NSF 358-4

Staff Analysis: The proposed referenced standards, ASTM F1960 and F2623, are currently referenced in the IMC.

Reason: This proposal is to add two industry standards for fittings for PE-RT tubing to Table 1210.5. ASTM F1960 “Standard Specification for Cold Expansion Fittings with PEX Reinforcing Rings for Use with Cross-linked Polyethylene (PEX) and Polyethylene of Raised Temperature (PE-RT) Tubing” is for a fitting system which has recently been approved for use with PERT tubing (PE-RT and PEX have identical dimensions and share most of the same fitting systems). ASTM F2623 “Standard Specification for Polyethylene of Raised Temperature (PE-RT) Systems for Non-Potable Water Applications” is a PE-RT system standard for non-potable applications, including hydronics, and includes requirements for fittings intended for use with PERT tubing.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

Including these fitting standards for PE-RT tubing in Table 1210.5 provides alternative fitting options for hydronic applications. The fittings covered by these standards are slightly less expensive than certain existing fitting standards, but also might be slightly more expensive than other existing fitting standards. It depends on which fittings are being compared. This code change proposal may decrease the cost of construction by 0% to 10% if these fitting standards are selected by users, or it may increase the cost of construction by 0% to 10% if these fitting standards are selected, or it may have no impact on the cost of construction if these fitting standards are not selected by users. To assign dollar values to this proposal, the use of the fittings covered by these proposed standards could decrease construction costs over a range from $1 to $5 per fitting, depending on the size of the piping, or it could increase construction costs over a range from $1 to $5 per fitting, depending on the size of the piping, etc., or it could have no effect on construction costs if users do not select to use one of these fitting standards. This proposal simply provides other fitting options.

Estimated Immediate Cost Impact Justification (methodology and variables):

Twelve (12) fitting standards for use with PE-RT tubing are already approved in Table 1210.5. This proposal simply provides additional options. The amount of the cost decrease or increase is highly dependent on exact comparisons for specific fitting materials and sizes, plus assembly and construction costs which vary for each individual project. Therefore, only a range of cost decreases or increases can be provided in this format.

Estimated Life Cycle Cost Impact:

Twelve (12) fitting standards for use with PE-RT tubing are already approved in Table 1210.5. This proposal simply provides additional options. The amount of the cost decrease or increase is highly dependent on exact comparisons for specific fitting materials and sizes, plus assembly and construction costs which vary for each individual project. The impact to Life Cycle Cost is highly dependent on exact comparisons for specific fitting materials and sizes plus assembly and construction costs which vary for each individual project.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

Twelve (12) fitting standards for use with PE-RT tubing are already approved in Table 1210.5. This proposal simply provides additional options. The amount of the cost decrease or increase is highly dependent on exact comparisons for specific fitting materials and sizes, plus assembly and construction costs which vary for each individual project. The impact to Life Cycle Cost is highly dependent on exact comparisons for specific fitting materials and sizes plus assembly and construction costs which vary for each individual project.

M86-24

M87-24

IMC®: TABLE 1302.3

Proponents: Christopher Adam Smith, Viega, LLC, Codes and Standards Manager for Viega, LLC

2024 International Mechanical Code

Revise as follows:

TABLE 1302.3 FUEL OIL PIPING AND FITTINGS

MATERIAL	STANDARD (see Chapter 15)
Copper or copper-alloy pipe and fittings	ASTM B42; ASTM B43; ASTM B302; ASTM F3226
Copper or copper-alloy tubing and fittings (Type K, L or M)	~~ASME B16.51;~~ ASTM B75; ASTM B88; ~~ASTM B280;~~ ASTM F3226
Labeled pipe	(See Section 1302.4)
Nonmetallic pipe	ASTM D2996
Steel and stainless steel pipe and fittings	ASTM A53; ASTM A106; A312/A312M; ASTM F3226; UL 180
Steel and stainless steel tubing and fittings	ASTM A254; A269/A269M; ASTM A539; ASTM F3226; UL 180

Staff Analysis: The proposed referenced standard, UL 180, is currently referenced in the IMC.

Reason: This proposal adds UL 180 "Combustible Liquid Tank Accessories" is a standard for pipe, fittings, and accessories for use with fuel oil. This Standard has been revised since the IMC was last updated, and now includes press-connect fittings. Adding UL 180 to this table will allow press-connect fittings to be used for fuel oil applications, and inspectors will be able to verify that those fittings have been listed and labeled for the application.

This proposal will also remove the standards ASME B16.51 "Copper and Copper-Alloy Press-Connect Pressure Fittings" and ASTM B280 "Seamless Copper Tube for Air Conditioning and Refrigeration Field Service." ASME B16.51 has a scope which covers only "...pressure fittings for use with hard-drawn seamless copper water tube conforming to ASTM B88 for piping systems conveying water." ASTM B280 is a refrigerant tubing standard. It is our understanding that these standards were used in lieu of applicable standards available at the time. The Code will be more accurate and less confusing with these two inappropriate references removed from the Table. Removal of these standards from this table will decrease the likelihood of inappropriate products being used in a fuel oil application.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The addition of this standard does not increase the cost of construction. The addition of this standard allows for a wider selection of materials but does not make their use mandatory. By including this standard in the code, the options for installers will increase while the cost of construction should stay the same or even decrease.

M87-24

M88-24

IMC®: 1302.9

Proponents: Christopher Adam Smith, Viega, LLC, Codes and Standards Manager for Viega, LLC

2024 International Mechanical Code

Revise as follows:

1302.9 Piping systems.
Above-ground piping systems shall be *listed* and *labeled* in accordance with UL 1369 or UL 180. Underground piping systems shall be *listed* and *labeled* in accordance with UL 971A.

Staff Analysis: The proposed referenced standard, UL 180, is currently referenced in the IMC.

Reason: This proposal adds UL 180 "Combustible Liquid Tank Accessories" is a standard for pipe, fittings, and accessories for use with fuel oil. This Standard has been revised since the IMC was last updated, and now includes press-connect fittings. Adding UL 180 to this table will allow press-connect fittings to be used for fuel oil applications, and inspectors will be able to verify that those fittings have been listed and labeled for the application.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The addition of this standard does not increase the cost of construction. The addition of this standard allows for a wider selection of materials but does not make their use mandatory. By including this standard in the code, the options for installers will increase while the cost of construction should stay the same or even decrease.

M88-24

M89-24

IMC®: SECTION 202 (New), 309.2 (New)

Proponents: Clayton Trevillyan, City of Tucson, City of Tucson (clayton.trevillyan@tucsonaz.gov); Pete Quintela, Miami-Dade County, Miami-Dade County; Jane Gilbert, Miami-Dade County, Miami-Dade County (jane.gilbert@miamidade.gov); Stefano Schiavon, University of California, Berkeley, Self (schiavon@berkeley.edu); Ali Frazzini, Los Angeles County Chief Sustainability Office (afrazzini@cso.lacounty.gov); Mary Wright, City of Phoenix/Office of Heat Response and Mitigation, self

2024 International Mechanical Code

Add new definition as follows:

DESIGN COOLING DAY. A design parameter where air conditioning loads are determined.

Add new text as follows:

309.2 Cooling systems. Interior spaces intended for human occupancy shall be capable of maintaining an indoor temperature at or below 80°F (27°C) in the occupied zone 3 feet (914 mm) above the floor and at least 2 feet (610 mm) from exterior walls on the *design cooling day.* Where permanently installed fans capable of generating 120 fpm (0.6 m/s) air speed within the occupied zone, the indoor temperature during the *design cooling day* shall be maintained at or below 85°F (29°C). The installation of one or more portable systems shall not be used to achieve compliance with this section.

Exception: Cooling systems shall not be required for the following:

1. Interior spaces where the primary purpose is not associated with human comfort.
2. Group F, H, S and U occupancies.

Reason: The building code requires minimum heating of spaces for the safety of the occupants. The code is silent on requirements for cooling, despite the negative impacts of elevated exterior thermal conditions on humans. The built environment is a safe haven from the effects of weather and climatic conditions, heat not being an exception for people to seek shelter from the elements. Media attention to heat-related health emergencies on the elderly and people in underserved communities demonstrates the need for improvements in the built environment[1]. As a result of increased summer temperatures, some jurisdictions have already mandated cooling be provided in new buildings and many others are considering extreme heat related ordinances. A coordinated application in the codes that can be consistently applied to new construction is warranted due to the trend in local agencies with differing requirements throughout the county.

The proposal is a performance specification to ensure safety in the built environment due to higher expected summer thermal conditions. The solution can either be active or passive systems, or a combination of these systems to provide relief from elevated thermal conditions. The active systems would include traditional central mechanical air conditioning systems that are provided in most modern homes and do not represent a significant change to how most buildings are constructed. Passive cooling systems utilize unique design features of the building that prevent heat from entering the building and/or removing heat from the building. Passive design applications include building orientation, insulation, solar control (shading and landscaping), ventilation and other methods that naturally, and without input energy, would provide and maintain thermal comfort. Passive systems could be more cost effective in both the short term and the long term as compared to active mechanical systems for circumstances where a few design changes could comply with specified interior temperature. The interior temperature of 80°F was selected as the maximum temperature for the thermal comfort of the interior environment based on ANSI/ASHRAE Standard 55-2020[2] and generally at, or above the temperature in most local ordinances.

The second sentence recognizes that air movement provides a cooling effect as experienced by the occupants of the building. ASHRAE Standard 55-2020 states that air movement of only 120 feet per minute results in the perception of 5°F cooler temperatures. Where permanent fans are installed, the resulting interior maximum temperature can be increased 5°F above the baseline temperature of 80°F that would be required for either the active or passive systems installed in accordance with the first sentence of the code change proposal. This is an additional cost-effective manner to provide the minimum cooling effect on human bodies where thermal comfort and safety is provided in the built environment. Permanently installed fans can include ceiling fans, wall-mounted fans, bladeless ceiling fans, or any permanently installed fan that can be verified at the time of final inspection that the equipment is installed.

The third sentence is a carryover from the heating requirement, where the expectation for compliance is permanently installed equipment that can be utilized by the occupant as needed for thermal comfort and lifesaving opportunities from dangerous heat related health considerations.

Bibliography: (1) Kenny, Glen P., Jane Yardley, Candice Brown, Ronald J. Sigal, and Ollie Jay. “Heat Stress in Older Individuals and Patients with Common Chronic Diseases.” CMAJ 182, no. 10 (July 13, 2010): 1053–60. https://doi.org/10.1503/cmaj.081050.

(2) ANSI/ASHRAE 55-2020: Thermal Environmental Conditions for Human Occupancy. Atlanta, GA, US: ASHRAE, 2020.

(3) RSMeans https://www.businesshue.com/commercial-hvac-cost-per-square-foot/.

(4) Energy Trust https://www.energytrust.org/wp-content/uploads/2018/06/AC-Research_PhaseII_9MAR2018_Final.pdf.

(5) IEA https://www.iea.org/reports/sustainable-affordable-cooling-can-save-tens-of-thousands-of-lives-each-year.

Cost Impact: Increase

Estimated Immediate Cost Impact:

$0 - $31+ per square foot of new or renovated habitable buildings.
The immediate cost impact to construction is for newly constructed or renovated buildings. There is no immediate cost to existing buildings. This value ranges greatly depending on variables that include but are not limited to:

- If the proposed construction would include cooling regardless of this code change. Zero cost impact will apply to many regions and project scopes for new permits.
- If the project includes a system that can be further supplemented at relatively low cost due to other air handling equipment that would have otherwise been included in the project scope.
- The method of proposed cooling and quality of equipment.
- Level of efficiency and sustainability of system design.
- The climate zone of project area.

Estimated Immediate Cost Impact Justification (methodology and variables):

1. Estimation from major HVAC contractor (Watsco)

“There are a lot of variables (i.e. size of the building, type of system, region, needs, installation costs). Below are some rough estimates"

- For commercial buildings the average cost can range from $15 to $30 per sq ft for a basic system but can go up to $40+ for more complex or high efficiency systems.
- For multi-family buildings the average cost can range from $2,500-$5,000 per unit for a basic system increasing in price for high efficiency units. ($40 pf @ 2 units for 4000 sf)

Comparison necessary to isolate cost of heating systems alone (e.g. furnace/boiler systems) to identify cost differential.

2. RSMeans Data (remeansonline.com)

$8-30 per sf
https://www.businesshue.com/commercial-hvac-cost-per-square-foot/

3. AC cost report (page 28)

https://www.energytrust.org/wp-content/uploads/2018/06/AC-Research_PhaseII_9MAR2018_Final.pdf

4. Report from IEA, claiming that fans are the best affordable and available active cooling technology.

https://www.iea.org/reports/sustainable-affordable-cooling-can-save-tens-of-thousands-of-lives-each-year

M89-24

2024 GROUP A – PROPOSED CHANGES TO THE INTERNATIONAL PLUMBING CODE

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TENTATIVE ORDER OF DISCUSSION
2021 PROPOSED CHANGES TO THE
INTERNATIONAL PLUMBING CODE

The following is the tentative order in which the proposed changes to the code will be discussed at the public hearings. Proposed changes which impact the same subject have been grouped to permit consideration in consecutive changes.

Proposed change numbers that are indented are those which are being heard out of numerical order. Indentation does not necessarily indicate that one change is related to another. Proposed changes may be grouped for purposes of discussion at the hearing at the discretion of the chair. Note that some P code change proposals may not be included on this list, as they are being heard by another committee.

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P1-24

IPC: SECTION 202

Proponents: Guy McMann, Jefferson County Colorado, CAPMO (gmcmann@jeffco.us)

2024 International Plumbing Code

Revise as follows:

BATHROOM GROUP. A group of fixtures consisting of a water closet, urinal, lavatory, bathtub or shower, including or excluding a bidet, an *emergency floor drain* or both. Such fixtures are located together on the same floor level.

Reason: There doesn't seem to be a technical reason to not include a urinal in a wet vented bathroom group. Currently, the fixture can't be included and is dealt with separately.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

Decrease in cost will be realized by not having to plumb the fixture separately .The estimated cost savings for a typical urinal installation is $100 to $250

Estimated Immediate Cost Impact Justification (methodology and variables):

.Material (pipe and fittings) $15 to $100 and the labor is $60 to $120 depending on the salary of the installer.

P1-24

P2-24

IPC: SECTION 202

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Plumbing Code

Revise as follows:

WATER DISPENSER. A plumbing fixture that is manually controlled by the user for the purpose of dispensing potable drinking water into a receptacle such as a cup, glass or bottle. Such fixture is connected to the potable water distribution system of the premises. Such fixtures include bottle filling stations.

Reason: With the onset of the worldwide pandemic of 2021, most people stopped using drinking fountains out of fear of catching the disease or, in many cases, the local jurisdictions mandated disabling the fountains to prevent their use. The use of refillable and single use water bottles became widely prevalent during the pandemic years. These water use habits have continued as now a large part of the populous no longer trust drinking fountains as a “safe” location to obtain a drink of water. To service this different way that people now obtain drinking water, the code should encourage the installation of bottle filling stations. In fact, the code already allows substitution of water dispensers in Section 410.3. The problem is that many code users did not realize that bottle filling stations are water dispensers in order to make the substitution for some drinking fountains. Therefore, the definition is being amended to add clarity to the topic in hopes that more designers will realize that substitution is allowed.

This proposal is submitted by the ICC Plumbing Mechanical Gas Code Action Committee (PMGCAC)

PMGCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 PMGCAC has held 26 virtual meetings open to any interested party. In addition, there were several virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the PMGCAC website at PMGCAC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

There is no change in technical requirement as it is a designer’s choice to substitute water dispensers for drinking fountains.

P2-24

P3-24

IPC: 303.6 (New), 303.6.1 (New)

Proponents: Marcelo Hirschler, GBH International, GBH International (mmh@gbhint.com)

2024 International Plumbing Code

Add new text as follows:

303.6 Noncombustible materials. Noncombustible materials shall be those materials that comply with Section 703.3.1 of the International Building Code.

303.6.1 Inherently noncombustible materials..
Inherently noncombustible materials, such as concrete and steel, shall not be required to be tested to be acceptable as noncombustible materials.

Reason: The term noncombustible material is used multiple times in the IPC and, thus, an explanation/requirement is needed. The proposed requirement is identical to what is being proposed for the IFC (by FCAC), the IMC, and the IFGC and is consistent with the IBC requirements.

ICC definitions should not contain requirements. Therefore, this proposal adds a requirement into chapter 3 (general requirements) for how to classify a material as a noncombustible material, consistent with how the IBC does such a classification.

The 2021 edition of the IPC had a definition or "noncombustible materials" that was actually a requirement and was based on an old (now obsolete) set of criteria in ASTM E136. That definition has now been deleted but clarification on the concept is still needed.

The proposed text provides necessary clarification indicating that such materials are not required to be tested. "In the area of material regulation, materials that pass ASTM E136 have long been considered to be those that are noncombustible materials. Note that ASTM E136 is one of the very few ASTM fire test standards that has acceptance criteria. The acceptance criteria are different from the theoretical definition of a noncombustible material.

The IBC includes in Chapter 7 (section 703.3.1) added details on how to classify materials as noncombustible materials, but, appropriately, not a definition.

If no requirement exists experience indicates that some material manufacturers have claimed that their material is noncombustible when it simply exhibits improved fire performance. When searching the internet, multiple web sites offer materials or products that are alleged to be noncombustible when that claim is incorrect. There is often confusion in the public mind regarding materials that perform better than typical combustible materials, but that are not good enough for the material to be considered noncombustible in typical use. Including a correct requirement for what is a noncombustible material does not mean that clearly noncombustible materials, such as steel, concrete, or masonry need to be tested.

The language in section 703.3.1 of the IBC reads as follows:

703.3.1 Noncombustible materials. Materials required to be noncombustible shall be tested in accordance with ASTM E136. Alternately, materials required to be noncombustible shall be tested in accordance with ASTM E2652 using the acceptance criteria prescribed by ASTM E136.

Exception: Materials having a structural base of noncombustible material as determined in accordance with ASTM E136, or with ASTM E2652 using the acceptance criteria prescribed by ASTM E136, with a surfacing of not more than 0.125 inch (3.18 mm) in thickness having a flame spread index not greater than 50 when tested in accordance with ASTM E84 or UL 723 shall be acceptable as noncombustible.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The code proposal simply connects with the IBC.

P4-24 Part I

IPC: 305.4

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

Revise as follows:

305.4 Freezing. Water, soil and waste pipes shall not be installed outside of ~~a~~ the building~~, in attics or crawl spaces, concealed in outside walls, or in any other place subjected to freezing temperatures unless adequate provision is made to protect such pipes from freezing by insulation or heat or both~~ thermal envelope. Exterior water supply system piping shall be installed not less than 6 inches (152 mm) below the frost line and not less than 12 inches (305 mm) below grade.

P4-24 Part I

P4-24 Part II

IRC: P2603.5

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov)

2024 International Residential Code

Revise as follows:

P2603.5 Freezing.
In localities having a winter design temperature of 32°F (0°C) or lower as shown in Table R301.2 of this code, a water, soil or waste pipe shall not be installed outside of ~~a~~ the *building*~~, in exterior walls, in~~ ~~*attics*~~ ~~or~~ ~~*crawl spaces*~~~~, or in any other place subjected to freezing temperature unless adequate provision is made to protect it from freezing by insulation or heat or both~~ thermal envelope. Water service pipe shall be installed not less than 12 inches (305 mm) deep and not less than 6 inches (152 mm) below the frost line.

Reason: The current code text is misleading to many including owners, contractors, and even design professional. Providing "heat, insulation, or both" give them the impression that there is a choice when the reality is the piping must remain in a space that has adequate heat to prevent freezing. Insulation can serve 1 of 2 purposes, it is used to prevent the loss of heat from a space or it is used to prevent the infiltration of heat into a space. The current text technically informs users that they could just provide insulation. More importantly, without direction that the piping must remain inside the thermal envelope, we have seen installations where heat and insulation were provided yet water lines still froze. In this situation, there was a bathroom that cantilevered over a portion of a an attached garage. The portion below the bathroom was provided with adequate space for insulation and was provided with a "heat run" into that space. It was discovered later after 2 consecutive years of freezing that the entire space had been filled with insulation, leaving no way for the heat to reach the pipe to keep them from freezing. Insulation along the perimeter and the bottom portion of the space would have kept the pipes within the building thermal envelope where they would not have frozen.

Bibliography: See reason statement.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal just simplifies the language in the code and will not negatively or positively affect cost of construction.

P4-24 Part II

P5-24

IPC: 305.8, 305.8.1, 305.8.2

Proponents: Brandon Adams, Image Engineering Group, self (brandon.adams@iegmep.com)

2024 International Plumbing Code

305.8 Expansive soil.
Where expansive soil is identified under buildings in accordance with Section 1803.5.3 of the *International Building Code*, but not removed in accordance with Section 1808.6.3 of the *International Building Code*, plumbing shall be protected in accordance with Section 305.8.1 or 305.8.2.

305.8.1 Nonisolated foundations.
Under foundations with slabs that are structurally supported by a subgrade, buried plumbing shall be permitted.

Revise as follows:

305.8.2 Isolated foundations.
Under foundations with a slab or framing that structurally spans over an under-floor space that isolates the slab or framing from the effects of expansive soil swelling and shrinking in accordance with Section 1808.6.1 of the *International Building Code*, the plumbing shall be suspended so that plumbing, hangers and supports are isolated, by a voidspace, from the effects of expansive soil swelling and shrinking.

Exception: Plumbing shall be permitted to be buried where it provides drainage of an under-floor space.

To protect the voidspace, soil shall be sloped, benched or retained in accordance with an *approved* design methodology. Plumbing, hangers and supports below the slab or framing shall not be permitted to be in contact with the soil or any assemblage of materials that is in contact with soil in the active zone. A slab and plumbing shall not be permitted to be lifted as an assembly to create the voidspace unless the under-floor space is a crawl space with access to allow inspection of plumbing after lifting.

Exception: Plumbing shall be permitted to be buried where it provides provides drainage of an under-floor space.

Organic materials subject to decay shall not be used for hangers, supports and soil retention systems. Materials subject to corrosion shall not be used for hangers, supports and soil retention systems unless protected in an *approved* manner. Where plumbing transitions to a buried condition beyond the perimeter of the foundation, an adequately flexible expansion joint shall be provided in the plumbing system to accommodate the effects of expansive soil swelling and shrinking. Where plumbing transitions to a buried condition, the difference in flow line elevations at each end of horizontal flexible expansion joints for horizontal drainage piping shall not be less than the sum of the minimum specified vertical dimension of the voidspace under plumbing and the product of the minimum slope required by Section 704.1 multiplied by the length of the flexible expansion joint.

Attached Files

- **ASPE Tech Symposium_Failures reduced.pdf**
  https://www.cdpaccess.com/proposal/10447/30163/files/download/4705/
- **BPI Presentation on Protection of Plumbing reduced.pdf**
  https://www.cdpaccess.com/proposal/10447/30163/files/download/4704/
- **Protection of Plumbing reduced.pdf**
  https://www.cdpaccess.com/proposal/10447/30163/files/download/4703/

Reason: This is a necessary clarification of the code to assist in code enforcement protecting the life, safety and welfare of occupants. This adds no cost whatsoever. The code already requires flexible expansion joints be designed to accommodate the swell and shrink potential of expansive soil. However, some engineers have incorrectly interpreted the 2024 IPC language to simply require a flexible expansion joint in Section 305.8.2 and they will specify that the slope of the flexible expansion joint simply meet the minimum slopes in Section 704.1, as if the fact that the flexible expansion joint can telescope and rotate at each end will "accommodate" the movement.

Doing so would certainly not accommodate the movement because it leads to a primary problem that the code language added to the 2024 IPC was resolving. For horizontal drainage plumbing draining away from a building, when expansive soil swelling causes buried plumbing outside of a building to rise, it is absolutely essential for the fixed elevation of the isolated plumbing on one end of a flexible expansion joint to be high enough above the lower end so that the slope of the flexible expansion joint will still meet the minimum slope requirements of Section 704.1 after the upward vertical expansive soil movement occurs where the plumbing is buried. For the less common case of horizontal drainage plumbing draining toward a building (e.g. a sanitary sewer line from another building that runs under a proposed building), when expansive soil shrinkage causes buried plumbing outside of a building to drop, it is absolutely essential for the fixed elevation of the isolated plumbing on one end of a flexible expansion joint to be low enough below the upper end so that the slope of the flexible expansion joint will still meet the minimum slope requirements of Section 704.1 after the downward vertical expansive soil movement occurs where the plumbing is buried. The clarification language proposed herein is written to be applicable for both of these cases. I have personally seen multiple crawlspace foundations where the buried end of DWV plumbing rises because of expansive soil and the vast majority of the suspended plumbing (that is attached to the bottom of the slab) is now too "low" for any of it to function properly because the downstream plumbing has risen up in elevation, making the suspended upstream system sometimes 6 or 12 inches too "low". If there is not sufficient slope in the flexible expansion joint at the time of initial construction, no amount of "maintenance" by replacing broken pipes can solve the problem. A major capital improvements project is required. This proposed code change is not going to change the cost of construction at all. This is a common sense application of the current code when you understand the basic problems that expansive soil presents to DWV plumbing. The multi-million dollar problems (e.g. $23M damage claim on a 100,000 square foot building footprint in one published Geoprofessional Business Association, GBA, case study) that expansive soil inflicts on plumbing and design approaches that can appropriately address these challenges are well documented today. The architecture and engineering community overall is very appreciative of the new language in the 2024 IPC that avoids any confusion over what minimum expectations are for plumbing under buildings where expansive soil is identified in a soil report. Various Plumbing Engineers, Geotechnical Engineers and Structural Engineers have been presenting nationally on this topic in the last few years since the new language in the 2024 IPC was adopted, one including another engineer from my MEP design firm. Attached are three (3) of these presentations that discuss the reasons why this is a necessary code clarification to the 2024 IPC language. Because understanding this issue involved different engineering design disciplines, each presentation was presented by a unique team consisting of a Plumbing (Mechanical) Engineer, a Geotechnical Engineer and a Structural Engineer. The three (3) presentations attached are therefore a representation from nine (9) different engineering design firms. The three (3) presentations look similar because content was shared among peers with the permission of the original presenters. However, each presentation was tailored to a different audience at a different time and so there are some substantive differences but all of the content in the presentations is supportive of this code change proposal.

Bibliography: Hendrix, B.; Roland, M.; Mushmann, J; September 2023; "Failures of Non-Isolated Plumbing in Expansive Soil", American Society of Plumbing Engineers 2023 Tech Symposium; Bellevue, Washington.

Podojil, R.; Grammer, A.; Janish, T.; November 15, 2022, "Isolation of Plumbing Under Isolated Slabs", Structural Engineers Association of Texas Dallas Chapter Meeting; Dallas, Texas.

Focht, J.; Penn, D.; Lee, M.; July 13, 2022, "Protection of Plumbing from Expansive Soils Under Foundations", North Texas Building Professional Institute; Irving, Texas.

Penn, D.; July 4, 2022; "Protection of Plumbing from Expansive Soil", Plumbing Engineer Magazine.

Geoprofessional Business Association, 2021, "Case Study 108", Geo-Omaha.

American Society of Plumbing Engineers; ASPE Plumbing Design Handbook; Vol. 4, Chapter 6, "Hanger and Support Conditions", "Natural Environmental Conditions".

American Standard National Plumbing Code, ASA A40.8, 1955, Basic Principles.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposed code change only defines what the minimum slope needs to be for flexible expansion joints that are already required by the 2024 IPC, providing clarity that assists in enforcement, because the minimum slopes in Section 704.1 are not sufficient for this application.

P6-24

IPC: 306.2, 306.3, 306.5 (New)

Proponents: Brian Conner, Charlotte Pipe and Foundry (bconner@charlottepipe.com)

2024 International Plumbing Code

Revise as follows:

306.2 Trenching and bedding.
Where trenches are excavated such that the bottom of the trench forms the bed for the pipe, solid and continuous load-bearing support shall be provided between joints. Bell holes, hub holes and coupling holes shall be provided at points where the pipe is joined. Such pipe shall not be supported on blocks to grade. <u>Plastic drainage and sewer piping shall have a trench width not less than the outside diameter of the pipe plus 16 inches (406 mm) or a trench width of not less than 1.25 times the outside diameter plus 12 inches (305 mm). Bedding for plastic drainage and sewer piping shall be not less than 4 inches (102 mm) in depth.</u> In instances where the material manufacturer's installation instructions are more restrictive than those prescribed by the code, the material shall be installed in accordance with the more restrictive requirement.

306.3 Backfilling.
Backfill shall be free from discarded construction material and debris. Loose earth free from rocks, broken concrete and frozen chunks shall be placed in the trench in 6-inch (152 mm) layers and tamped in place until the crown of the pipe is covered by 12 inches (305 mm) of tamped earth. The backfill under and beside the pipe shall be compacted for pipe support. Backfill shall be brought up evenly on both sides of the pipe so that the pipe remains aligned. <u>Backfill for plastic drainage and sewer piping shall be compacted to a minimum 85 percent (%) standard proctor density</u>. In instances where the manufacturer's instructions for materials are more restrictive than those prescribed by the code, the material shall be installed in accordance with the more restrictive requirement.

Add new text as follows:

<u>**306.5 Special Inspection Required.** Special inspection required of plastic drainage and sewer piping trenching, bedding, backfill, and compaction shall be performed by a third-party approved by the code official. Inspections shall be in accordance with Sections 306.2 and 306.3 of the code.</u>

Reason: This section provides the minimum prescriptive requirements for piping installations underground. This section is being revised to contain minimum requirements for plastic drainage piping, as plastic drainage piping for drainage and sewer applications are reliant upon the soil and proper installation to maintain the sanitary nature of the installed piping system. Plastic drainage piping materials are in a failed state when they are deflected in excess of 5-7.5%. When the trenching, bedding, backfill or compaction process is not completed properly and to the correct levels, failure opportunity substantially increases. Many manufacturers of plastic drainage piping provide manufacturer's installation instruction that exceed these prescriptive requirements. Their installation instructions would be the more restrictive requirement. There are manufacturers that do not provide manufacturer installation instructions or guidance for underground installation; therefore, the products could be installed with less than necessary soil compaction, trench width, little or no bedding, or even improper backfill procedures. All of which plastic piping systems are reliant upon for their underground integrity. The special inspection section has been added in this proposal due to the backfilling and compaction requirements being outside of the normal schedule of inspections for most AHJ's. These are crucial steps to ensure that the plastic piping installation is adequate to maintain its integrity and function as intended. If the enforcement component is not done, the critical installation steps may not be completed properly, leading to sewage exfiltration into the ground, contamination, possible structural issues and costly repairs. There have been failures and issues due to improper installation occurring in a similar fashion as the code currently states, rather than the proper minimum installation as it is being revised to. This code change provides a minimum prescriptive base level of proper installation and the enforcement component to guide all users of this code to ensure safety of occupants and our environment.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

All of the steps of installation are already being performed by the installer (many times, incorrectly). Installing the pipe and fitting systems correctly in accordance with these changes will not add to the cost of construction.

P6-24

P7-24

IPC: 306.2.4

Proponents: Guy McMann, Jefferson County Colorado, CAPMO (gmcmann@jeffco.us)

2024 International Plumbing Code

Revise as follows:

306.2.4 Tracer wire.
For plastic sewer piping, an insulated copper tracer wire or other *approved* conductor shall be installed adjacent to and over the full length of the piping. Access shall be provided to the tracer wire or the tracer wire shall terminate at the cleanout between the *building drain* and *building sewer*. The tracer wire size shall be not less than ~~14~~ 18 American Wire Gauge (2.5 mm^2), shall be green in color and the insulation type shall be listed for direct burial.

Reason: Its overkill to require a 14-gauge wire when a 18 gauge wire will do the same job and is less expensive. This is consistent with what's required in the IFGC. The American Public Works Association provides color guidance for sewer pipe including blue for potable water and yellow for gas.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

This will decrease the cost of construction requiring a smaller gauge wire that is less expensive than a 14 gauge wire. “The cost savings is $15 for 100 feet of tracer wire..

Estimated Immediate Cost Impact Justification (methodology and variables):

.
There is not a difference in labor to install. The current price of 18 gauge wire is $0.09 per foot and for 14 gauge wire, $0.11 per foot.

P7-24

P8-24

IPC: 308.5, MSS Chapter 15 (New)

Proponents: Lance MacNevin, Director of Engineering, The Plastics Pipe Institute, The Plastics Pipe Institute (lmacnevin@plasticpipe.org)

2024 International Plumbing Code

Revise as follows:

308.5 Interval of support. Pipe shall be supported in accordance with Table 308.5 <u>or in accordance with ANSI/MSS SP-58</u>.

Exception: The interval of support for piping systems designed to provide for expansion/contraction shall conform to the engineered design in accordance with Section 316.1.

Add new standard(s) as follows:

MSS

Manufacturers Standardization Society of the Valve and Fittings Industry, Inc.
127 Park St. NE
Vienna, VA 22180-4602

<u>SP-58-2018</u>	<u>Pipe Hangers and Supports-Materials, Design, Manufacture, Selection, Applications, and Installation (ANSI-approved American National Standard) which includes Amendment 1 Issued 10-17-2019.</u>

Staff Analysis: A review of the standard proposed for inclusion in the code, SP-58-2018 *Pipe Hangers and Supports-Materials, Design, Manufacture, Selection, Applications, and Installation (ANSI-approved American National Standard) which includes Amendment 1 Issued 10-17-2019*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: This proposal will harmonize requirements for the intervals of pipe supports with the 2024 IMC Section 305.4 by allowing interval spacing for pipes to also be in accordance with ANSI/MSS SP-58 *Pipe Hangers and Supports – Materials, Design, Manufacture, Selection, Application, and Installation*.

According to the ANSI press release on this standard, “ANSI/MSS SP-58 2018 is an extensive standard with information on a multitude of topics involving pipe hangers and supports. Not only does it serve as “an industry accepted basis” for those involved in the different aspects of pipe hangers and supports, but it also establishes the minimum guidelines for materials, allowable stresses, product design, testing, and load ratings for pipe hanger and support assemblies for standard and unique pipe hangers and supports.”

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal will harmonize requirements for the intervals of pipe supports with the 2024 IMC Section 305.4 by allowing interval spacing for pipes to also be in accordance with ANSI/MSS SP-58 *Pipe Hangers and Supports – Materials, Design, Manufacture, Selection, Application, and Installation*. The selection of pipe support spacing according to either of these resources is a designer choice, and this proposal simply adds options.

P8-24

P9-24

IPC: 308.6

Proponents: James Walls, Cast Iron Soil Pipe Institute, Cast Iron Soil Pipe Institute (jwalls@cispi.org)

2024 International Plumbing Code

Revise as follows:

308.6 Sway bracing.
Where *horizontal pipes* 4 inches (102 mm) and larger convey drainage ~~or waste,~~ and where a pipe fitting in that piping changes the flow direction greater than 45 degrees (0.79 rad), rigid bracing or other rigid support arrangements shall be installed to resist movement of the upstream pipe in the direction of pipe flow. A change of flow direction into a vertical pipe shall not require the upstream pipe to be braced.

Reason: The term “waste” is being removed as it is redundant and a component of the term “drainage.” This change clarifies the language to users of the code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This change will have no impact on the cost of construction. The change is editorial and simply the removal of the term "or waste" that is already encompassed by the existing term "drainage".

P9-24

P10-24

IPC: SECTION 202 (New), 308.7, 308.7.1

Proponents: James Walls, Cast Iron Soil Pipe Institute, Cast Iron Soil Pipe Institute (jwalls@cispi.org)

2024 International Plumbing Code

Add new definition as follows:

JOINT RESTRAINT. A restraint assembly to resist axial movement at a joint in a piping system.

Revise as follows:

308.7 ~~Anchorage~~ Joint restraint. ~~Anchorage~~ Joint restraint shall be provided to restrain drainage piping from axial movement.

308.7.1 Location. For ~~pipe sizes~~ *horizontal pipes* 4 inches (102 mm) and larger that convey drainage ~~greater than 4 inches (102 mm),~~ joint restraints shall be provided ~~for drain pipes~~ at all changes in direction. ~~and~~ Joint restraints shall be provided for *horizontal pipes* 4 inches (102 mm) and larger that convey drainage at all changes in diameter greater than two pipe sizes. Braces, blocks, rodding and other suitable methods as specified by the coupling manufacturer shall be utilized.

Reason: There has been a great deal of confusion between sway bracing, joint restraint, and the current code term “anchorage.” This proposal replaces the current term anchorage and replaces it with what the code is prescribing, which is joint restraint. This proposal provides a clear distinction for the users of the code as well as what is required of each. These items are specifically for drainage piping systems and the current proposal is reflective of that fact. Additionally, the language has been made consistent with related section 308.6, utilizing the language “*horizontal pipes* that convey drainage” The addition of further clarification as to change of direction as well as separating and clarifying the two distinct applications of joint restraint locations has been made. This clarifies the distinction between the two items and the requirements to accomplish each to the code official, installer, and other users of this code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is is a clarification and has no cost impact on the cost of construction.

P10-24

P11-24

IPC: 312.1, 312.6

Proponents: Michael Cudahy, PPFA Plastic Pipe and Fittings Association, PPFA Plastic Pipe and Fittings Association (mikec@cmservices.com)

2024 International Plumbing Code

Revise as follows:

312.1 Required tests.
The permit holder shall make the applicable tests prescribed in Sections 312.2 through 312.11 to determine compliance with the provisions of this code. The permit holder shall give reasonable advance notice to the code official when the plumbing work is ready for tests. The equipment, material, power and labor necessary for the inspection and test shall be furnished by the permit holder and he or she shall be responsible for determining that the work will withstand the test pressure prescribed in the following tests. ~~Plumbing system piping shall be tested with either water or, for piping systems other than plastic, by air.~~ After the plumbing fixtures have been set and their traps filled with water, the entire drainage system shall be submitted to final tests. The code official shall require the removal of any cleanouts if necessary to ascertain whether the pressure has reached all parts of the system.

312.6 Water supply system test.
Upon completion of a section of or the entire water supply system, the system, or portion completed, shall be tested and proved tight under a water pressure not less than the working pressure of the system; or, for piping systems other than plastic, by an air test of not less than 50 psi (344 kPa). This pressure shall be held for not less than 15 minutes. The water utilized for tests shall be obtained from a potable source of supply. The required tests shall be performed in accordance with this section and Section 111.

> **Exception:** For plastic piping systems, testing with a compressed gas shall be an alternative to hydrostatic testing where compressed air or other gas pressure testing is specifically authorized by the manufacturer's instructions for the pipe and fittings products installed at the time the system is being tested, and compressed air or other gas testing is not otherwise prohibited by applicable codes, laws or regulations outside of this code.

Reason: Language in the general section 312.1 does not allow for air testing plastic systems, but there are existing conditions in the later testing sections (Sections 312.2 through 312.11) where it is permitted, typically with products such as PEX and PERT. The restriction is therefore, deleted in 312.1, and a specific exception is placed in the supply line section, where these types of materials may also be used.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

This proposal offers an alternative for pressure testing PEX and PE-RT tubing materials using compressed gas, potentially reducing the cost of testing pipes in these systems by $1 to $10,000. In situations with available water and no freezing risk, the cost decrease may be minimal, around $1 or less, as compressed gas testing is unnecessary.

If water is unavailable during pipe installation, the cost reduction could range from $1 to $1,000 by eliminating the need to transport water for testing.

In cold weather, when compressed air isn't an option, providing temporary heat to prevent freezing may cost $100 to $10,000, depending on building size and completion status. For instance, if a partially enclosed building requires temporary insulation during cold-weather testing, allowing the use of compressed gas could yield a $10,000 cost reduction.

Estimated Immediate Cost Impact Justification (methodology and variables):

This proposal offers an alternative for pressure testing PEX and PE-RT tubing materials using compressed gas, potentially reducing the cost of testing pipes in these systems by $1 to $10,000. In situations with available water and no freezing risk, the cost decrease may be minimal, around $1 or less, as compressed gas testing is unnecessary.

If water is unavailable during pipe installation, the cost reduction could range from $1 to $1,000 by eliminating the need to transport water

for testing.

In cold weather, when compressed air isn't an option, providing temporary heat to prevent freezing may cost $100 to $10,000, depending on building size and completion status. For instance, if a partially enclosed building requires temporary insulation during cold-weather testing, allowing the use of compressed gas could yield a $10,000 cost reduction.

Estimated Life Cycle Cost Impact:

There is no cost impact of air vs. water testing over the life cycle.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

None.

P11-24

P12-24 Part I

IPC: 312.3

Proponents: Joseph Summers, Mashantucket Pequot Tribal Nation, Building Code Enforcement

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

Revise as follows:

312.3 Drainage and vent air test.
Plastic piping shall not be tested using air. An air test shall be made by forcing air into the system until there is a uniform gauge pressure of 5 psi (34.5 kPa) or sufficient to balance a 10-inch (254 mm) column of mercury. <u>Test assemblies shall be equipped with a pressure regulator and pressure relief device to limit the maximum pressure to 6 psi.</u> This pressure shall be held for a test period of not less than 15 minutes. Any adjustments to the test pressure required because of changes in ambient temperatures or the seating of gaskets shall be made prior to the beginning of the test period.

Reason: Pages 57-58 of the Cast Iron Pipe Institute handbook outlines the test procedures acceptable for the testing of cast iron piping which are not addressed in 312.3 such as limiting an air test to 6 psi max and having a pressure regulator and relief devices installed. Fernco's only listed for a little over 4 psi.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is giving the installer another option and provides safeguards during the testing of piping by regulating the maximum amount of pressure that can be introduced into the pipe.

P12-24 Part I

P12-24 Part II

IRC: P2503.5.1

Proponents: Joseph Summers, Mashantucket Pequot Tribal Nation, Building Code Enforcement

2024 International Residential Code

Revise as follows:

P2503.5.1 Rough plumbing.
DWV systems shall be tested on completion of the rough piping installation by water, by air for piping systems other than plastic, or by a vacuum of air for plastic piping systems, without evidence of leakage. The test shall be applied to the drainage system in its entirety or in sections after rough-in piping has been installed, as follows:

1. Water test. Each section shall be filled with water to a point not less than 10 feet (3048 mm) above the highest fitting connection in that section, or to the highest point in the completed system. Water shall be held in the section under test for a period of 15 minutes. The system shall prove leak free by visual inspection.
2. Air test. The portion under test shall be maintained at a gauge pressure of 5 pounds per square inch (psi) (34 kPa) or 10 inches of mercury column (34 kPa). This pressure shall be held without introduction of additional air for a period of 15 minutes. <u>Test assemblies shall be equipped with a pressure regulator and pressure relief device to limit the maximum pressure to 6 psi.</u>
3. Vacuum test. The portion under test shall be evacuated of air by a vacuum-type pump to achieve a uniform gauge pressure of -5 pounds per square inch or a negative 10 inches of mercury column (-34 kPa). This pressure shall be held without the removal of additional air for a period of 15 minutes. <u>Test assemblies shall be equipped with a pressure regulator and pressure relief device to limit the maximum pressure to -6 psi.</u>

Reason: Pages 57-58 of the Cast Iron Pipe Institute handbook outlines the test procedures acceptable for the testing of cast iron piping which are not addressed in 312.3 such as limiting an air test to 6 psi max and having a pressure regulator and relief devices installed. Fernco’s only listed for a little over 4 psi.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This provides the installer with an additional level of safety with using air by limiting the pressure into the system.

P12-24 Part II

P13-24 Part I

IPC: 312.6

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

Revise as follows:

312.6 Water supply system test.
Upon completion of a section of or the entire water supply system, the system, or portion completed, shall be tested and proved tight under a water pressure not less than the working pressure of the system; or, for piping systems other than plastic, by an air test of not less than 50 psi (344 kPa). This pressure shall be held for not less than 15 minutes. The water utilized for tests shall be obtained from a potable source of supply. The required tests shall be performed in accordance with this section and Section 111.

> <u>**Exception:** For PEX and PE-RT piping systems, testing with a compressed gas shall be an alternative to hydrostatic testing where compressed air or other gas pressure testing is specifically authorized by the manufacturer’s instructions for the PEX or PE-RT pipe and fittings products installed at the time the system is being tested, and compressed air or other gas testing is not otherwise prohibited by applicable codes, laws or regulations outside of this code.</u>

P13-24 Part I

P13-24 Part II

IRC: P2503.7

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Residential Code

Revise as follows:

P2503.7 Water-supply system testing.
Upon completion of the water-supply system or a section of it, the system or portion completed shall be tested and proved tight under a water pressure of not less than the working pressure of the system or, for piping systems other than plastic, by an air test of not less than 50 psi (345 kPa). This pressure shall be held for not less than 15 minutes. The water used for tests shall be obtained from a potable water source.

Exception: For PEX and PE-RT piping systems, testing with a compressed gas shall be an alternative to hydrostatic testing where compressed air or other gas pressure testing is specifically authorized by the manufacturer's instructions for the PEX or PE-RT pipe and fittings products installed at the time the system is being tested, and compressed air or other gas testing is not otherwise prohibited by applicable codes, laws or regulations outside of this code.

P13-24 Part II

P13-24 Part III

IMC®: 1208.1

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Mechanical Code

Revise as follows:

1208.1 General. Hydronic piping systems shall be tested hydrostatically at one and one-half times the maximum system design pressure, but not less than 100 psi (689 kPa). The duration of each test shall be not less than 15 minutes.

> **Exception:** For PEX <u>and PE-RT</u> piping systems, testing with a compressed gas shall be an alternative to hydrostatic testing where compressed air or other gas pressure testing is specifically authorized by all of the manufacturers' instructions for the PEX <u>or PE-RT</u> pipe and fitting products installed at the time the system is being tested, and compressed air or other gas testing is not otherwise prohibited by applicable codes, laws or regulations outside of this code.

Reason: PART I: The IRC currently allows pressure testing of PEX piping systems with compressed gas in P2503.7 via an Exception. The Exception should be added to the IPC for consistency, and the Exception should apply to both PEX and PE-RT flexible piping materials.

The Exception found in IRC P2503.7 Water Supply System Testing is technically appropriate, is safe, and is supported by the plastic piping industry. In fact, this Exception should also be expanded to apply to PE-RT piping materials. A separate code change request has been submitted for that purpose. Like PEX, PE-RT is also produced from HDPE material and does not fail via brittle failure or separation of shards. The Plastics Pipe Institute's *Recommendation F* was updated in 2022 to also apply to PE-RT tubing, and is now titled "Testing PEX and PE-RT Tubing Systems with Compressed Air or Inert Gas" Recommendation F.pdf (plasticpipe.org).

PART II: The IRC currently allows pressure testing of PEX piping systems with compressed gas in P2503.7 Water Supply System Testing via an Exception. The Exception should be revised to also apply to PE-RT piping systems. Like PEX, PE-RT tubing is also produced from HDPE material and does not fail via brittle failure or separation of shards. The Plastics Pipe Institute's *Recommendation F* was updated in 2022 to also apply to PE-RT tubing, and is now titled "Testing PEX and PE-RT Tubing Systems with Compressed Air or Inert Gas" Recommendation F.pdf (plasticpipe.org).

Part III: The IRC currently allows pressure testing of PEX piping systems with compressed gas in P2503.7 via an Exception. The Exception should be added to the IPC for consistency, and the Exception should apply to both PEX and PE-RT flexible piping materials.

The Exception found in IRC P2503.7 Water Supply System Testing is technically appropriate, is safe, and is supported by the plastic piping industry. In fact, this Exception should also be expanded to apply to PE-RT piping materials. A separate code change request has been submitted for that purpose. Like PEX, PE-RT is also produced from HDPE material and does not fail via brittle failure or separation of shards. The Plastics Pipe Institute's *Recommendation F* was updated in 2022 to also apply to PE-RT tubing, and is now titled "Testing PEX and PE-RT Tubing Systems with Compressed Air or Inert Gas" Recommendation F.pdf (plasticpipe.org).

This proposal is submitted by the ICC Plumbing Mechanical Gas Code Action Committee (PMGCAC)

PMGCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 PMGCAC has held 26 virtual meetings open to any interested party. In addition, there were several virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the PMGCAC website at PMGCAC.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$1 to $10,000

Estimated Immediate Cost Impact Justification (methodology and variables):

By providing the alternative to pressure test PEX and PE-RT tubing materials with compressed gas, this code change proposal may decrease the cost of pressure testing pipes in these types of systems over a range from $1 to $10,000. In situations where water is readily available and there is no risk of freezing, the cost decrease can be $1 or less, because the compressed gas test method is not used. In situations where water is not available on the jobsite at the time when pipes are installed and ready for test, the cost decrease can be $1 to $1,000 by preventing the need to transport potable water to the jobsite for testing. In cold weather situations, without the option of using compressed air for testing, the cost to provide temporary heat to the building to prevent freezing of water in pipes during testing is significant and could range from $100 to $10,000 depending on the size of the building and its level of completion during the pressure test period. For example, if the building is not yet fully enclosed and must be wrapped with temporary insulation during the use of temporary heat for a pressure test in cold weather, the cost decrease of allowing the use of compressed gas can be as high as $10,000.

Estimated Life Cycle Cost Impact:

N/A

Estimated Life Cycle Cost Impact Justification (methodology and variables):

N/A

P13-24 Part III

P14-24

IPC: 403.1, 403.1.1, TABLE 403.1, 403.1.2; IBC: [P] 2902.1, [P] 2902.1.1, TABLE 2902.1, [P] 2902.1.2

Proponents: Eirene Knott, BRR Architecture, Metropolitan Kansas City Chapter of the ICC (eirene.knott@brrarch.com)

2024 International Plumbing Code

Revise as follows:

403.1 Minimum number of fixtures.
Plumbing fixtures shall be provided in the minimum number as shown in Table ~~403.1~~ 403.1.1, based on the actual use of the building or space. Uses not shown in Table ~~403.1~~ 403.1.1 shall be considered individually by the code official. The number of occupants shall be determined by the *International Building Code*.

403.1.1 Fixture calculations.
To determine the occupant load of each sex, the total occupant load shall be divided in half. To determine the required number of fixtures, the fixture ratio or ratios for each fixture type shall be applied to the occupant load of each sex in accordance with Table ~~403.1~~ 403.1.1. Fractional numbers resulting from applying the fixture ratios of Table ~~403.1~~ 403.1.1 shall be rounded up to the next whole number. For calculations involving multiple *occupancies*, such fractional numbers for each *occupancy* shall first be summed and then rounded up to the next whole number.

Exceptions:

1. The total occupant load shall not be required to be divided in half where *approved* statistical data indicate a distribution of the sexes of other than 50 percent of each sex.
2. Where multiple-user facilities are designed to serve all genders, the minimum fixture count shall be calculated 100 percent, based on total occupant load. In such multiple-user facilities, each fixture type shall be in accordance with ICC A117.1 .

TABLE ~~403.1~~ 403.1.1 MINIMUM NUMBER OF REQUIRED PLUMBING FIXTURES[a] (See Section~~s 403.1.1 and~~ 403.2)
Portions of table not shown remain unchanged.

Portions of the table not shown remain unchanged

403.1.2 Fixtures in single-user toilet facilities and bathing rooms.
The plumbing fixtures located in single-user toilet facilities and single-user bathing rooms, including family or assisted-use toilet facilities and bathing rooms, shall contribute toward the total number of required plumbing fixtures for a building or tenant space. The number of fixtures in single-user toilet facilities, single-user bathing rooms and family or assisted-use toilet facilities shall be deducted proportionately from the required gender ratios of Table ~~403.1~~ 403.1.1. Single-user toilet facilities and bathing rooms, and family or assisted-use toilet facilities and bathing rooms shall be identified as being available for use by all persons regardless of their sex.The total number of fixtures shall be based on the required number of separate facilities or based on the aggregate of any combination of single-user or multiple-user facilities.

2024 International Building Code

Revise as follows:

[P] 2902.1 Minimum number of fixtures.
Plumbing fixtures shall be provided in the minimum number as shown in Table ~~2902.1~~ 2902.1.1 based on the actual use of the *building* or space. Uses not shown in Table ~~2902.1~~ 2902.1.1 shall be considered individually by the code official. The number of occupants shall be determined by this code.

[P] 2902.1.1 Fixture calculations. To determine the *occupant load* of each sex, the total *occupant load* shall be divided in half. To determine the required number of fixtures, the fixture ratio or ratios for each fixture type shall be applied to the *occupant load* of each sex in accordance with Table ~~2902.1~~ 2902.1.1. Fractional numbers resulting from applying the fixture ratios of Table~~2902.1~~ 2902.1.1 shall be rounded up to the next whole number. For calculations involving multiple occupancies, such fractional numbers for each occupancy shall first be summed and then rounded up to the next whole number.

Exceptions:

1. The total *occupant load* shall not be required to be divided in half where *approved* statistical data indicates a distribution of the sexes of other than 50 percent of each sex.
2. Where multiple-user *facilities* are designed to serve all genders, the minimum fixture count shall be calculated 100 percent, based on total *occupant load*. In such multiple-user user *facilities*, each fixture type shall be in accordance with ICC A117.1 .

TABLE ~~2902.1~~ 2902.1.1 MINIMUM NUMBER OF REQUIRED PLUMBING FIXTURES[a] (See Section~~s 2902.1.1 and~~ 2902.2)
Portions of table not shown remain unchanged.

Table removed as no changes are made

[P] 2902.1.2 Fixtures in single-user toilet facilities and bathing rooms. The plumbing fixtures located in single-user toilet *facilities* and single-user rooms, including family or assisted-use toilet *facilities* and bathing rooms, shall contribute toward the total number of required plumbing fixtures for a *building* or tenant space. The number of fixtures in single-user toilet *facilities*, single-user bathing rooms and family or assisted-use toilet *facilities* shall be deducted proportionately from the required gender ratios of Table ~~2902.1~~ 2902.1.1 . Single-user toilet facilities and bathing rooms, and family or assisted-use toilet facilities and bathing rooms shall be identified as being available for use by all *persons* regardless of their sex. The total number of fixtures shall be based on the required number of separate *facilities* or based on the aggregate of any combination of single-user or separate *facilities*.

Reason: What I have attempted to do is to renumber the fixture table so that it appears in the order in which one would apply the required number of fixtures. IPC Section 403.1 and IBC Section 2902.1 explain that fixtures are to be provided based on the table.

Why would the table come before the directions? Wouldn't the directions be first, then the table? All this code change is doing is providing for more of a logical flow as to how to determine the fixture counts. Having the table before the directions is somewhat counterintuitive.

I have also removed the reference in the table to IPC Section 403.1.1 and IBC Section 2902.1.1 since the table would now become part of that same section. By moving the table to appear after IPC Section 403.1.1 and IBC Section 2901.1.1, the reference from the table to that section can be removed, so only IPC Section 403.2 and IBC Section 2902.2 need to be referenced.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This change only changes the number of the fixture table to be more consistent in the order of the content needed to determine plumbing fixture counts.

P14-24

P15-24

IPC: TABLE 403.1; IBC: TABLE 2902.1

Proponents: Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C., Self (jbengineer@aol.com)

2024 International Plumbing Code

Revise as follows:

TABLE 403.1 MINIMUM NUMBER OF REQUIRED PLUMBING FIXTURES[a] (See Sections 403.1.1 and 403.2)

NO.	CLASSIFICATION	DESCRIPTION		WATER CLOSETS (URINALS: SEE SECTION 424.2) MALE	WATER CLOSETS FEMALE	LAVATORIES MALE	LAVATORIES FEMALE	BATHTUBS/ SHOWERS	DRINKING FOUNTAIN (SEE SECTION 410)	OTHER
1	Assembly	Theaters and other buildings for the performing arts and motion pictures[d]		1 per 125	1 per 65	1 per 200		—	1 per 500	1 service sink
		Nightclubs, bars, taverns, dance halls and buildings for similar purposes[d]		1 per 40 ~~1 per 40~~		1 per 75		—	1 per 500	1 service sink
		Restaurants, banquet halls and food courts[d]		1 per 75 ~~1 per 75~~		1 per 200		—	1 per 500	1 service sink
		Casino gaming areas		1 per 100 for the first 400 and 1 per 250 for the remainder exceeding 400	1 per 50 for the first 400 and 1 per 150 for the remainder exceeding 400	1 per 250 for the first 750 and 1 per 500 for the remainder exceeding 750		—	1 per 1,000	1 service sink
		Auditoriums without permanent seating, art galleries, exhibition halls, museums, lecture halls, libraries, arcades and gymnasiums[d]		1 per 125	1 per 65	1 per 200		—	1 per 500	1 service sink
		Passenger terminals and transportation facilities[d]		1 per 500 ~~1 per 500~~		1 per 750		—	1 per 1,000	1 service sink
		Places of worship and other religious services[d]		1 per 150	1 per 75	1 per 200		—	1 per 1,000	1 service sink
		Coliseums, arenas, skating rinks, pools and tennis courts for indoor sporting events and activities [f]		1 per 75 for the first 1,500 and 1 per 120 for the remainder exceeding 1,500	1 per 40 for the first 1,520 and 1 per 60 for the remainder exceeding 1,520	1 per 200	1 per 150	—	1 per 1,000	1 service sink
		Stadiums, amusement parks, bleachers and grandstands for outdoor sporting events and activities[f]		1 per 75 for the first 1,500 and 1 per 120 for the remainder exceeding 1,500	1 per 40 for the first 1,520 and 1 per 60 for the remainder exceeding 1,520	1 per 200	1 per 150	—	1 per 1,000	1 service sink
2	Business	Buildings for the transaction of business, nonmedical professional services, other services involving merchandise, office buildings, banks, light industrial and similar uses		1 per 25 for the first 50 and 1 per 50 for the remainder exceeding 50		1 per 40 for the first 80 and 1 per 80 for the remainder exceeding 80		—	1 per 100	1 service sink[e]
		Ambulatory care facilities and outpatient clinics		1 per 25 for the first 50 and 1 per 50 for the remainder exceeding 50 ~~1 per 25 for the first 50 and 1 per 50 for the remainder exceeding 50~~		1 per 50		—	1 per 100	1 service sink per floor
3	Educational	Educational facilities		1 per 50		1 per 50		—	1 per 100	1 service sink
4	Factory and industrial	Structures in which occupants are engaged in work fabricating, assembly or processing of products or materials		1 per 100		1 per 100		—	1 per 400	1 service sink
5	Institutional	Alcohol and drug centers[b] Congregate care facilities[b] Group homes[b] Halfway houses[b] Social rehabilitation facilities[b] Foster care facilities[b]		1 per 10 care recipients		1 per 10 care recipients		1 per 8 care recipients	—	—
		Assisted living and residential board and care facilities with care recipients who receive custodial care	Sleeping units for care recipient[c]	1 per 2 sleeping units		1 per 2 sleeping units		1 per 8 sleeping units		
			Dwelling units for care recipients	1 per dwelling unit		1 per dwelling unit		1 per dwelling unit	—	1 kitchen sink per dwelling unit
			Employee facilities	1 per 60 care recipient units		1 per 60 care recipient units		—	1 per 100	1 service sink per floor
			Visitor facilities	1 per 75 care recipient units.		1 per 75 care recipient units		—	—	—
		Nursing homes[b]	Sleeping units for care recipients[c]	1 per 2 care recipient sleeping units		1 per 2 care recipient sleeping units		1 per 8 care recipient sleeping units	—	—

NO.	CLASSIFICATION	DESCRIPTION		WATER CLOSETS (URINALS: SEE SECTION 424.2) MALE	WATER CLOSETS (URINALS: SEE SECTION 424.2) FEMALE	LAVATORIES MALE	LAVATORIES FEMALE	BATHTUBS/ SHOWERS	DRINKING FOUNTAIN (SEE SECTION 410)	OTHER
			Employee facilities	1 per 60 care recipient units		1 per 60 care recipient sleeping units		—	1 per 100	1 service sink per floor
			Visitor facilities	1 per 75 care recipient units		1 per 75 care recipient sleeping rooms		—	—	—
		Hospitals	Sleeping units for care recipients	1 per care recipient sleeping unit		1 per c are recipient sleeping unit		1 per100 care recipient sleeping units	—	
			Care recipient treatment areas	1 per 25 care recipient treatment rooms		1 per 50 care recipient treatment room s		--	1 per 100	—
			Employee facilities	1 per 25 care recipient sleeping units or treatment room ~~1 per 25 care recipient sleeping units or treatment room~~		1 per 50 care recipient sleeping room or treatment room			1 per 100	1 service sink per floor
			Visitor facilities	1 per 75 care recipient sleeping units or treatment room ~~1 per 75 care recipient sleeping units or treatment room~~		1 per 50 care recipient sleeping room or treatment room			1 per 500	—
Prisons[b]		1 per cell			1 per cell	1 per 15	1 per 100	1 service sink		
Reformatories, detention centers and correctional centers[b]	Cells	1 per 15			1 per 15	1 per 15	1 per 100	1 service sink		
	Congregate Living Facilities	1 per 15			1 per 15	1 per 15	1 per 100	1 service sink		
	Employees	1 per 25			1 per 35	—	1 per 100	—		
Adult day care and child day care		1 per 15			1 per 15	1	1 per 100	1 service sink		
6	Mercantile	Retail stores, service stations, shops, salesrooms, markets and shopping centers		1 per 500		1 per 750		—	1 per 1,000	1 service sink[e]
7	Residential	Hotels, motels, boarding houses (transient)		1 per dwelling or sleeping unit		1 per dwelling or sleeping unit		1 per dwelling or sleeping unit	—	1 service sink
		Dormitories, fraternities, sororities and boarding houses (not transient)		1 per 10		1 per 10		1 per 8	1 per 100	1 service sink
		Apartment house		1 per dwelling unit or sleeping unit		1 per dwelling unit or sleeping unit		1 per dwelling unit or sleeping unit	—	1 kitchen sink per dwelling unit; 1 automatic clothes washer connection per 20 dwelling units
		Congregate living facilities with 16 or fewer care recipients receiving custodial care		1 per 10		1 per 10		1 per 8	1 kitchen sink	
		One- and two-family dwellings and lodging houses with five or fewer guestrooms		1 per dwelling unit		1 per dwelling unit		1 per dwelling unit	—	1 kitchen sink per dwelling unit; 1 automatic clothes washer connection per dwelling unit
8	Storage	Structures for the storage of goods, warehouses, storehouse and freight depots. Low and Moderate Hazard.		1 per 100		1 per 100		—	1 per 1,000	1 service sink

a. The fixtures shown are based on one fixture being the minimum required for the number of persons indicated or any fraction of the number of persons indicated. The number of occupants shall be determined by the *International Building Code*.

b. Toilet facilities for employees shall be separate from facilities for inmates or care recipients.

c. A single-user toilet facility with one water closet and one lavatory serving not more than two adjacent care recipient sleeping units shall be permitted provided that each patient sleeping unit has direct access to the toilet room and provision for privacy for the toilet room user is provided.

d. The occupant load for seasonal outdoor seating and entertainment areas shall be included when determining the minimum number of facilities required.

e. For business and mercantile classifications with an occupant load of 15 or fewer, service sinks shall not be required.

f. The required number and type of plumbing fixtures for indoor and outdoor public swimming pools shall be in accordance with Section 609 of the International Swimming Pool and Spa Code.

2024 International Building Code

Revise as follows:

TABLE 2902.1 MINIMUM NUMBER OF REQUIRED PLUMBING FIXTURES[a] (See Sections 2902.1.1 and 2902.2)

NO.	CLASSIFICATION	DESCRIPTION		WATER CLOSETS (URINALS: SEE SECTION 424.2)		LAVATORIES		BATHTUBS/ SHOWERS	DRINKING FOUNTAIN (SEE SECTION 410)	OTHER
				MALE	FEMALE	MALE	FEMALE			
1	Assembly	Theaters and other buildings for the performing arts and motion pictures[d]		1 per 125	1 per 65	1 per 200		—	1 per 500	1 service sink
		Nightclubs, bars, taverns, dance halls and buildings for similar purposes[d]		1 per 40 ~~1 per 40~~		1 per 75		—	1 per 500	1 service sink
		Restaurants, banquet halls and food courts[d]		1 per 75 ~~1 per 75~~		1 per 200		—	1 per 500	1 service sink
		Casino gaming areas		1 per 100 for the first 400 and 1 per 250 for the remainder exceeding 400	1 per 50 for the first 400 and 1 per 150 for the remainder exceeding 400	1 per 250 for the first 750 and 1 per 500 for the remainder exceeding 750		—	1 per 1,000	1 service sink
		Auditoriums without permanent seating, art galleries, exhibition halls, museums, lecture halls, libraries, arcades and gymnasiums[d]		1 per 125	1 per 65	1 per 200		—	1 per 500	1 service sink
		Passenger terminals and transportation facilities[d]		1 per 500 ~~1 per 500~~		1 per 750		—	1 per 1,000	1 service sink
		Places of worship and other religious services[d]		1 per 150	1 per 75	1 per 200		—	1 per 1,000	1 service sink
		Coliseums, arenas, skating rinks, pools and tennis courts for indoor sporting events and activities [f]		1 per 75 for the first 1,500 and 1 per 120 for the remainder exceeding 1,500	1 per 40 for the first 1,520 and 1 per 60 for the remainder exceeding 1,520	1 per 200	1 per 150	—	1 per 1,000	1 service sink
		Stadiums, amusement parks, bleachers and grandstands for outdoor sporting events and activities[f]		1 per 75 for the first 1,500 and 1 per 120 for the remainder exceeding 1,500	1 per 40 for the first 1,520 and 1 per 60 for the remainder exceeding 1,520	1 per 200	1 per 150	—	1 per 1,000	1 service sink
2	Business	Buildings for the transaction of business, nonmedical professional services, other services involving merchandise, office buildings, banks, light industrial and similar uses		1 per 25 for the first 50 and 1 per 50 for the remainder exceeding 50		1 per 40 for the first 80 and 1 per 80 for the remainder exceeding 80		—	1 per 100	1 service sink[e]
		Ambulatory care facilities and outpatient clinics		1 per 25 for the first 50 and 1 per 50 for the remainder exceeding 50 ~~1 per 25 for the first 50 and 1 per 50 for the remainder exceeding 50~~		1 per 50		—	1 per 100	1 service sink per floor
3	Educational	Educational facilities		1 per 50		1 per 50		—	1 per 100	1 service sink
4	Factory and industrial	Structures in which occupants are engaged in work fabricating, assembly or processing of products or materials		1 per 100		1 per 100		—	1 per 400	1 service sink
5	Institutional	Alcohol and drug centers[b] Congregate care facilities[b] Group homes[b] Halfway houses[b] Social rehabilitation facilities[b] Foster care facilities[b]		1 per 10 care recipients		1 per 10 care recipients		1 per 8 care recipients	—	—
		Assisted living and residential board and care facilities with care recipients who receive custodial care	Sleeping units for care recipient[c]	1 per 2 sleeping units		1 per 2 sleeping units		1 per 8 sleeping units		
			Dwelling units for care recipients	1 per dwelling unit		1 per dwelling unit		1 per dwelling unit	—	1 kitchen sink per dwelling unit
			Employee facilities	1 per 60 care recipient units		1 per 60 care recipient units		—	1 per 100	1 service sink per floor
			Visitor facilities	1 per 75 care recipient units.		1 per 75 care recipient units		—	—	—
		Nursing homes[b]	Sleeping units for care recipients[c]	1 per 2 care recipient sleeping units		1 per 2 care recipient sleeping units		1 per 8 care recipient sleeping units	—	—
			Employee facilities	1 per 60 care recipient units		1 per 60 care recipient sleeping units		—	1 per 100	1 service sink per floor
			Visitor facilities	1 per 75 care recipient units		1 per 75 care recipient sleeping rooms		—	—	—
		Hospitals[b]	Sleeping units for care recipients	1 per care recipient sleeping unit		1 per c are recipient sleeping unit		1 per100 care recipient sleeping units		—

NO.	CLASSIFICATION	DESCRIPTION		WATER CLOSETS (URINALS: SEE SECTION 424.2)		LAVATORIES		BATHTUBS/ SHOWERS	DRINKING FOUNTAIN (SEE SECTION 410)	OTHER
				MALE	FEMALE	MALE	FEMALE			
			Care recipient treatment areas	1 per 25 care recipient treatment rooms		1 per 50 care recipient treatment room s		—	1 per 100	—
			Employee facilities	1 per 25 care recipient sleeping units or treatment room ~~1 per 25 care recipient sleeping units or treatment room~~		1 per 50 care recipient sleeping room or treatment room		—	1 per 100	1 service sink per floor
			Visitor facilities	1 per 75 care recipient sleeping units or treatment room ~~1 per 75 care recipient sleeping units or treatment room~~		1 per 50 care recipient sleeping room or treatment room		—	1 per 500	—
								—		—
								—		—
		Prisons[b]		1 per cell		1 per cell		1 per 15	1 per 100	1 service sink
		Reformatories, detention centers and correctional centers[b]	Cells	1 per 15		1 per 15		1 per 15	1 per 100	1 service sink
			Congregate Living Facilities	1 per 15		1 per 15		1 per 15	1 per 100	1 service sink
			Employees	1 per 25		1 per 35		—	1 per 100	—
		Adult day care and child day care		1 per 15		1 per 15		1	1 per 100	1 service sink
6	Mercantile	Retail stores, service stations, shops, salesrooms, markets and shopping centers		1 per 500		1 per 750		—	1 per 1,000	1 service sink[e]
7	Residential	Hotels, motels, boarding houses (transient)		1 per dwelling or sleeping unit		1 per dwelling or sleeping unit		1 per dwelling or sleeping unit	—	1 service sink
		Dormitories, fraternities, sororities and boarding houses (not transient)		1 per 10		1 per 10		1 per 8	1 per 100	1 service sink
		Apartment house		1 per dwelling unit or sleeping unit		1 per dwelling unit or sleeping unit		1 per dwelling unit or sleeping unit	—	1 kitchen sink per dwelling unit; 1 automatic clothes washer connection per 20 dwelling units
		Congregate living facilities with 16 or fewer care recipients receiving custodial care		1 per 10		1 per 10		1 per 8		1 kitchen sink
		One- and two-family dwellings and lodging houses with five or fewer guestrooms		1 per dwelling unit		1 per dwelling unit		1 per dwelling unit	—	1 kitchen sink per dwelling unit; 1 automatic clothes washer connection per dwelling unit
8	Storage	Structures for the storage of goods, warehouses, storehouse and freight depots. Low and Moderate Hazard.		1 per 100		1 per 100		—	1 per 1,000	1 service sink

a. The fixtures shown are based on one fixture being the minimum required for the number of *persons* indicated or any fraction of the number of *persons* indicated. The number of occupants shall be determined by this code.

b. Toilet *facilities* for employees shall be separate from *facilities* for inmates or care recipients.

c. A single-occupant toilet room with one water closet and one lavatory serving not more than two adjacent patient *sleeping units* shall be permitted, provided that each patient sleeping unit has direct access to the toilet room and provisions for privacy for the toilet room user are provided.

d. The *occupant load* for seasonal outdoor seating and entertainment areas shall be included when determining the minimum number of *facilities* required.

e. For business and mercantile classifications with an *occupant load* of 15 or fewer, a service sink shall not be required.

f. The required number and type of plumbing fixtures for indoor and outdoor swimming pools shall be in accordance with Section 609 of the International Swimming Pool and Spa Code.

Reason: The purpose of this change is to combine the men's and ladies' into a single cell when the numbers are the same for number of water closets required or number of lavatories required. The only time there should be separate male and female listings is when there are different ratios for the number of fixtures required.

The revised cells of the table are shown merged with the extra ratio information deleted. The intent is to simply make one cell to show the ratio applicable to both males and females.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This change is editorial and has no impact on cost. There is no change to the fixture requirements. The same number of fixtures will be required. With the movement towards all-gender toilet rooms, the code will be easier to interpret.

P15-24

P16-24

IPC: TABLE 403.1; IBC: TABLE 2902.1

Proponents: Ardel Jala, Seattle Dept of Construction & Inspections, Seattle Dept of Construction & Inspections (ardel.jala@seattle.gov); Jenifer Gilliland, Seattle Department of Construction and Inspections, Seattle Department of Construction and Inspections (jenifer.gilliland@seattle.gov)

2024 International Plumbing Code

Revise as follows:

TABLE 403.1 MINIMUM NUMBER OF REQUIRED PLUMBING FIXTURES[a] (See Sections 403.1.1 and 403.2)

Portions of table not shown remain unchanged.

NO.	CLASSIFICATION	DESCRIPTION	WATER CLOSETS (URINALS: SEE SECTION 424.2)		LAVATORIES		BATHTUBS/ SHOWERS	DRINKING FOUNTAIN (SEE SECTION 410)	OTHER
			MALE	FEMALE	MALE	FEMALE			
1	Assembly	Auditoriums without permanent seating, art galleries, exhibition halls, museums, lecture halls, libraries, arcades, occupiable roofs and gymnasiums[d]	1 per 125	1 per 65	1 per 200		—	1 per 500	1 service sink

a. The fixtures shown are based on one fixture being the minimum required for the number of persons indicated or any fraction of the number of persons indicated. The number of occupants shall be determined by the *International Building Code*.

b. Toilet facilities for employees shall be separate from facilities for inmates or care recipients.

c. A single-user toilet facility with one water closet and one lavatory serving not more than two adjacent care recipient sleeping units shall be permitted provided that each patient sleeping unit has direct access to the toilet room and provision for privacy for the toilet room user is provided.

d. The occupant load for seasonal outdoor seating and entertainment areas shall be included when determining the minimum number of facilities required.

e. For business and mercantile classifications with an occupant load of 15 or fewer, service sinks shall not be required.

f. The required number and type of plumbing fixtures for indoor and outdoor public swimming pools shall be in accordance with Section 609 of the International Swimming Pool and Spa Code.

2024 International Building Code

Revise as follows:

TABLE 2902.1 MINIMUM NUMBER OF REQUIRED PLUMBING FIXTURES[a] (See Sections 2902.1.1 and 2902.2)

Portions of table not shown remain unchanged.

NO.	CLASSIFICATION	DESCRIPTION	WATER CLOSETS (URINALS: SEE SECTION 424.2)		LAVATORIES		BATHTUBS/ SHOWERS	DRINKING FOUNTAIN (SEE SECTION 410)	OTHER
			MALE	FEMALE	MALE	FEMALE			
1	Assembly	Auditoriums without permanent seating, art galleries, exhibition halls, museums, lecture halls, libraries, arcades, occupiable roofs and gymnasiums[d]	1 per 125	1 per 65	1 per 200		—	1 per 500	1 service sink

a. The fixtures shown are based on one fixture being the minimum required for the number of *persons* indicated or any fraction of the number of *persons* indicated. The number of occupants shall be determined by this code.

b. Toilet *facilities* for employees shall be separate from *facilities* for inmates or care recipients.

c. A single-occupant toilet room with one water closet and one lavatory serving not more than two adjacent patient *sleeping units* shall be permitted, provided that each patient sleeping unit has direct access to the toilet room and provisions for privacy for the toilet room user are provided.

d. The *occupant load* for seasonal outdoor seating and entertainment areas shall be included when determining the minimum number of *facilities* required.

e. For business and mercantile classifications with an *occupant load* of 15 or fewer, a service sink shall not be required.

f. The required number and type of plumbing fixtures for indoor and outdoor swimming pools shall be in accordance with Section 609 of the International Swimming Pool and Spa Code.

Reason: The provisions for an occupied roof have become more comprehensive over the last few code cycles. This code change proposal adds occupied roof to the Assembly classification in the Minimum Plumbing Fixture requirements in IPC Table 403.1 which would also be published as Table 2902.1 in the IBC. This provides clear direction on how to assign a plumbing fixture ratio when the occupied roof has a generic assembly use that is not associated with a restaurant or another more specific use in the table.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This change proposal clarifies how to assign minimum plumbing fixtures for an occupied roof used for assembly that is not more closely associated with another use in IPC Table 403.1 and IBC Table 2902.1

P16-24

P17-24

IPC: TABLE 403.1; IBC: TABLE 2902.1

Proponents: Ronald Geren, RLGA Technical Services, LLC, Self (ron@specsandcodes.com)

2024 International Plumbing Code

Revise as follows:

TABLE 403.1 MINIMUM NUMBER OF REQUIRED PLUMBING FIXTURES[a] (See Sections 403.1.1 and 403.2)
Portions of table not shown remain unchanged.

NO.	CLASSIFICATION	DESCRIPTION	WATER CLOSETS (URINALS: SEE SECTION 424.2) MALE	FEMALE	LAVATORIES MALE	FEMALE	BATHTUBS/ SHOWERS	DRINKING FOUNTAIN (SEE SECTION 410)	OTHER
8	Storage	Structures for the storage of goods, warehouses, storehouse, ~~and~~ freight depots and self-storage. Low and Moderate Hazard.	1 per 100		1 per 100		—	1 per 1,000	1 service sink

a. The fixtures shown are based on one fixture being the minimum required for the number of persons indicated or any fraction of the number of persons indicated. The number of occupants shall be determined by the *International Building Code*.

b. Toilet facilities for employees shall be separate from facilities for inmates or care recipients.

c. A single-user toilet facility with one water closet and one lavatory serving not more than two adjacent care recipient sleeping units shall be permitted provided that each patient sleeping unit has direct access to the toilet room and provision for privacy for the toilet room user is provided.

d. The occupant load for seasonal outdoor seating and entertainment areas shall be included when determining the minimum number of facilities required.

e. For business and mercantile classifications with an occupant load of 15 or fewer, service sinks shall not be required.

f. The required number and type of plumbing fixtures for indoor and outdoor public swimming pools shall be in accordance with Section 609 of the International Swimming Pool and Spa Code.

2024 International Building Code

Revise as follows:

TABLE 2902.1 MINIMUM NUMBER OF REQUIRED PLUMBING FIXTURES[a] (See Sections 2902.1.1 and 2902.2)
Portions of table not shown remain unchanged.

NO.	CLASSIFICATION	DESCRIPTION	WATER CLOSETS (URINALS: SEE SECTION 424.2) MALE	FEMALE	LAVATORIES MALE	FEMALE	BATHTUBS/ SHOWERS	DRINKING FOUNTAIN (SEE SECTION 410)	OTHER
7	Residential								
8	Storage	Structures for the storage of goods, warehouses, storehouse, ~~and~~ freight depots, and self storage. Low and Moderate Hazard.	1 per 100		1 per 100		—	1 per 1,000	1 service sink

a. The fixtures shown are based on one fixture being the minimum required for the number of *persons* indicated or any fraction of the number of *persons* indicated. The number of occupants shall be determined by this code.

b. Toilet *facilities* for employees shall be separate from *facilities* for inmates or care recipients.

c. A single-occupant toilet room with one water closet and one lavatory serving not more than two adjacent patient *sleeping units* shall be permitted, provided that each patient sleeping unit has direct access to the toilet room and provisions for privacy for the toilet room user are provided.

d. The *occupant load* for seasonal outdoor seating and entertainment areas shall be included when determining the minimum number of *facilities* required.

e. For business and mercantile classifications with an *occupant load* of 15 or fewer, a service sink shall not be required.

f. The required number and type of plumbing fixtures for indoor and outdoor swimming pools shall be in accordance with Section 609 of the International Swimming Pool and Spa Code.

Reason: Self storage facilities have low occupant loads, and most visitors are only in the facility for short periods of time. Thus, the number of available fixtures needed can be minimal.

According to the Self Storage Association (SSA), the size of a facility can range from 10,000 to 100,000 square feet, with an average size of 56,900 square feet. That amounts to approximately 546 units per facility. Per SSA's "Self Storage Standards and the Modern Community," there is an average of 6.82 trips per day for every 100 units. At 546 units, that would be 30.4 trips per day.

Assuming four occupants per trip, that would total 122 visitors daily. Most self storage facilities operate from 6:00 AM to 10:00 PM (16 hours), which means the average occupancy at any one time is 7.6 occupants, plus 3.5 employees (per SSA statistics), for an average total occupant load of 11. There will likely be peak periods where the number of visitors is higher than average.

At 122 occupants, the minimum number of fixtures would provide at least one water closet and one lavatory for each sex. Using the warehouse occupant load factor of 500 gsf per occupant, a large size self storage facility would have an occupant load of 200, which would still only require one closet and one lavatory for each sex, thus not creating an unnecessary burden on self storage facilities by providing an excessive number of fixtures for such low demand. Without definitive direction in the table, some designers have been directed to utilize the "Business" plumbing fixture ratios since a self storage facility is a "business."

For facilities that include on-site residential units for employees, those units would comply with the requirements for one- and two-family dwellings.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Most self storage facilities utilize the "Storage" plumbing fixture ratios as a default; however, the examples provided do not depict a self storage facility. This could cause apprehension, if not confusion when trying to apply the plumbing fixture requirements to facilities like self-storage. Pushing owners towards ratios that generate higher plumbing fixture counts may actually increase the cost of construction. The inclusion of self storage with the provided examples removes all doubt about plumbing ratios to use; thus, allowing owners to anticipate the number of fixtures and stay within their budgets.

P17-24

P18-24

IPC: TABLE 403.1; IBC: TABLE 2902.1

Proponents: Andrew Klein, A S Klein Engineering, PLLC, Self Storage Association (andrew@asklein.com)

2024 International Plumbing Code

Revise as follows:

TABLE 403.1 MINIMUM NUMBER OF REQUIRED PLUMBING FIXTURES[a] (See Sections 403.1.1 and 403.2)
Portions of table not shown remain unchanged.

NO.	CLASSIFICATION	DESCRIPTION	WATER CLOSETS (URINALS: SEE SECTION 424.2)		LAVATORIES		BATHTUBS/ SHOWERS	DRINKING FOUNTAIN (SEE SECTION 410)	OTHER
			MALE	FEMALE	MALE	FEMALE			
8	Storage	Structures for the storage of goods, warehouses, storehouse and freight depots. Low and Moderate Hazard.	1 per 100		1 per 100		—	1 per 1,000	1 service sink
		Self-service storage facilities	1 per 500 units		1 per 500 units		—	1 per 1000 units	—

2024 International Building Code

Revise as follows:

TABLE 2902.1 MINIMUM NUMBER OF REQUIRED PLUMBING FIXTURES[a] (See Sections 2902.1.1 and 2902.2)
Portions of table not shown remain unchanged.

NO.	CLASSIFICATION	DESCRIPTION	WATER CLOSETS (URINALS: SEE SECTION 424.2)		LAVATORIES		BATHTUBS/ SHOWERS	DRINKING FOUNTAIN (SEE SECTION 410)	OTHER
			MALE	FEMALE	MALE	FEMALE			
8	Storage	Structures for the storage of goods, warehouses, storehouse and freight depots. Low and Moderate Hazard.	1 per 100		1 per 100		—	1 per 1,000	1 service sink
		Self-service storage facilities	1 per 500 units		1 per 500 units		—	1 per 1000 units	—

Reason: Self-service storage facilities are low occupancy buildings, where the occupant load is most closely aligned with the number of units rather than the square footage of the building. Such a metric is therefore more appropriate and is being proposed. Service sinks are not needed in self-storage facilities like they are in traditional warehouses.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

The average self-storage facility will save the cost of installing a service sink, about $2,000.

Estimated Immediate Cost Impact Justification (methodology and variables):

Restrooms are currently being overdesigned in self-service storage facilities. This code change proposal attempts to provide an appropriate metric for supplying restroom facilities.Currently, the number of fixtures are tied to occupant load at 1 WC & Lavatory per 100 occupants. and 1 drinking fountain per 1,000 occupants. A total of one service sink is required. IBC Table 1004.5, assigns one occupant per 500 gross SF for warehouses. The current code requires only a single water fountain for self-storage facilities up to 500,000 SF (500 SF/occupant X 1,000 occupants) and one WC/lavatory per 50,000 SF (500 SF/occupant X 100 occupants) of building area.

The average self-storage facility is 46,000 SF of rentable space [*]. Dividing the average net rentable space by the net rentable area percentage results in an average building area of 46,000 - 61,000 gross SF. Dividing the gross building area by 500 SF/occupant results an a building occupancy of 92 - 122 persons in an average building. **The current code, per IPC Table 403.1 therefore requires 1-2 WC/lavs, 1 water fountain, and 1 service sink per average facility.**

The average self-storage unit size is 100 SF [*], and net rentable areas for self-storage facilities are between 75% to 100% of the building [*]. This code change proposal will require a water fountain for each 100,000 - 133,000 SF and a WC/lav for each 50,000 - 67,000 SF of building area.

The average self-storage facility with 46,000 SF of rentable space therefore has 460 units when the rentable area is divided by the average unit size. **This proposal results in the need for 1 WC/lav and 1 water fountain for the average facility, and no service sink.**

The average facility therefore saves on the cost of a service sink (~$1000 [2]) and its installation. Assumed installation cost is 50% of total cost.

[*] SELF STORAGE PRIMER (www.selfstorage.org/LinkClick.aspx?fileticket=AbINHWcUX9w%3D&portalid=0), accessed 1/26/2024

[2] Commercial Service Sink (americanstandard-us.com) (www.americanstandard-us.com/commercial-sinks/commercial-service-sink-list), accessed 1/26/2024

P18-24

P19-24 Part I

IPC: TABLE 403.1; IBC: TABLE 2902.1

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org); Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org)

THIS IS A 3 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IBC EGRESS CODE COMMITTEE. PART III WILL BE HEARD BY THE ISPSC CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

Revise as follows:

TABLE 403.1 MINIMUM NUMBER OF REQUIRED PLUMBING FIXTURES[a] (See Sections 403.1.1 and 403.2)
Portions of table not shown remain unchanged.

NO.	CLASSIFICATION	DESCRIPTION	WATER CLOSETS (URINALS: SEE SECTION 424.2)		LAVATORIES		BATHTUBS/ SHOWERS	DRINKING FOUNTAIN (SEE SECTION 410)	OTHER
			MALE	FEMALE	MALE	FEMALE			
1	Assembly	Coliseums, arenas, skating rinks~~, pools~~ and tennis courts for indoor sporting events and activities ~~f~~	1 per 75 for the first 1,500 and 1 per 120 for the remainder exceeding 1,500	1 per 40 for the first 1,520 and 1 per 60 for the remainder exceeding 1,520	1 per 200	1 per 150	—	1 per 1,000	1 service sink
		Indoor and outdoor swimming pools, spas and aquatic recreation facilities [f]	1 per 200	1 per 100 for the first 400 and 1 per 133 for the remaninder exceeding 400	1 per 400	1 per 300	-	1 per 1,000	1 service sink
		Stadiums, amusement parks, bleachers and grandstands for outdoor sporting events and activities ~~f~~	1 per 75 for the first 1,500 and 1 per 120 for the remainder exceeding 1,500	1 per 40 for the first 1,520 and 1 per 60 for the remainder exceeding 1,520	1 per 200	1 per 150	—	1 per 1,000	1 service sink

a. The fixtures shown are based on one fixture being the minimum required for the number of persons indicated or any fraction of the number of persons indicated. The number of occupants shall be determined by the *International Building Code*.

b. Toilet facilities for employees shall be separate from facilities for inmates or care recipients.

c. A single-user toilet facility with one water closet and one lavatory serving not more than two adjacent care recipient sleeping units shall be permitted provided that each patient sleeping unit has direct access to the toilet room and provision for privacy for the toilet room user is provided.

d. The occupant load for seasonal outdoor seating and entertainment areas shall be included when determining the minimum number of facilities required.

e. For business and mercantile classifications with an occupant load of 15 or fewer, service sinks shall not be required.

f. ~~The required number and type of plumbing fixtures for indoor and outdoor public swimming pools shall be in accordance with Section 609 of the International Swimming Pool and Spa Code.~~ Plumbing fixture requirements are reduced or eliminated for certain Class C swimming pools. See the International Swimming Pool and Spa Code, Section 321.

2024 International Building Code

Revise as follows:

[P] TABLE 2902.1 MINIMUM NUMBER OF REQUIRED PLUMBING FIXTURES[a] (See Sections 2902.1.1 and 2902.2)
Portions of table not shown remain unchanged.

NO.	CLASSIFICATION	DESCRIPTION	WATER CLOSETS (URINALS: SEE SECTION 424.2)		LAVATORIES		BATHTUBS/ SHOWERS	DRINKING FOUNTAIN (SEE SECTION 410)	OTHER
			MALE	FEMALE	MALE	FEMALE			

NO.	CLASSIFICATION	DESCRIPTION	WATER CLOSETS (URINALS: SEE SECTION 424.2) MALE	FEMALE	LAVATORIES MALE	FEMALE	BATHTUBS/ SHOWERS	DRINKING FOUNTAIN (SEE SECTION 410)	OTHER
1	Assembly	Coliseums, arenas, skating rinks, pools and tennis courts for indoor sporting events and activities [f]	1 per 75 for the first 1,500 and 1 per 120 for the remainder exceeding 1,500	1 per 40 for the first 1,520 and 1 per 60 for the remainder exceeding 1,520	1 per 200	1 per 150	—	1 per 1,000	1 service sink
		Indoor and outdoor swimming pools, spas and aquatic recreation facilities [f]	1 per 200	1 per 100 for the first 400 and 1 per 133 for the remanainder exceeding 400	1 per 400	1 per 300	-	1 per 1,000	1 service sink
		Stadiums, amusement parks, bleachers and grandstands for outdoor sporting events and activities [f]	1 per 75 for the first 1,500 and 1 per 120 for the remainder exceeding 1,500	1 per 40 for the first 1,520 and 1 per 60 for the remainder exceeding 1,520	1 per 200	1 per 150	—	1 per 1,000	1 service sink

a. The fixtures shown are based on one fixture being the minimum required for the number of *persons* indicated or any fraction of the number of *persons* indicated. The number of occupants shall be determined by this code.

b. Toilet *facilities* for employees shall be separate from *facilities* for inmates or care recipients.

c. A single-occupant toilet room with one water closet and one lavatory serving not more than two adjacent patient *sleeping units* shall be permitted, provided that each patient sleeping unit has direct access to the toilet room and provisions for privacy for the toilet room user are provided.

d. The *occupant load* for seasonal outdoor seating and entertainment areas shall be included when determining the minimum number of *facilities* required.

e. For business and mercantile classifications with an *occupant load* of 15 or fewer, a service sink shall not be required.

f. ~~The required number and type of plumbing fixtures for indoor and outdoor swimming pools shall be in accordance with Section 609 of the International Swimming Pool and Spa Code.~~ Plumbing fixture requirements are reduced or eliminated for certain Class C swimming pools. See the International Swimming Pool and Spa Code, Section 321.

P19-24 Part I

P19-24 Part II

IBC: TABLE 1004.5, 1004.9 (New); IFC: [BE] TABLE 1004.5, 1004.9 (New)

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org); Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org)

2024 International Building Code

Revise as follows:

TABLE 1004.5 MAXIMUM FLOOR AREA ALLOWANCES PER OCCUPANT

FUNCTION OF SPACE	OCCUPANT LOAD FACTOR[a]
Agricultural building	300 gross
Aircraft hangars	500 gross
Airport terminal	
Baggage claim	20 gross
Baggage handling	300 gross
Concourse	100 gross
Waiting areas	15 gross
Assembly	
Gaming floors (keno, slots, etc.)	11 gross
Exhibit gallery and museum	30 net
Assembly with fixed seats	See Section 1004.6
Assembly without fixed seats	
Concentrated (chairs only—not fixed)	7 net
Standing space	5 net
Unconcentrated (tables and chairs)	15 net
Bowling centers, allow 5 persons for each lane including 15 feet of runway, and for additional areas	7 net
Business areas	150 gross
Concentrated business use areas	See Section 1004.8
Courtrooms—other than fixed seating areas	40 net
Day care	35 net
Dormitories	50 gross
Educational	
Classroom area	20 net
Shops and other vocational room areas	50 net
Exercise rooms	50 gross
Group H-5 fabrication and manufacturing areas	200 gross
Industrial areas	100 gross
Information technology equipment facilities	300 gross
Institutional areas	
Inpatient treatment areas	240 gross
Outpatient areas	100 gross
Sleeping areas	120 gross
Kitchens, commercial	200 gross
Library	
Reading rooms	50 net
Stack area	100 gross
Locker rooms	50 gross
Mall buildings—covered and open	See Section 402.8.2
Mercantile	60 gross
Storage, stock, shipping areas	300 gross
Parking garages	200 gross
Residential	200 gross
Skating rinks~~, swimming pools~~	
Rink ~~and pool~~	50 gross
~~Decks~~ Skating rink decks	15 gross
Stages and platforms	15 net
Swimming pools	
Swimming pool areas with water depth exceeding 5 feet	150 gross
Spa areas	10 gross
Catch pool areas	See Section 1004.9
All other swimming pool areas and decks	24 gross
Warehouses	500 gross

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m^2.

a. Floor area in square feet per occupant.

Add new text as follows:

1004.9 Catch Pools . The *occupant load* of catch pools and designated sections of pools used as a terminus for a water slide flume shall be sum of the maximum number of users that can ride each slide that terminates in that pool or pool area at one time.

2024 International Fire Code

Revise as follows:

[BE] TABLE 1004.5 MAXIMUM FLOOR AREA ALLOWANCES PER OCCUPANT

FUNCTION OF SPACE	OCCUPANT LOAD FACTOR[a]
Accessory storage areas, mechanical equipment room	300 gross
Agricultural building	300 gross
Aircraft hangars	500 gross
Airport terminal	
Baggage claim	20 gross
Baggage handling	300 gross
Concourse	100 gross
Waiting areas	15 gross
Assembly	
Gaming floors (keno, slots, etc.)	11 gross
Exhibit gallery and museum	30 net
Assembly with fixed seats	See Section 1004.6
Assembly without fixed seats	
Concentrated (chairs only—not fixed)	7 net
Standing space	5 net
Unconcentrated (tables and chairs)	15 net
Bowling centers, allow 5 persons for each lane including 15 feet of runway, and for additional areas	7 net
Business areas	150 gross
Concentrated business use areas	See Section 1004.8
Courtrooms—other than fixed seating areas	40 net
Day care	35 net
Dormitories	50 gross
Educational	
Classroom area	20 net
Shops and other vocational room areas	50 net
Exercise rooms	50 gross
Group H-5 fabrication and manufacturing areas	200 gross
Industrial areas	100 gross
Information technology equipment facilities	300 gross
Institutional areas	
Inpatient treatment areas	240 gross
Outpatient areas	100 gross
Sleeping areas	120 gross
Kitchens, commercial	200 gross
Library	
Reading rooms	50 net
Stack area	100 gross
Locker rooms	50 gross
Mall buildings—covered and open	See Section 402.8.2 of the International Building Code
Mercantile	60 gross
Storage, stock, shipping areas	300 gross
Parking garages	200 gross
Residential	200 gross
Skating rinks~~, swimming pools~~	
Rink ~~and pool~~	50 gross
~~Decks~~ Skating rink decks	15 gross
Stages and platforms	15 net
Swimming pools	
Swimming pool areas with water depth exceeding 5 feet	150 gross
Spa areas	10 gross
Catch pool areas	See Section 1004.9
All other swimming pool areas and decks	24 gross

FUNCTION OF SPACE	OCCUPANT LOAD FACTOR
Warehouses	500 gross

For SI: 1 square foot = 0.0929 m^2, 1 foot = 304.8 mm.

a. Floor area in square feet per occupant.

Add new text as follows:

1004.9 Catch Pools. The *occupant load* of catch pools and designated sections of pools used as a terminus for a water slide flume shall be sum of the maximum number of users that can ride each slide that terminates in that pool or pool area at one time.

P19-24 Part II

P19-24 Part III

ISPSC: SECTION 202 (New), 202 (New), SECTION 321 (New), 321.1 (New), 321.2 (New), 321.2.1 (New), 321.2.1.1 (New), 321.2.1.2 (New), 321.3 (New), 321.3.1 (New), 321.4 (New), 321.4.1 (New), 321.4.2 (New), 321.5 (New), 321,6 (New), 321.7 (New), 321.8 (New), 321.9 (New), SECTION 410, 410.1, SECTION 608, 608.1, TABLE 608.1, 608.2, SECTION 609, 609.1, 609.2, 609.2.1, 609.2.2, 609.3, 609.3.1, 609.3.2, 609.3.3, 609.4, 609.4.1, 609.4.2, 609.5, 609.6, 609.7, 609.8, 609.9

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org); Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org)

2024 International Swimming Pool and Spa Code

Add new definition as follows:

SHOWER. A device that sprays water on the body.

Cleansing.
A shower located within a hygiene facility using warm water and soap. The purpose of showers is to remove contaminants including perianal fecal material, sweat, skin cells, personal care products, and dirt before bathers enter the aquatic venue.

Rinse. A shower typically located in the pool deck area with ambient temperature water. The main purpose is to remove dirt, sand, or organic material prior to entering the aquatic venue to reduce the introduction of contaminants and the formation of disinfection byproduct.

Add new text as follows:

SECTION 321
DRESSING AND SANITARY FACILITIES

321.1 General. Dressing and sanitary facilities for public pools, public spas and aquatic recreation facilities shall be provided in accordance with the minimum requirements of the *International Building Code*, the *International Plumbing Code* and Sections 321.2 through 321.9. These facilities shall be located within a 300 foot path of travel from the pool area.

321.2 Number of fixtures. The minimum number of required water closets, urinals, lavatories, and drinking fountains fixtures shall be provided in accordance with the minimum requirements of the *International Building Code* and the *International Plumbing Code*.

Exception: For Class C swimming pools, fixtures dedicated to the pool area shall not be required where all dwelling units meet all of the following requirements:

1. The dwelling units have private facilities.
2. The dwelling units are within a 300 feet path of travel from the pool area.
3. The dwelling units are not more than one story above or below the pool area.

For Class C swimming pools where some but not all dwelling units meet the requirements of this exception, the minimum occupant load used to calculate the minimum fixture requirements shall be reduced by a factor equal to the number of dwelling units meeting these requirements, divided by the total number of dwelling units served by the pools.

321.2.1 Dressing facilties and rinsing showers. Dressing facilities and the number of rinse showers shall be provided in accordance with Sections 321.2.1.1 and 321.2.1.2.

321.2.1.1 Dressing Facilities. Public pools, public spas and aquatic recreation facilities shall have dressing facilities.

Exception: This section shall not apply to Class C pools.

321.2.1.2 Rinse shower. In addition to the requirement for cleansing showers in the International Plumbing Code and International

Building Code, not less than one rinse shower shall be provided on the deck of, or at the entrance of, each pool.

321.3 Water heater and mixing valve. Bather access to water heaters and thermostatically controlled mixing valves for showers shall be prohibited.

321.3.1 Temperature. At each cleansing showerhead, hot or tempered water shall be provided as required by the *International Plumbing Code*.

Exception: Water supplied to rinse showers shall not be required to be heated

321.4 Soap dispensers. . Soap dispensers shall be in accordance with Sections 329.4.1 and 329.4.2.

321.4.1 Liquid or powdered soap. Soap dispensers shall be provided at each lavatory and cleansing shower. Soap dispensers shall dispense liquid or powdered soap. Reusable cake soap shall be prohibited. Soap dispensers and soap shall not be provided at rinse showers.

321.4.2 Metal or plastic dispenser. Soap dispensers shall be made of metal or plastic. Glass materials shall be prohibited.

321.5 Toilet tissue holder. A toilet tissue holder shall be provided at each water closet

321,6 Mirrors. Where provided, mirrors shall be shatter resistant

321.7 Sanitary napkin receptacles. Sanitary napkin receptacles shall be provided in each water closet compartment for females and in the cleansing area of the showers for female use only.

321.8 Sanitary napkin dispensers. A sanitary napkin dispenser shall be provided in each toilet facility for females.

321.9 Infant care. Baby-changing tables shall be provided in toilet facilities

SECTION 410
SANITARY FACILITIES

Revise as follows:

410.1 ~~Toilet facilities~~ General. ~~Class A and B pools~~ Public pools and public spas shall be provided with ~~toilet facilities~~ dressing and sanitary facilities ~~having the required number of plumbing fixtures~~ in accordance with Section 321.~~the *International Building Code* or the *International Plumbing Code*.~~

SECTION 608
NUMBER OF OCCUPANTS

Revise as follows:

608.1 Occupant load. The occupant load for the Class D-1, D-4, and D-6 pools ~~or spas~~ in the facility shall be calculated in accordance with Table 608.1~~.~~ , however the occupant load used for the minimum fixture count shall be calculated in accordance with Table 1004.5 of the International Building Code. The occupant load for all other pools shall be calculated in accordance with Table 1004.5 of the International Building Code.

~~The occupant load shall be the combined total of the number of users based on the pool or spa water surface area and the deck area surrounding the pool or spa. The deck area occupant load shall be based on the occupant load calculated where a deck is provided or based on an assumed 4-foot-wide (1219 mm) deck surrounding the entire perimeter of the pool or spa, whichever is greater.~~

TABLE 608.1 INCREASED OCCUPANT LOAD FOR CLASS D-1, D-4, AND D-6 POOLS

SHALLOW OR WADING ZERO DEPTH AREAS	DEEP AREA ~~(NOT INCLUDING THE DIVING AREA)~~	~~DIVING AREA (PER EACH DIVING BOARD)~~	DRY DECK AREA	
Vessel water surface area	8 sq. ft per user	~~10 sq. ft. per user~~	300 sq. ft. per user	—
Deck area	—	~~—~~	—	1 user per 15 sq. ft.

For SI: 1 square foot = 0.0929 m^2.

Delete without substitution:

~~**608.2 Facility capacity.** For multiple pools and spas in a single aquatic recreation facility, the total facility occupant capacity shall not be limited by the number of occupants calculated in accordance with Section 608.1.~~

SECTION 609
DRESSING AND SANITARY FACILITIES

Revise as follows:

609.1 General. Dressing and sanitary facilities shall be provided in accordance with the minimum requirements of Section 321. ~~the *International Building Code* and *International Plumbing Code* and Sections 609.2 through 609.9.~~

Delete without substitution:

~~**609.2 Number of fixtures.** The minimum number of required water closets, urinals, lavatory, and drinking fountain fixtures shall be provided as required by the *International Building Code* and *International Plumbing Code* and the dressing facilities and number of cleansing and rinse showers shall be provided in accordance with Sections 609.2.1, 609.2.2, and 609.3.1.~~

~~**609.2.1 Water area less than 7500 square feet.** Facilities that have less than 7500 gross square feet (697 m²) of water area available for bather access shall have dressing facilities and not less than one cleansing shower for males and one cleansing shower for females.~~

~~**Exception:** This requirement shall not apply to Class C semipublic pools.~~

~~**609.2.2 Water area 7500 square feet or more.** Facilities that have 7500 gross square feet (697 m²) or more of water area available for bather access shall have dressing facilities and not less than one cleansing shower for males, and one cleansing shower for females for every 7500 square feet (697 m²) or portion thereof. Where the result of the fixture calculation is a portion of a whole number, the result shall be rounded up to the nearest whole number.~~

~~**609.3 Showers.** Showers shall be in accordance with Sections 609.3.1 through 609.3.3.~~

~~**609.3.1 Rinse shower.** In addition to the requirement for cleansing showers in Sections 609.2.1 and 609.2.2, not less than one rinse showershall be provided on the deck of or at the entrance of each pool.~~

~~**609.3.2 Water heater and mixing valve.** Bather access to water heaters and thermostatically controlled mixing valves for showers shall be prohibited.~~

~~**609.3.3 Temperature.** At each cleansing showerhead, the heated shower water temperature shall be not less than 90°F (32°C) and not greater than 120°F (49°C). Water supplied to rinse showers shall not be required to be heated.~~

~~**609.4 Soap dispensers.** Soap dispensers shall be in accordance with Sections 609.4.1 and 609.4.2.~~

~~**609.4.1 Liquid or powder.** Soap dispensers shall be provided at each lavatory and cleansing shower. Soap dispensers shall dispense liquid or powdered soap. Reusable cake soap is prohibited. Soap dispensers and soap shall not be provided at rinse showers.~~

~~**609.4.2 Metal or plastic.** Soap dispensers shall be made of metal or plastic. Glass materials shall be prohibited.~~

~~**609.5 Toilet tissue holder.** A toilet paper holder shall be provided at each water closet.~~

~~**609.6 Lavatory mirror.** Where mirrors are provided, they shall be shatter resistant.~~

~~**609.7 Sanitary napkin receptacles.** Sanitary napkin receptacles shall be provided in each water closet compartment for females and in the cleansing area of the showers for female use only.~~

~~**609.8 Sanitary napkin dispensers.** A sanitary napkin dispenser shall be provided in each toilet facility for females.~~

~~**609.9 Infant care.** Baby-changing tables shall be provided in toilet facilities having two or more water closets.~~

Reason: Background

The *2024 International Swimming Pool and Spa Code* does not have any restroom fixture requirements for class A, B, or C pools. For Class D pools, the fixture count is deferred to the *2024 International Plumbing Code.* But that code does not divide pools by class, and requires a large number of plumbing fixtures for indoor pools, but none for outdoor pools. The number of plumbing fixtures is an important public health concern as bathrooms being too far away or long lines for the bathroom will encourage some people to urinate in the pool. This is true regardless of the class of the pool and regardless of its location indoors and outdoors. That said, the number of fixtures required for indoor pools has been found to be excessive. The occupants of a pool and deck area will all use the bathroom on their own relaxed schedule. They will not all go at the same time as they might at a coliseum or arena. Therefore we have an obvious need to reduce the fixture requirement for indoor pools, but apply the same requirement for outdoor pools, and make the requirements cover all pools according to their class.

Occupant loads assigned under existing codes

In the *2024 International Building Code*, the current occupant load factors for pools are 50 gross in the pool and 15 gross on the deck. We have found that both requirements are unrealistic for most pools today. Pools today are shallower, many have no deep end at all. As a result, people comfortably congregate in them more closely than they used to. When the deck area and pool area are equal, these factors are equivalent to ignoring the deck area and assigning one user per 12 square feet of water, or assigning one user per 24 square feet of deck and water surface area per occupant.

The *2024 International Swimming Pool and Spa Code* recommends that a *bather load* (this is not the same thing as *occupant load*) be assigned based on various factors that vary from 20 gross to 8 gross. Confusingly, the load factors get smaller as the deck area gets bigger. The result is that the *bather load* stops increasing with deck area once the deck area is equal to twice the pool area. In this case, the maximum bather load is 8 square feet of water surface area per bather, or, equivalently, 24 square feet of deck and water surface per bather. When the deck area is equal to the water surface area, again the math comes out to 24 square feet of deck and water surface area per bather.

For Class D pools only, the *2024 ISPSC* does assign an occupant load. It requires a much larger load, with the load factor varying from 10 gross to 8 gross, this time with deck area considered at 15 gross (this changed in 2015 to harmonize it with IBC Table 1004.5. Previously it was 50 gross). These occupant loads are aggressively larger, but only if the jurisdiction has adopted the *ISPSC.* This increased load might be reasonable for heavily used wave pools and leisure rivers, but other Class D pools can only be used by a few users at a time, for instance floating lily pad walks, climbing walls, water slides, etc, so that increase does not make much sense in these cases.

The *Model Aquatic Health Code* assigns occupant load factors ranging from 10 to 20 square feet for water surface area, but only one occupant per 50 square feet on the deck. This is roughly a mirror image of the current *International Building Code.*

Justification of changes occupant loads in IBC Table 1004.5 and ISPSC 608.1

- **Swimming pool areas with water depth exceeding 5 ft** – users do not lounge or congregate in these areas because keeping one's head above water requires constant effort. They are doing activities such as lap swimming, diving, synchronized swimming, and water polo. The highest density of these activities is water polo, with a pool area as small as 20 meters by 10 meters being used by two teams of seven players each. The result is one occupant per 150 square feet.
- **Spa areas –** The *Model Aquatic Health Code* and *Florida Building Code* both assign 1 occupant or bather per 10 square feet. It

would not be conservative for the *International Building Code* to ignore this guidance.

· **Catch pools –** The slides are supervised and people are not permitted to go down the slide unless the area is clear.

· **All other swimming pool areas and decks –** Currently these areas are treated very differently. We have observed users congregating in pools tighter than one per 50 square feet. As for the deck, it is reasonable to think that people congregate in deck areas similar to unconcentrated assembly seating or airport terminal waiting areas (which both get a load factor of 15), however, most of these people "reserve" a movable chair for themselves with a towel or purse and then proceed to the pool. Increasing this factor to 24 accounts for the fact that some people stay in this area, but most reserve a space in the area before moving on to another area. Assigning the same factor to both areas is logical when you consider the increased number of tanning ledges that are being installed recently. Such areas are basically used the same as deck, mainly used by people standing or in lounge chairs, yet the load factor is different. The load factor should be the same.

· **Class D-1, D-4, and D-6 pool deep areas –** These bodies of water do not tend to have deep areas, and even when they do, ropes are placed to discourage users from using them. The occupant load factors for shallow areas and decks have been left alone so that the egress requirements for these types of pools will not change. However, in past versions of the code the Class D minimum fixture count was not based on this very high number of occupants. In the 2018 code, a Leisure River with 7500 square feet of water and 7500 square feet of deck would have 1,438 occupants but only require 2 water closets for females. We are proposing that the occupant count would remain 1,438, but that number brought to the proposed revision of Table 2902 computes to 7 water closets for females. That is roughly similar to what the current code would call for on an indoor class A, B, or C pool, and that is too high. So this proposal adds a clause to Section 608 of the *ISPSC* that Table 608 should not be used for fixture count, rather Table 1004.5 of the *IBC* should be used. This way changing a pool from Class C to Class D will have no impact on the minimum fixture count, but it would have an impact on egress and other occupant count related items. The minimum fixture count for the Leisure River mentioned above would be 4 water closets for females.

· **Other Class D pools –** This includes catch pools, activity pools, and vortex pools. These pools are meant to be used by distinct groups of supervised users one at a time. Letting them default back to one occupant per 24 square feet rather than one per 8 square feet is still conservative.

Summary of changes occupant loads resulting from this proposal

The changes to 1004.5 under this proposed change would give:

Class A, B, or C Pool, 5' deep or less, with

deck area *less than* pool area

Slightly *more* occupants

deck area *equal* to pool area

The *same* number occupants

deck area *more than* pool area

Slightly *fewer* occupants

Catch Pools

~ 100x *fewer* occupants

Wave Pools, Leisure Rivers, Interactive Water Features, 5' deep or less

The *same* (very large) number of occupants

Activity Pools, Vortex Pools, Pool areas greater than 5' deep

3x *fewer* occupants

Spa Pools

5x *more* occupants

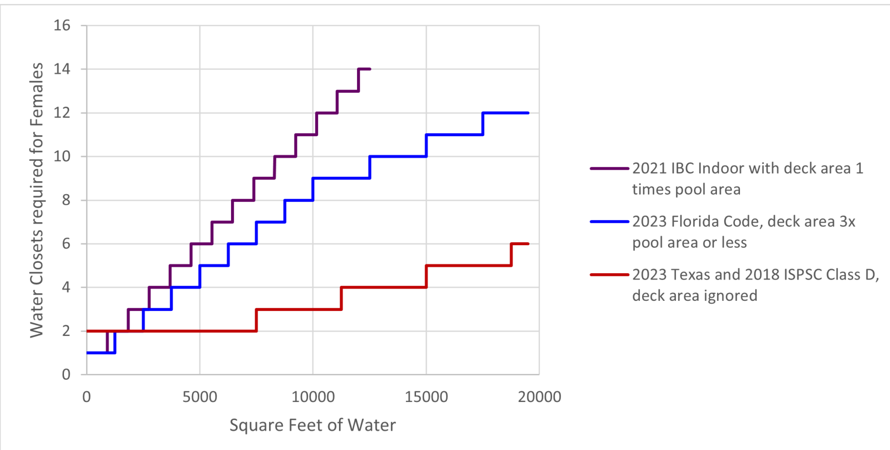
Minimum Fixture Count in 2018 I-codes

The *International Swimming Pool and Spa Code 2018* assigned a minimum fixture count to all Class D pools. This fixture count overruled Table 2902 in the *IBC.* In this code year, the result was a Class D pool would be assigned many more occupants than a Class

A, B, or C pool. But if it was indoors, it would be assigned many fewer minimum restroom fixtures than a similar Class A, B, or C pool. If it was outdoors, it would be assigned the same small number of fixtures, even though a Class A, B, or C pool would not have any minimum number of fixtures. In the 2021 code cycle, section 609 of the *International Swimming Pool and Spa Code* was truncated, leaving only a minimum number of showers, not of toilets or lavatories, for outdoor pools and Class D pools.

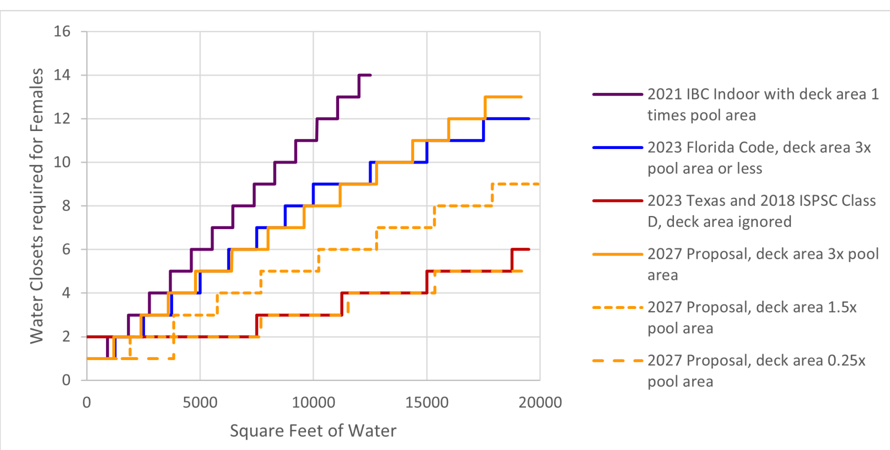
Minimum Fixture Count in current codes

The *International Building Code* assigns fixtures to occupants, of indoor pools, and assigns occupants both to the deck area and the pool water area. No fixtures are assigned to occupants of outdoor pools. In effect, fixtures are assigned both to areas of the deck and areas of the pool. The other state-level codes surveyed in this effort are for Florida and Texas. In Texas, the deck area is ignored entirely. In Florida, it is ignored for all deck area less than 3x of the pool area, which practically includes all pool decks. But in the current *IBC,* for indoor pools only, the deck area becomes a much more important factor than the pool area. The number of fixtures required by this code is already significantly more than Florida would require even when the deck is only 1x of the pool area. The reason is because the occupants of a pool and pool deck are treated the same as the occupants of a stadium or arena in terms of their need to use the bathroom. Meanwhile Texas, ignoring the pool area, their code gives a result that is much lower for the same pool. But Texas didn't make this up, rather, their table comes from section 609 of the 2018 ISPSC.



Justification of new row in IBC Table 2902.1

The intent of adding a new row, rather than using the existing rows for coliseums and arenas, is to reduce the number of fixtures required. The occupants of a pool and deck area will all use the bathroom on their own relaxed schedule. They will not all go at the same time as they might at a coliseum or arena. The calculation results in the new orange lines shown in the graph below, with the existing codes still shown for reference. The new code proposal will agree closely with the Florida Code when the deck is 3x the pool area, and agree closely with the Texas code when only minimal deck is provided.



Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0

Estimated Immediate Cost Impact Justification (methodology and variables):

For indoor pools and Class D pools plumbing fixture requirement will be about the same. Indoor pool plumbing fixture requirements will be reduced. Outdoor pool plumbing fixture requirements will be increased. Overall, the number of plumbing fixtures will be slightly decreased.

P19-24 Part III

P20-24

IPC: 403.1.1, TABLE 403.1; IBC: TABLE 2902.1, [P] 2902.1.1

Proponents: Eirene Knott, BRR Architecture, BRR Architecture (eirene.knott@brrarch.com)

2024 International Plumbing Code

Revise as follows:

403.1.1 Fixture calculations.
To determine the occupant load of each sex, the total occupant load shall be divided in half. To determine the required number of fixtures, the fixture ratio or ratios for each fixture type shall be applied to the occupant load of each sex in accordance with Table 403.1. Fractional numbers resulting from applying the fixture ratios of Table 403.1 shall be rounded up to the next whole number. For calculations involving multiple *occupancies*, such fractional numbers for each *occupancy* shall first be summed and then rounded up to the next whole number.

Exceptions:

1. The total occupant load shall not be required to be divided in half where *approved* statistical data indicate a distribution of the sexes of other than 50 percent of each sex.
2. Where multiple-user facilities are designed to serve all genders, the minimum fixture count shall be calculated 100 percent, based on total occupant load. In such multiple-user facilities, each fixture type shall be in accordance with ICC A117.1.
3. <u>Where a swimming pool serves only a designated group of residential sleeping or dwelling units and not the general public, poolside sanitary facilities are not required if all such units are within a 250-foot horizontal radius of the nearest water's edge, are not over three stories in height unless serviced by an elevator, and are each equipped with private sanitary facilities.</u>

TABLE 403.1 MINIMUM NUMBER OF REQUIRED PLUMBING FIXTURES[a] (See Sections 403.1.1 and 403.2)
Portions of table not shown remain unchanged.

No changes to Table - only footnotes

a. The fixtures shown are based on one fixture being the minimum required for the number of persons indicated or any fraction of the number of persons indicated. The number of occupants shall be determined by the *International Building Code*.

b. Toilet facilities for employees shall be separate from facilities for inmates or care recipients.

c. A single-user toilet facility with one water closet and one lavatory serving not more than two adjacent care recipient sleeping units shall be permitted provided that each patient sleeping unit has direct access to the toilet room and provision for privacy for the toilet room user is provided.

d. The occupant load for seasonal outdoor seating and entertainment areas shall be included when determining the minimum number of facilities required.

e. For business and mercantile classifications with an occupant load of 15 or fewer, service sinks shall not be required.

f. The required number and type of plumbing fixtures for indoor and outdoor public swimming pools shall <u>also</u> be in accordance with Section 609 of the International Swimming Pool and Spa Code.

2024 International Building Code

Revise as follows:

[P] TABLE 2902.1 MINIMUM NUMBER OF REQUIRED PLUMBING FIXTURES[a] (See Sections 2902.1.1 and 2902.2)
Portions of table not shown remain unchanged.

No changes to Table - only footnotes

a. The fixtures shown are based on one fixture being the minimum required for the number of *persons* indicated or any fraction of the number of *persons* indicated. The number of occupants shall be determined by this code.

b. Toilet *facilities* for employees shall be separate from *facilities* for inmates or care recipients.

c. A single-occupant toilet room with one water closet and one lavatory serving not more than two adjacent patient *sleeping units* shall be permitted, provided that each patient sleeping unit has direct access to the toilet room and provisions for privacy for the toilet room user are provided.

d. The *occupant load* for seasonal outdoor seating and entertainment areas shall be included when determining the minimum number of *facilities* required.

e. For business and mercantile classifications with an *occupant load* of 15 or fewer, a service sink shall not be required.

f. The required number and type of plumbing fixtures for indoor and outdoor swimming pools shall <u>also</u> be in accordance with Section 609 of the International Swimming Pool and Spa Code.

[P] 2902.1.1 Fixture calculations.
To determine the *occupant load* of each sex, the total *occupant load* shall be divided in half. To determine the required number of fixtures, the fixture ratio or ratios for each fixture type shall be applied to the *occupant load* of each sex in accordance with Table 2902.1. Fractional numbers resulting from applying the fixture ratios of Table 2902.1 shall be rounded up to the next whole number. For calculations involving multiple occupancies, such fractional numbers for each occupancy shall first be summed and then rounded up to the next whole number.

Exceptions:

1. The total *occupant load* shall not be required to be divided in half where *approved* statistical data indicates a distribution of the sexes of other than 50 percent of each sex.
2. Where multiple-user *facilities* are designed to serve all genders, the minimum fixture count shall be calculated 100 percent, based on total *occupant load*. In such multiple-user user *facilities*, each fixture type shall be in accordance with ICC A117.1.
3. <u>Where a swimming pool serves only a designated group of residential sleeping or dwelling units and not the general public, poolside sanitary facilities are not required if all such units are within a 250-foot horizontal radius of the nearest water's edge, are not over three stories in height unless serviced by an elevator, and are each equipped with private sanitary facilities.</u>

Reason: The proposed language is attempting to do two things. The first is to clean up what appears to be a circular reference in both the IBC and IPC to the ISPSC on the required facilities for both indoor and outdoor pools. Footnote f to the fixture tables directs the user to the ISPSC for fixtures associated with an indoor or outdoor public swimming pools. However, the section referenced in the table (ISPSC 609) refers to the IBC/IPC for the toilet facilities and the ISPSC then addresses the need for the bathing room. When I amended the footnote to the table last year, my point was to not require the bathing facility for a hotel/motel or apartment/condominium complex. Then I subsequently amended the ISPSC to not require the bathing facility for pools associated with a Class C semipublic pool serving hotels, motels, apartments and condominiums. It was not until I wanted to update the toilet facility with the second part of this change that I realized there was a circular reference occurring.

The second part of the proposed language is an attempt to reduce the number of required plumbing fixtures at a swimming pool associated with a hotel/motel or apartment/condominium complex. Most people in these facilities will use the toilet room associated with their sleeping or dwelling unit rather than use the ones provided at the pool itself. Allowing for the recognition of the toilets provided within each sleeping/dwelling unit will allow for a reduction in the plumbing fixtures required at the pool itself. These pools are limited in use by those staying as guests of the hotel or residents of the apartment/condominium complex; these are not used by the general public. Per the ISPSC, this type of pool is recognized as a Class C semi-public pool, since it is operated solely for and in conjunction with a hotel, motel, apartments or condominiums.

Some concern may be raised about hotels with water parks associated with them. I believe the requirements of the ISPSC would require the bathing facility based on the area of the water area as many of these areas will be over the 7,500 square foot requirement under the

ISPSC for the bathing facility.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$65,000. If a hotel/motel or apartment/condominium facility is not required to provide additional toilet facilities within the pool area due to each guest room being within a reasonable distance to the pool side, this could provide for a reduction in overall costs, especially those associated with long term maintenance of the pool area.

Estimated Immediate Cost Impact Justification (methodology and variables):

To provide two accessible single user toilet rooms, new construction can run around $65,000 based on all associated costs such as plumbing pipe, electrical wiring, metal stud partitions, insulation, sprinkler protection, gypsum wallboard and associated finishes, including water closets, lavatories, drinking fountains, grab bars, and tiled walls. These new construction costs were provided for by a general contractor for a multi user toilet room and a ratio was used based on the square footage associated with the multi user toilet rooms and two accessible, single user toilet rooms.

This cost does not include any maintenance associated with the toilet rooms once they have been constructed. Vandalism is something to consider and the costs associated with replacement of fixtures. Water closets can cost on average to replace at least $250 just for the fixture itself, with a lavatory running slightly less at around $100. The replacement costs are based on a google search and the average pricing found for an ADA water closet and an ADA lavatory.

Estimated Life Cycle Cost Impact:

N/A

Estimated Life Cycle Cost Impact Justification (methodology and variables):

N/A

P20-24

P21-24

IPC: 403.1.1; IBC: [P] 2902.1.1

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Plumbing Code

Revise as follows:

403.1.1 Fixture calculations.
To determine the occupant load of each sex, the total occupant load shall be divided in half. To determine the required number of fixtures, the fixture ratio or ratios for each fixture type shall be applied to the occupant load of each sex in accordance with Table 403.1. Fractional numbers resulting from applying the fixture ratios of Table 403.1 shall be rounded up to the next whole number. For calculations involving multiple *occupancies*, such fractional numbers for each *occupancy* shall first be summed and then rounded up to the next whole number.

Exceptions:

1. The total occupant load shall not be required to be divided in half where *approved* statistical data indicate a distribution of the sexes of other than 50 percent of each sex.
2. Where multiple-user facilities are designed to serve all genders, the minimum fixture count shall be calculated ~~100 percent, based~~ on the total occupant load and shall be based on the method outlined in Section 403.1.1 . In such multiple-user facilities, each fixture type shall be in accordance with ICC A117.1 .

2024 International Building Code

Revise as follows:

[P] 2902.1.1 Fixture calculations.
To determine the *occupant load* of each sex, the total *occupant load* shall be divided in half. To determine the required number of fixtures, the fixture ratio or ratios for each fixture type shall be applied to the *occupant load* of each sex in accordance with Table 2902.1. Fractional numbers resulting from applying the fixture ratios of Table 2902.1 shall be rounded up to the next whole number. For calculations involving multiple occupancies, such fractional numbers for each occupancy shall first be summed and then rounded up to the next whole number.

Exceptions:

1. The total *occupant load* shall not be required to be divided in half where *approved* statistical data indicates a distribution of the sexes of other than 50 percent of each sex.
2. Where multiple-user *facilities* are designed to serve all genders, the minimum fixture count shall be calculated ~~100 percent, based~~ on the total occupant load and shall be based on the method outlined in Section 403.1.1. In such multiple-user user *facilities*, each fixture type shall be in accordance with ICC A117.1 .

Reason: The phrase "calculated 100 percent" has caused confusion especially where Table 403.1 has different fixture ratios for males and females. This proposal points the reader to Section 403.1.1 where the standard calculation method is given and well understood.

This proposal is submitted by the ICC Plumbing Mechanical Gas Code Action Committee (PMGCAC)
PMGCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 PMGCAC has held 26 virtual meetings open to any interested party. In addition, there were several virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the PMGCAC website at PMGCAC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This only clarifies how to apply the IPC Table 403.1.

P21-24

P22-24

IPC: 403.1.1; IBC: [P] 2902.1.1

Proponents: Jeffrey Grove, Southern Nevada ICC Chapter (jeff.grove@coffman.com)

2024 International Plumbing Code

Revise as follows:

403.1.1 Fixture calculations.
To determine the occupant load of each sex, the total occupant load shall be divided in half. To determine the required number of fixtures, the fixture ratio or ratios for each fixture type shall be applied to the occupant load of each sex in accordance with Table 403.1. Fractional numbers resulting from applying the fixture ratios of Table 403.1 shall be rounded up to the next whole number. For calculations involving multiple *occupancies*, such fractional numbers for each *occupancy* shall first be summed and then rounded up to the next whole number.

Exceptions:

1. The total occupant load shall not be required to be divided in half where *approved* statistical data indicate a distribution of the sexes of other than 50 percent of each sex.
2. Where multiple-user facilities are designed to serve all genders, the minimum fixture count shall be calculated 100 percent, based on total occupant load. In such multiple-user facilities, ~~each fixture type shall be in accordance with ICC A117.1~~ the required number of accessible fixtures shall be determined in accordance with IBC Section 1110.
.

2024 International Building Code

Revise as follows:

[P] 2902.1.1 Fixture calculations.
To determine the *occupant load* of each sex, the total *occupant load* shall be divided in half. To determine the required number of fixtures, the fixture ratio or ratios for each fixture type shall be applied to the *occupant load* of each sex in accordance with Table 2902.1. Fractional numbers resulting from applying the fixture ratios of Table 2902.1 shall be rounded up to the next whole number. For calculations involving multiple occupancies, such fractional numbers for each occupancy shall first be summed and then rounded up to the next whole number.

Exceptions:

1. The total *occupant load* shall not be required to be divided in half where *approved* statistical data indicates a distribution of the sexes of other than 50 percent of each sex.
2. Where multiple-user *facilities* are designed to serve all genders, the minimum fixture count shall be calculated 100 percent, based on total *occupant load*. In such multiple-user ~~user~~ *facilities*, ~~each fixture type shall be in accordance with ICC A117.1.~~ the required number of accessible fixtures shall be determined in accordance with IBC Section 1110.

Reason: The removal of; “each fixture type shall be in accordance with ICC A117.1” is necessary for two reasons. First, the term: “each fixture type” does not accurately capture the intent of this provision. The actual intent here should be to reference the minimum “number of accessible fixtures” required, not the type of fixtures present. Second, the term “shall be in accordance with ICC A117.1” also does not accurately capture the intent of this provision because the IBC contains the scoping provisions for accessibility (i.e. the required quantities of accessible fixtures and elements), whereas the ICC A117.1 does not. Additionally, as adopted, the reference to ICC A117.1 here appears to mandate that 100% of all toilet fixtures in multiple-user facilities designed to serve all genders are required to be accessible. That’s because within the ICC A117.1 standard, there are only two (2) available design options for toilets within a multi-user restrooms:

1. A wheelchair accessible toilet compartment (per ICC A117.1 Section 604.9), or
2. An ambulatory accessible toilet compartment (per ICC A117.1 Section 604.10)

In its entirety, IBC Section 1110 fully enumerates the required quantities of accessible fixtures for all fixture types in each of the available toilet/bathing room facility types (i.e. configurations) that could possibly be provided within a building.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Because this proposal is a clarification, it neither increases nor decreases the cost of construction.

P22-24

P23-24

IPC: 403.2; IBC: [P] 2902.2

Proponents: Eirene Knott, BRR Architecture, Metropolitan Kansas City Chapter of the ICC (eirene.knott@brrarch.com)

2024 International Plumbing Code

Revise as follows:

403.2 Separate facilities.
Where plumbing fixtures are required, separate toilet facilities shall be provided for each sex.

Exceptions:

1. Separate toilet facilities shall not be required for dwelling units and sleeping units.
2. Separate toilet facilities shall not be required in structures or tenant spaces with a total occupant load, including both employees and customers, of 15 or fewer.
3. Separate toilet facilities shall not be required in mercantile *occupancies* in which the maximum occupant load is 100 or fewer.
4. Separate toilet facilities shall not be required in business <u>or residential</u> *occupancies* in which the maximum occupant load is 25 or fewer.
5. Separate toilet facilities shall not be required to be designated by sex where single-user toilet rooms are provided in accordance with Section 403.1.2.
6. Separate toilet facilities shall not be required where rooms having both water closets and lavatory fixtures are designed for use by all persons regardless of sex and privacy is provided for water closets in accordance with Section 405.3.4 and for urinals in accordance with Section 405.3.5.

2024 International Building Code

Revise as follows:

[P] 2902.2 Separate facilities.
Where plumbing fixtures are required, separate *facilities* shall be provided for each sex.

Exceptions:

1. Separate toilet *facilities* shall not be required for *dwelling units* and *sleeping units*.
2. Separate toilet *facilities* shall not be required in *structures* or tenant spaces with a total *occupant load*, including both employees and customers, of 15 or fewer.
3. Separate toilet *facilities* shall not be required in mercantile occupancies in which the maximum *occupant load* is 100 or fewer.
4. Separate toilet *facilities* shall not be required in business <u>or residential</u> occupancies in which the maximum *occupant load* is 25 or fewer.
5. Separate toilet *facilities* shall not be required to be designated by sex where single-user toilet rooms are provided in accordance with Section 2902.1.2.
6. Separate toilet *facilities* shall not be required where rooms having both water closets and lavatory fixtures are designed for use by all *persons* regardless of sex and privacy is provided for water closets in accordance with Section 405.3.4 of the *International Plumbing Code* and for urinals in accordance with Section 405.3.5 of the *International Plumbing Code* .

Reason: Hotels/Motels that do not offer any public amenities should not be required to provide multiple toilet rooms, as a single user toilet room can accommodate the smaller occupant loads associated with these hotels.

Many hotel chains provide the bare minimum for guests and do not provide a breakfast service. For those, they usually only offer a fitness room that's less than 750 square feet and a guest laundry room. Any additional spaces provided are for hotel employees only and are very minimum in nature, usually comprising of a small office space and the front check-in area. In many cases, the total occupant load of all of these spaces can be calculated to be less than 25 occupants. For these hotels/motels, providing two separate sex or two unisex toilet rooms eats into space that would be used to serve these small areas. To provide a single user toilet room would meet the requirement for employees to have access to a toilet room as well as giving hotel guests the convenience of using a toilet room after working out or while doing laundry, but not necessitate the need for two toilet rooms. The code already recognizes that small business spaces with an occupant load of 25 or less need only provide one toilet facility, the same should apply here as well as most of the area in question can be classified as a business occupancy.

Cost Impact: Decrease

- **toiletrooms.pdf**
  https://www.cdpaccess.com/proposal/9235/28623/documentation/134870/attachments/download/4694/

Estimated Immediate Cost Impact:

This could reduce the estimated construction costs by $82,000 by allowing the use of a single user toilet room to serve the hotel/motel employees rather than requiring two toilet rooms to serve each sex as well as not reducing the square footage that could be used for guest amenities such as a fitness center and guest laundry.

Estimated Immediate Cost Impact Justification (methodology and variables):

See attached spreadsheet. The cost of two water closets, two lavatories, assorted accessories (paper towel dispenser, toilet paper dispenser, etc.) along with the potential need for grab bars in each toilet room and the costs of materials to build a second toilet room (studs, gypsum, wall//floor finish). Not requiring the second toilet room would allow for more space that could be rented to provide more income to the building owner.

Estimated Life Cycle Cost Impact:

The additional maintenance to support a second toilet room could be reduced. Not requiring the second toilet room would allow for more space that could be rented to provide more income to the building owner.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

It would be far less expensive to maintain one toilet room versus two used on a very seldom basis. Not requiring the second toilet room would allow for more space that could be rented to provide more income to the building owner.

P23-24

P24-24

IPC: 403.2; IBC: [P] 2902.2

Proponents: Jeanne Rice, NYS DOS, NYS DOS (jeanne.rice@dos.ny.gov); Chad Sievers, NYS, NYS DOS (chad.sievers@dos.ny.gov); Kevin Duerr-Clark, NYS DOS, NYS DOS (kevin.duerr-clark@dos.ny.gov); China Clarke, New York State Dept of State, Manager Technical Support Unit (china.clarke@dos.ny.gov)

2024 International Plumbing Code

Revise as follows:

403.2 Separate facilities.
Where plumbing fixtures are required, separate toilet facilities shall be provided for each sex.

Exceptions:

1. Separate toilet facilities shall not be required for dwelling units and sleeping units.
2. Separate toilet facilities shall not be required in structures or tenant spaces with a total occupant load, including both employees and customers, of 15 or fewer.
3. Separate toilet facilities shall not be required in mercantile *occupancies* in which the maximum occupant load is 100 or fewer.
4. Separate toilet facilities shall not be required in business *occupancies* in which the maximum occupant load is 25 or fewer.
5. Separate toilet facilities shall ~~not be required to be designated by sex~~ be identified as being available for use by all persons regardless of sex where single-user toilet rooms are provided in accordance with Section 403.1.2
6. Separate toilet facilities shall not be required where rooms having both water closets and lavatory fixtures are designed for use by all persons regardless of sex and privacy is provided for water closets in accordance with Section 405.3.4 and for urinals in accordance with Section 405.3.5.

2024 International Building Code

Revise as follows:

[P] 2902.2 Separate facilities.
Where plumbing fixtures are required, separate *facilities* shall be provided for each sex.

Exceptions:

1. Separate toilet *facilities* shall not be required for *dwelling units* and *sleeping units*.
2. Separate toilet *facilities* shall not be required in *structures* or tenant spaces with a total *occupant load*, including both employees and customers, of 15 or fewer.
3. Separate toilet *facilities* shall not be required in mercantile occupancies in which the maximum *occupant load* is 100 or fewer.
4. Separate toilet *facilities* shall not be required in business occupancies in which the maximum *occupant load* is 25 or fewer.
5. Separate toilet facilities shall ~~not be required to be designated by sex~~ be identified as being available for use by all persons regardless of sexwhere single-user toilet rooms are provided in accordance with Section 403.1.2
6. Separate toilet *facilities* shall not be required where rooms having both water closets and lavatory fixtures are designed for use by all *persons* regardless of sex and privacy is provided for water closets in accordance with Section 405.3.4 of the *International Plumbing Code* and for urinals in accordance with Section 405.3.5 of the *International Plumbing Code* .

Reason: Section 403.1.2 requires single-user toilet facilities to be designated as gender neutral, but Section 403.2 merely states that such facilities "may" be designated gender neutral. This change modifies Section 402.3 to match Section 403.1.2. Designating single-user toilet facilities for use by only one sex is inefficient and can cause increased wait times for bathroom use, and is unnecessary since such toilet facilities are intended for use by only one person at a time.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This change aligns section 403.2 with section 403.1.2. Since section 403.1.2 already required single-user toilet facilities to be designated as gender neutral, this change does not add any requirements, but simply coordinates the sections to prevent confusion.

P24-24

P25-24

IPC: 403.2; IBC: [P] 2902.2

Proponents: Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C., Self (jbengineer@aol.com)

2024 International Plumbing Code

Revise as follows:

403.2 ~~Separate~~ Toilet facilities.
~~Where~~ Required plumbing fixtures ~~are required, separate~~ ~~toilet~~ ~~facilities~~ shall be located in all gender toilet rooms or in separate toilet rooms provided for each sex.

~~**Exceptions:**~~

1. ~~Separate toilet facilities shall not be required for dwelling units and sleeping units.~~
2. ~~Separate toilet facilities shall not be required in structures or tenant spaces with a total occupant load, including both employees and customers, of 15 or fewer.~~
3. ~~Separate toilet facilities shall not be required in mercantile *occupancies* in which the maximum occupant load is 100 or fewer.~~
4. ~~Separate toilet facilities shall not be required in business *occupancies* in which the maximum occupant load is 25 or fewer.~~
5. ~~Separate toilet facilities shall not be required to be designated by sex where single-user toilet rooms are provided in accordance with Section 403.1.2.~~
6. ~~Separate toilet facilities shall not be required where rooms having both water closets and lavatory fixtures are designed for use by all persons regardless of sex and privacy is provided for water closets in accordance with Section 405.3.4 and for urinals in accordance with Section 405.3.5.~~

2024 International Building Code

Revise as follows:

[P] 2902.2 ~~Separate~~ Toilet facilities.
~~Where~~ Required plumbing fixtures ~~are required, separate~~ ~~toilet~~ ~~facilities~~ shall be located in all gender toilet rooms or in separate toilet rooms provided for each sex.

~~**Exceptions:**~~

1. ~~Separate toilet *facilities* shall not be required for *dwelling units* and *sleeping units*.~~
2. ~~Separate toilet *facilities* shall not be required in *structures* or tenant spaces with a total *occupant load*, including both employees and customers, of 15 or fewer.~~
3. ~~Separate toilet *facilities* shall not be required in mercantile occupancies in which the maximum *occupant load* is 100 or fewer.~~
4. ~~Separate toilet *facilities* shall not be required in business occupancies in which the maximum *occupant load* is 25 or fewer.~~
5. ~~Separate toilet *facilities* shall not be required to be designated by sex where single-user toilet rooms are provided in accordance with Section 2902.1.2.~~
6. ~~Separate toilet *facilities* shall not be required where rooms having both water closets and lavatory fixtures are designed for use by all *persons* regardless of sex and privacy is provided for water closets in accordance with Section 405.3.4 of the *International Plumbing Code* and for urinals in accordance with Section 405.3.5 of the *International Plumbing Code* .~~

Reason: The change allowing all gender toilet rooms during the last cycle resulted in all of the other exceptions being superfluous. The code allows fixtures to be located in all gender toilet rooms or in separate toilet rooms for each sex. Therefore, rather than confusing and contradictory code text, the code should simply state what it means, you can have all gender toilet rooms, or you can have toilet rooms for each sex. It is purely the designer's choice.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This change is editorial in nature and has no impact on cost. There is no increase in the number of fixtures required, nor is there a decrease in the number of fixtures required. The exceptions being deleted only create confusion since all-gender toilet rooms have been accepted in the code. The section should have been updated during the previous cycle.

P25-24

P26-24

IPC: 403.3; IBC: [P] 2902.3

Proponents: Andrew Klein, A S Klein Engineering, PLLC, Self Storage Association (andrew@asklein.com)

2024 International Plumbing Code

Revise as follows:

403.3 Employee and public toilet facilities.
For structures and tenant spaces intended for public utilization, customers, patrons and visitors shall be provided with *public* toilet facilities. Employees associated with structures and tenant spaces shall be provided with toilet facilities. The number of plumbing fixtures located within the required toilet facilities shall be provided in accordance with Section 403 for all users. Employee toilet facilities shall be either separate or combined employee and *public* toilet facilities.

Exception: *Public* toilet facilities shall not be required for:

1. Parking garages <u>and self-service storage facilities</u> operated without ~~parking~~ attendants.
2. Structures and tenant spaces intended for quick transactions, including takeout, pickup and drop-off, having a public access area less than or equal to 300 square feet (28 m^2).

2024 International Building Code

Revise as follows:

[P] 2902.3 Employee and public toilet facilities.
For *structures* and tenant spaces intended for public utilization, customers, patrons and visitors shall be provided with public toilet *facilities*. Employees associated with *structures* and tenant spaces shall be provided with toilet *facilities*. The number of plumbing fixtures located within the required toilet *facilities* shall be provided in accordance with Section 2902 for all users. Employee toilet *facilities* shall be either separate or combined employee and public toilet *facilities*.

Exception: Public toilet *facilities* shall not be required for:

1. Parking garages <u>and self-service storage facilities</u> operated without ~~parking~~ attendants.
2. *Structures* and tenant spaces intended for quick transactions, including takeout, pickup and drop-off, having a public access area less than or equal to 300 square feet (28 m^2).

Reason: Self-service storage facilities are low occupancy. Facilities operating without attendants are often exempted from the restroom requirements by local building code officials for the same reason unattended parking garages are exempted. Codifying this helps maintain continuity in the Code.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

- $20,000 to - $25,000 per restroom not required.

Estimated Immediate Cost Impact Justification (methodology and variables):

A single-unit restroom costs about $20,000 - $25,000.

Restroom privacy and sensible construction - Page 5 of 5 - Construction Specifier (www.constructionspecifier.com/restroom-privacy-and-sensible-construction/5/), accessed 1/26/2024

P26-24

P27-24

IPC: 403.3.3; IBC: [P] 2902.3.3

Proponents: William Koffel, Koffel Associates, Inc., Semiconductor Industry Association (wkoffel@koffel.com)

2024 International Plumbing Code

Revise as follows:

403.3.3 Location of toilet facilities in occupancies other than malls.
In *occupancies* other than covered and open mall buildings, the required *public* and employee toilet facilities shall be located not more than one story above or below the space required to be provided with toilet facilities, and the path of travel to such facilities shall not exceed a distance of 500 feet (152 m).

Exceptions:

1. The location and maximum distances of travel to required employee facilities in <u>manufacturing areas of Group F and H</u> ~~factory and industrial~~ *occupancies* shall be permitted to exceed that required by this section, provided that the location and maximum distances of travel are *approved*.
2. The location and maximum distances of travel to required *public* and employee facilities in Group S *occupancies* shall be permitted to exceed that required by this section, provided that the location and maximum distances of travel are *approved*.

2024 International Building Code

Revise as follows:

[P] 2902.3.3 Location of toilet facilities in occupancies other than malls.
In occupancies other than covered and *open mall buildings*, the required public and employee toilet *facilities* shall be located not more than one *story* above or below the space required to be provided with toilet *facilities*, and the path of travel to such *facilities* shall not exceed a distance of 500 feet (152 m).

Exceptions:

1. The location and maximum distances of travel to required employee *facilities* in <u>manufacturing areas of Group F and H</u> ~~factory and industrial~~ *occupancies* shall be permitted to exceed that required by this section, provided that the location and maximum distances of travel are *approved*.
2. The location and maximum distances of travel to required public and employee *facilities* in Group S *occupancies* shall be permitted to exceed that required by this section, provided that the location and maximum distances of travel are *approved*.

Reason: Factory and industrial type manufacturing areas can also occur in Group H occupancies. The location and travel distance to employee facilities should not be any different from a manufacturing area in a Group F occupancy as compared to a Group H occupancy. The proposal also deletes the legacy language "factory and industrial occupancies" and replaces it with the appropriate IBC language.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0 - Fewer employee facilities will be required although the fixture counts will remain the same.

Estimated Immediate Cost Impact Justification (methodology and variables):

Reduced cost associated with constructing additional, separate employee facilities. A portion of the proposal is editorial in nature.

P27-24

P28-24

IPC: 405.3.2; IBC: [P] 2903.1.2

Proponents: Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C., Self (jbengineer@aol.com)

2024 International Plumbing Code

Revise as follows:

~~405.3.2~~ 403.3.7 Public lavatories.
~~In~~ Public lavatories for employee and *public* use shall be located in the immediate vicinity of ~~toilet facilities, the required lavatory shall be located in the same room as the required~~ water ~~closet~~ closets and urinals.

2024 International Building Code

Revise as follows:

[P] ~~2903.1.2~~ 2903.1.7 Public lavatories.
~~In~~ Public lavatories for employee and *public* use shall be located in the immediate vicinity of ~~toilet facilities, the required lavatory shall be located in the same room as the required~~ water ~~closet~~ closets and urinals.

Reason: Section 405.3.2 is misplaced in that fixture requirement locations are found in Section 403. The first proposed modification would be to move this section to the appropriate location in Section 403.

This section is a holdover from when the code required separate men's and ladies' rooms with the assumption that water closets were located in compartments within the same room. This has also resulted in the wording of this section being subject to various interpretations as to what constitutes a room. If a water closet has a separate room that opens into a larger room with a lavatory, is that the same room? Sometimes this is interpreted as being one big room meeting the requirement, other times it is considered two rooms thus mandating a lavatory within the same smaller room as the water closet.

The intent of the section is to mandate the use of a lavatory in the close proximity of the water closet. This may result in exiting a separate room with a water closet and entering an area with a public lavatory. For all gender toilet rooms, it is not uncommon for the lavatory to be located in a general area whereas the water closets are located in separate rooms. This still provides the necessary sanitation.

The current section only addresses "required" water closets. Not all water closets are required, yet for sanitation purposes a lavatory needs to be located in the immediate vicinity. Similarly, the code does not address urinals. A urinal also needs a lavatory to be located in the immediate vicinity of the fixture for sanitation purposes. The revised text deletes "required" and adds urinals as a fixture requiring a lavatory in the immediate vicinity.

The other option would be to delete this section in its entirety since architects, engineers and developers always locate public lavatories in the immediate vicinity of water closets and urinals.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$1,920 to $6,960 for a reduction in floor area of 8 square feet for one lavatory.

Estimated Immediate Cost Impact Justification (methodology and variables):

This change may reduce the cost of construction by lowering the immediate floor area if the section is misinterpreted. If a floor area is reduced by the relocation of a public lavatory to a non-increase area of the building, there would be a savings in floor area of 8 square feet. This would result in a savings in the cost of construction of between $1,920 and $6,960 depending on where the building is constructed in the United States. It should be noted that these values are based on the United States, not the rest of the international world. The justification for these savings is based on a cost of commercial construction ranging from $240 to $870 per square foot. These values were published in an article written by Jennifer Carlson and edited by Kristen Cramer on January 4, 2024. Realize that this savings is per lavatory relocation. If 10 lavatories are required, the cost savings would increase to $19,200 to $69,600. Public lavatories will still be required.

P28-24

P29-24

IPC: 405.3.2; IBC: [P] 2903.1.2

Proponents: Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C., Self (jbengineer@aol.com)

2024 International Plumbing Code

Delete without substitution:

~~**405.3.2 Public lavatories.**~~
~~In employee and *public* toilet facilities, the required lavatory shall be located in the same room as the required water closet.~~

2024 International Building Code

Delete without substitution:

~~**[P] 2903.1.2 Public lavatories.**~~
~~In employee and public toilet rooms, the required lavatory shall be located in the same room as the required water closet.~~

Reason: This section is misplaced as a subsection of “Setting.” The location of plumbing fixtures is regulated in Section 403, not 405. Furthermore, this is a meaningless section. There is no definition of “room” in the Plumbing Code, nor is there a definition of “room” in the Building Code. Interesting, the Building Code has a definition of Guest Room. Yet within that definition, there is a separate bathroom that is a part of the guest room. Hence, does a lavatory on the open side of a door enclosing a water closet constitute the same room.

This is a code requirement seeking to solve a problem that does not exist. The section should have never been added to the code. With the increased use of all gender toilet rooms, the water closet may be located in a room with a lockable door located within an overall toilet room. If the lavatory is on the other side of the door, is it still within the same room as the water closet?

In checking with Merriam- Webster dictionary, the first definition of room is, “an extent of space occupied by or sufficient or available for something.” Another definition is, “a partitioned part of the inside of a building.” That would seem to imply that a water closet compartment with partitions may be a room.

Section 405.3 adequately addresses the location of plumbing fixture and the proximity of a lavatory to a water closet. There is a definition of toilet facilities. This identifies that the water closet and lavatory are together. Any additional requirements, such as Section 405.3.2, does not belong in the code.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$1,920 to $6,960 for one lavatory.

Estimated Immediate Cost Impact Justification (methodology and variables):

This change has no impact on the cost of construction if lavatories are not relocated. However, if this section is misinterpreted, the deletion may lower the cost of construction. If a floor area is reduced by the relocation of a public lavatory to a non-increase area of the building, there would be a savings in floor area of 8 square feet. This would result in a savings in the cost of construction of between $1,920 and $6,960 depending on where the building is constructed in the United States. It should be noted that these values are based on the United States, not the rest of the international world. The justification for these savings is based on a cost of commercial construction ranging from $240 to $870 per square foot. These values were published in an article written by Jennifer Carlson and edited by Kristen Cramer on January 4, 2024. Realize that this savings is per lavatory relocation. If 10 lavatories are required, the cost savings would increase to $19,200 to $69,600. Public lavatories will still be required.

P30-24

IPC: 405.3.4 (New), 405.3.4, 405.3.5, CHAPTER 15, IAPMO Chapter 15 (New)

Proponents: Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C., Bradley Corp. (jbengineer@aol.com)

2024 International Plumbing Code

Add new text as follows:

405.3.4 Premanufactured water closet and urinal partitions.. Premanufactured partitions for water closets or urinals shall comply with IAPMO Z124.10.

Revise as follows:

~~405.3.4~~405.3.5 Water closet privacy ~~compartment~~.
Each water closet utilized by the public or employees shall occupy a separate compartment with walls or partitions and a door enclosing the fixtures to ensure privacy. Premanufactured partitions for water closets located in separate gender toilet or bathing rooms shall comply with the Type B privacy requirements of IAPMO Z124.10. Water closets located in all gender toilet rooms shall be enclosed by premanufactured partitions complying with the Type A privacy requirements of IAPMO Z124.10 or the water closet shall be located in separate room with a lockable door.

Exceptions:

1. Water closet compartments shall not be required in a single-occupant toilet room with a lockable door.
2. Toilet facilities located in child day care facilities and containing two or more water closets shall be permitted to have one water closet without an enclosing compartment.
3. This provision is not applicable to toilet areas located within Group I-3 housing areas.

~~405.3.5~~405.3.6 Urinal ~~partitions~~ privacy.
Each urinal utilized by the public or employees shall occupy a separate area with walls or partitions to provide privacy. Premanufactured partitions for urinals located in separate gender toilet or bathing rooms shall comply with the Type C privacy requirements of IAPMO Z124.10. The horizontal dimension between walls ~~or partitions~~ at each urinal shall be not less than 30 inches (762 mm). The walls ~~or partitions~~ shall ~~begin at a height not greater than 12 inches (305 mm) from and~~ extend not less than 60 inches (1524 mm) above the finished floor surface. The walls ~~or partitions~~ shall extend from the wall surface at each side of the urinal not less than 18 inches (457 mm) or to a point not less than 6 inches (152 mm) beyond the outermost front lip of the urinal measured from the finished backwall surface, whichever is greater. Urinals located in all gender toilet rooms shall be enclosed by premanufactured partitions complying with the Type A privacy requirements of IAPMO Z124.10 or the urinals shall be located in a separate room.

Exceptions:

1. Urinal partitions shall not be required in a single occupant or family/assisted-use toilet room with a lockable door.
2. Toilet facilities located in child day care facilities and containing two or more urinals shall be permitted to have one urinal without partitions.

CHAPTER 15 REFERENCED STANDARDS

Add new standard(s) as follows:

IAPMO

IAPMO Group
4755 E. Philadelphia Street
Ontario, CA 91761 USA

Z124.10-22 Standard for Water Closets and Urinal Partitions

Staff Analysis: A review of the standard proposed for inclusion in the code, IAPMO Z124.10-22 *Standard for Water Closets and Urinal Partitions*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: IAPMO Z124.10 is a new standard that regulates water closet and urinal partitions. The standard was published in 2022. The standard specified three different privacy ratings. In addition, there are tests for the quality of the partition. The tests include load, coating, surface examination, subsurface, colorfastness, stain resistance, wear and cleanability, chemical resistance, and stress test to name a few.

Type A privacy partitions are intended for all gender toilet rooms and provide the highest level of privacy. The standard states the following privacy requirements, “The bottom edge of the partition including the door shall be located less than or equal to 100 mm (4 in) off the finished floor. The top edge of the partition including the door shall be located greater than or equal to 2.13 m (84 in) above the finished floor. The full height of the door to the partitions on both sides shall prevent any visual observation from the outside of the partition enclosure. Doors shall be lockable from the inside of the partition enclosure. The door locking device shall be readily distinguishable as locked from the outside of the partition enclosure.” Furthermore, the standard requires a visual indication that the compartment is occupied when the partition door lock is activated.

Type B privacy partitions are standard water closet partitions found in separate gender toilet rooms. The standard states the following for privacy, “The bottom edge of the partition including the door shall be located within 406 mm (16 in) of the finished floor. The top edge of the partition including the door shall be located greater than or equal to 1.75 m (69 in) above the finished floor. The door to the partitions shall have a maximum of 13 mm (½ in) gap between the edge of the door and the wall of the partition. Doors shall be lockable from the inside of the partition enclosure.”

Type C privacy partitions are urinal partitions. The standard specifies the following requirements, “The bottom of the urinal partition shall be located a maximum of 406 mm (16 in) above the finished floor. The top of the urinal partition shall be a minimum of 1.5 m (60 in) above the finished floor. The urinal partition shall extend a minimum of 457 mm (18 in) from the wall.”

With the increase in the number of all gender toilet rooms, it is important to have proper privacy requirements to assure both privacy and security. This proposed change will require water closets and urinals in all gender toilet rooms to be enclosed in Type A privacy partitions or be located in a separate room. This will provide the highest level of privacy and security.

Type B privacy partitions are standard water closet partitions found in men’s and ladies’ rooms today. However, the gap between partition sections or between the door and frame have been reduced to ½ inch. Currently, there is no regulation on the gap in partitions nor are there any regulations for the quality of the partitions.

Type C privacy partitions are urinal partitions currently found in men’s rooms. Type C partitions are only intended for separate gender toilet rooms. In all gender toilet rooms, urinals are located similar to water closets to ensure privacy.

Cost Impact: Increase

Estimated Immediate Cost Impact:

$0.12 to $6.04 per partition, dependent on partition production volume.

Estimated Immediate Cost Impact Justification (methodology and variables):

This change could increase the cost of construction. It should be noted that manufacturers are prohibited by Federal Law to discuss prices. That being stated, one can review the cost of listing a product on-line. Compliance with the standard will add a cost to manufacturers for the testing and listing of partitions. In an attempt to find out the listing costs, one can check the ICC-ES website. The questions of what a cost of a listing is results in the following answer: Fees may vary. Contact us for a Statement of Work and/or an initial estimate. Similarly, IAPMO R&T does not publish fees. One can only request a quote for a listing. A Google search for the cost of a UL listing identified the cost as ranging between $5,000 and $50,000. Intertek advertises an annual listing fee of $6,040 for a single sanitary product, which is what a partition would likely be classified as. Hence, the exact dollar amount for a listing is unknown. That listing cost may or may not be added to the cost of the product. If it is added to the cost of the product, that additional cost will add to the cost of construction. However, manufacturers do not indicate if listing costs increase the cost of the product (construction). Hence, the impact is unknown. If one assumes the Intertek price for a listing and further assumes that the manufacturer sells 50,000 partitions a year, the increase cost of construction per partition could be assumed to be $0.12. If they only sell 1,000 partitions, the increased cost per partition would be $6.04.

P31-24

IPC: 405.4.3

Proponents: Justin Cassamassino, ASME, A112 Main Committee (cassamassinoj@asme.org)

2024 International Plumbing Code

Revise as follows:

405.4.3 Securing wall-hung water closet bowls <u>and urinals</u>.
Wall-hung water closet bowls <u>and urinals</u> shall be supported by a concealed metal carrier that is attached to the building structural members so that strain is not transmitted to the fixture connector or any other part of the plumbing system. The carrier shall conform to ASME A112.6.1M or ASME A112.6.2.

Reason: The ASME A112.6.1 and ASME A112.6.2 standards includes requirements for floor-affixed supports that can be used to secure off the floor water closets and as well as urinals.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Clarification of which fixtures the standards includes, supports already used for urinals and water closets.

P31-24

P32-24

IPC: 407.1, 419.1, 421.1, 422.1, CSA Chapter 15 (New)

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Plumbing Code

Revise as follows:

407.1 Approval.
Bathtubs shall conform to ASME A112.19.1/CSA B45.2, ASME A112.19.2/CSA B45.1, ASME A112.19.3/CSA B45.4, ~~or~~ CSA B45.5/IAPMO Z124,CSA B45.8/IAPMO Z403 or CSA B45.12/IAPMO Z402.

419.1 Approval.
Lavatories shall conform to ASME A112.19.1/CSA B45.2, ASME A112.19.2/CSA B45.1, ASME A112.19.3/CSA B45.4, ~~or~~ CSA B45.5/IAPMO Z124,CSA B45.8/IAPMO Z403, CSA B45.11/IAPMO Z401 or CSA B45.12/IAPMO Z402. Group wash fixtures shall conform to the requirements of Section 402. For determining the number of lavatories required by Table 403.1, every 20 inches (508 mm) of rim space of a group wash fixture shall be considered as one lavatory.

421.1 Approval.
Prefabricated showers and shower compartments shall conform to ASME A112.19.1/CSA B45.2, ASME A112.19.2/CSA B45.1, ASME A112.19.3/CSA B45.4, CSA B45.5/IAPMO Z124, CSA B45.8/IAPMO Z403 or CSA B45.12/IAPMO Z402. Shower valves for individual showers shall conform to the requirements of Section 412.3.

422.1 Approval.
Sinks shall conform to ASME A112.19.1/CSA B45.2, ASME A112.19.2/CSA B45.1, ASME A112.19.3/CSA B45.4, ~~or~~ CSA B45.5/IAPMO Z124 , CSA B45.8/IAPMO Z403, CSA B45.11/IAPMO Z401 or CSA B45.12/IAPMO Z402 .

Add new standard(s) as follows:

CSA

CSA Group
8501 East Pleasant Valley Road
Cleveland, OH 44131-5516

CSA B45.8-18/IAPMO Z403-2018 Terrazzo, concrete, composite stone, and natural stone plumbing fixtures

CSA B45.11:17/IAPMO Z401-2017	Glass plumbing fixtures
CSA B45.12-13/IAPMO Z402-2013 (R2018)	Aluminum and copper plumbing fixtures

Staff Analysis: A review of the standard proposed for inclusion in the code, CSA/IAPMO CSA B45.8-18/IAPMO Z403-2018 *Terrazzo, concrete, composite stone, and natural stone plumbing*, CSA/IAPMO CSA B45.12-13/IAPMO Z402-2013 (R2018) *Aluminum and copper plumbing fixtures* and CSA/IAPMO CSA B45.11:17/IAPMO Z401-2017 *Glass plumbing fixtures* with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: The code needs to include fixtures that are covered by product standards in order to allow for easy approvals. These types of fixtures are becoming more prevalent in building designs.

This proposal is submitted by the ICC Plumbing Mechanical Gas Code Action Committee (PMGCAC)

PMGCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 PMGCAC has held 26 virtual meetings open to any interested party. In addition, there were several virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the PMGCAC website at PMGCAC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The choice of the material type of fixtures is a designer decision.

P32-24

P33-24

IPC: SECTION 202 (New), SECTION 202, 410.4

Proponents: Eirene Knott, BRR Architecture, Metropolitan Kansas City Chapter of the ICC (eirene.knott@brrarch.com)

2024 International Plumbing Code

Add new definition as follows:

BOTTLE FILLING STATION. A plumbing fixture that is manually controlled by the user for the purpose of dispensing potable drinking water into water bottles or containers not less than 10 inches (254 mm) in height. Such fixture is connected to both the potable water distribution system and sanitary drainage system of the premises. See also *water dispenser.*

Revise as follows:

WATER DISPENSER. A plumbing fixture that is manually controlled by the user for the purpose of dispensing potable drinking water into a receptacle such as a cup, glass or bottle. Such fixture is connected to the potable water distribution system of the premises. Such fixtures include bottle filling stations.

410.4 Substitution.
Where restaurants provide drinking water in a container free of charge, drinking fountains shall not be required in those restaurants. In other *occupancies* ~~where three or more drinking fountains are required, *water dispensers*~~ bottle filling stations not combined with a drinking fountain shall be permitted to be substituted for not more than 50 percent of the required number of drinking fountains. Bottle filling stations combined with a drinking fountain shall be permitted to be substituted for all drinking fountains.

Reason: When Covid hit the country in 2020, every single drinking fountain in the country was no longer available. Since the IPC has been designed to make sure that the general public has access to free drinking water at all times, this created a problem. What I'm trying to do with this code change is allow the use of a bottle filling station to be used in lieu of a drinking fountain in all occupancy groups. If a bottle filling station is associated with a drinking fountain, then those can be substituted directly for a drinking fountain. If the bottle filling station does not also contain a drinking fountain, then the substitution ratio is fifty percent.

Just during the 2023 year, Michigan, Illinois, Vermont, Maine and Delaware passed legislation to require for bottle filling stations in educational occupancies. Both Maine and Vermont have language that specifically states "sanitary reasons" for the use of the bottle filler. Many states allow for the use of a combination drinking fountain/bottle filling station as an option for the required drinking fountain. In addition, the State of Washington allows for the bottle filling station and/or combination of a drinking fountain/bottle filling station for each drinking fountain required. Their point is to eliminate public waste with all the plastic bottles. Pennsylvania also has legislation encouraging the reduction in the use of plastics by allowing substitution of the bottle filling station for the required drinking fountains.

The State of Massachusetts recently enacted a ban on the purchase of single use plastic bottles for state agencies. The National Park Service began phasing out the sale of single use plastic bottles in 2022.

In September 2023, the United Nations published the "Zero Draft of the Plastics Treaty", which a portion addresses the plastics pollution concern.

Do we want plumbing fixtures to be dictated by state or even national requirements or by the building and/or plumbing code? The IPC needs to be the leader here and allow for the substitution of bottle filling stations for drinking fountains.

I have modified the definition of water dispenser to include a bottle filling station, as a bottle filling station meets these requirements. In addition, I have provided a definition of a bottle filling station to account for the minimum requirements needed to provide for a bottle or similar container. A bottle filling station would comply with the requirements of UL 399 as noted in IPC 410.1.

Cost Impact: Increase

Estimated Immediate Cost Impact:

$0 to $1100

Estimated Immediate Cost Impact Justification (methodology and variables):

I opted to reflect the increase as the cost of a bottle filling station may be more than that of a drinking fountain. However, a decrease may actually occur.
There may be minimal cost impact due to the legislative requirements in many states.

Based upon pricing available online, a typical hi-lo drinking fountain runs between $1000 and $2200 depending on the aesthetics of the fountain.

A single bottle filling stating ranges from $590 to $1100 depending on aesthetics and whether or not the filling station also includes a drinking fountain.

A dual hi-lo drinking fountain combined with a bottle filling station can range from $1400 to $1900.

Based on these numbers, no increase may occur. If a dual hi-lo drinking fountain is installed and a bottle filling station is installed in addition to the drinking fountain, then an increase of up to $1100 could occur.

However, if a combination hi-lo drinking fountain combined with a bottle filling station is installed, a decrease may occur depending on the aesthetics of the units provided.

Estimated Life Cycle Cost Impact:

N/A

Estimated Life Cycle Cost Impact Justification (methodology and variables):

N/A

P33-24

P34-24

IPC: CHAPTER 4, SECTION 410, 410.4

Proponents: Jonathan Flannery, Pandemic Task Force Code Development Working Group, PTF CDWG (jflannery@aha.org); Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Plumbing Code

CHAPTER 4 FIXTURES, FAUCETS AND FIXTURE FITTINGS

SECTION 410
DRINKING FOUNTAINS

Revise as follows:

410.4 Substitution.
Where restaurants provide drinking water in a container free of charge, drinking fountains shall not be required in those restaurants. In other *occupancies* where three or more drinking fountains are required, *water dispensers* shall be permitted to be substituted for ~~not more than 50 percent of~~ the required number of drinking fountains <u>provided that at least two drinking fountains are installed in accordance with Section 410.3.</u>

Reason: Ensuring safe access to drinking water is critical for the public health and well-being of building occupants. Traditional drinking fountains have served this purpose; however, limitations on these traditional fixtures were uncovered when many drinking fountains were roped off and abandoned due to fears of disease transmission during the COVID-19 pandemic. The use of water bottles and bottle filling stations largely took the place of traditional drinking fountains during this time and persisted, as a portion of the population no longer trusts drinking fountains as a “safe” water source. Recognizing this shift in water consumption habits, the proposed cost neutral change aims to expand the existing allowance in the IPC Section 410.4 for the substitution of drinking fountains with water dispensers. This proposed change will allow additional flexibility in the interior design while maintaining water access points and a minimum of two drinking fountains for persons without receptacles or who require fountains due to accessibility reasons.

The ICC/NEHA Pandemic Task Force (PTF) was organized and tasked with researching the effects of the COVID-19 pandemic on the built environment and developing a roadmap and proposing needed resources – including guidelines, recommended practices, publications and updates to the International Codes® (I-Codes®) – that are necessary to overcome the numerous challenges that may be faced during future pandemics and to construct and manage safe, sustainable and affordable occupancy of the built environment. The ICC Pandemic Task Force Code Development Work Group (PTF CDWG) has conducted a comprehensive review of current code requirements as they relate to the prevention of the transmission of diseases and other serious health concerns and suggested revisions to current code requirements based on this assessment.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposal does not mandate any change from current practices, it only increases the allowance for installing water dispensers in place of drinking fountains.

P34-24

P35-24

IPC: 410.4

Proponents: Joe Wolff, Zurn Elkay Water Solutions, Zurn Elkay Water Solutions (joe.wolff@elkay.com)

2024 International Plumbing Code

Revise as follows:

410.4 Substitution.
Where restaurants provide drinking water in a container free of charge, drinking fountains shall not be required in those restaurants. In other *occupancies* where three or more drinking fountains are required, *water dispensers* shall be permitted to be substituted for ~~not more than 50~~up to 100 percent of the required number of drinking fountains, provided that at least two drinking fountains are installed in accordance with Section 410.3.

Reason: Ensuring safe access to drinking water is crucial for the public health and well-being of building occupants. Traditional drinking fountains have served this purpose; however, limitations of these traditional fixtures were uncovered when many drinking fountains were roped off and abandoned due to fears of disease transmission during the COVID pandemic. The use of water bottles and bottle filling stations largely took the place of traditional drinking fountains during this time and has persisted, as a portion of the population no longer trusts drinking fountains as a “safe” water source. Recognizing this shift in water consumption habits, the proposed cost neutral change aims to expand the existing allowance in IPC Section 410.4 for the substitution of drinking fountains with water dispensers. This proposed change will allow additional flexibility in interior design while maintaining water access points and a minimum of two drinking fountains for persons without receptacles or who require fountains due to accessibility reasons.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposal does not mandate any change from current practices, it only increases the allowance for installing water dispensers in place of drinking fountains.

P35-24

P36-24

IPC: 411.2

Proponents: Greg McDaniel, Self (gmcdaniel@townofmorrisville.org)

2024 International Plumbing Code

Revise as follows:

411.2 Waste connection. Chemical waste connections shall ~~not~~ be required for emergency showers and eyewash stations where located inside laboratories or chemical handling areas.

Reason: The purpose of this Code Change to manage how the Chemical Waste is collected when having to utilize an Emergency Shower or Eyewash station in the case of a spill in a Laboratory or a Chemical Handling area.

Cost Impact: Increase

Estimated Immediate Cost Impact:

Acid resistant piping $80.00

Flood Drain $100.00

Install Labor $100.00

Total $280.00 each

Estimated Immediate Cost Impact Justification (methodology and variables):

I used common websites for parts and matrial. The estimates are using the higher end pricepoints. Labor for install will vary with each install.

Estimated Life Cycle Cost Impact:

Once installed there is no additional cost.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

Once installed there is no additional cost.

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P37-24

IPC: 412.3, 412.4, 412.5, 412.10

Proponents: Ronald George, Plumb-Tech Design & Consulting Services LLC, Self (ron@plumb-techllc.com)

2024 International Plumbing Code

Revise as follows:

412.3 Individual shower valves.
Individual shower and tub-shower combination valves shall be balanced-pressure, thermostatic or combination balanced-pressure/thermostatic valves that conform to the requirements of ASSE 1016/ASME A112.1016/CSA B125.16 or ASME A112.18.1/CSA B125.1. Such valves shall be installed at the point of use. Shower control valves shall be rated for the flow rate of the installed shower head. Shower and tub-shower combination valves required by this section shall be equipped with a means to limit the maximum setting of the valve to 120°F (49°C), which shall be field adjusted in accordance with the manufacturer's instructions to provide water at a temperature not to exceed 120°F (49°C). In-line thermostatic valves shall not be utilized for compliance with this section. <u>The thermostat on a water heater shall not be used for final temperature control. at fixtures.</u>

412.4 Multiple (gang) showers.
Multiple (gang) showers supplied with a single, *tempered water* supply pipe shall have the water supply for such showers controlled by an *approved* automatic temperature control mixing valve that conforms to ASSE 1069 or CSA B125.3, or each shower head shall be individually controlled by a balanced-pressure, thermostatic or combination balanced-pressure/thermostatic valve that conforms to ASSE 1016/ASME A112.1016/CSA B125.16 or ASME A112.18.1/CSA B125.1 and that is installed at the point of use. Where a shower head is individually controlled, shower control valves shall be rated for the flow rate of the installed shower head. Such valves shall be equipped with a means to limit the maximum setting of the valve to 120°F (49°C), which shall be field adjusted in accordance with the manufacturer's instructions to provide water at a temperature not to exceed 120°F (49°C). *Access* shall be provided to an ASSE 1069 or CSA B125.3 valve. <u>The thermostat on the water heater shall not be used for final temperature control at fixtures.</u>

412.5 Bathtub and whirlpool bathtub valves.
Bathtubs and whirlpool bathtub valves shall have or be supplied by a water-temperature-limiting device that conforms to ASSE 1070/ASME A112.1070/CSA B125.70 or by a water heater complying with ASSE 1082 or ASSE 1084, except where such valves are combination tub/shower valves in accordance with Section 412.3. The water-temperature-limiting device required by this section shall be equipped with a means to limit the maximum setting of the device to 120°F (49°C), and, where adjustable, shall be field adjusted in accordance with the manufacturer's instructions to provide *hot water* at a temperature not to exceed 120°F (49°C). *Access* shall be provided to water-temperature-limiting devices that conform to ASSE 1070/ASME A112.1070/CSA B125.70. <u>The water heater thermostat shall not be used for final temperature control at fixtures.</u>

~~Exception~~ <u>Exceptions</u>:

<u>1.</u> *Access* shall not be required for nonadjustable water-temperature-limiting devices that conform to ASSE 1070/ASME A112.1070/CSA B125.70 and are integral with a fixture fitting, provided that the fixture fitting itself can be accessed for replacement.

<u>2.</u> <u>The thermostat on an ASSE 1084 water heater can serve as the temperature limiting device in lieu of an ASSE 1070 valve.</u>

412.10 Head shampoo sink faucets.
Head shampoo sink faucets shall be supplied with *hot water* that is limited to not more than 120°F (49°C). Each faucet shall have integral check valves to prevent crossover flow between the hot and cold water supply connections. <u>The water heater thermostat shall not be used for final temperature control at fixtures, except for item # 2 below.</u> The means for regulating the maximum temperature shall be one of the following:

1. A limiting device conforming to ASSE 1070/ASME A112.1070/CSA B125.70.
2. A water heater conforming to ~~ASSE 1082 or~~ ASSE 1084.
3. A temperature-actuated, flow-reduction device conforming to ASSE 1062.

Reason: The code language prohibiting use of the water heater thermostat for final temperature control at fixtures is code language that has a long history and purpose in the plumbing codes, and it was mistakenly removed in previous code cycles.

The current language in these sections does not expressly prohibit the use of the water heater thermostat for final temperature at fixtures, and this is necessary to emphasize in order to protect against scalding at fixtures.

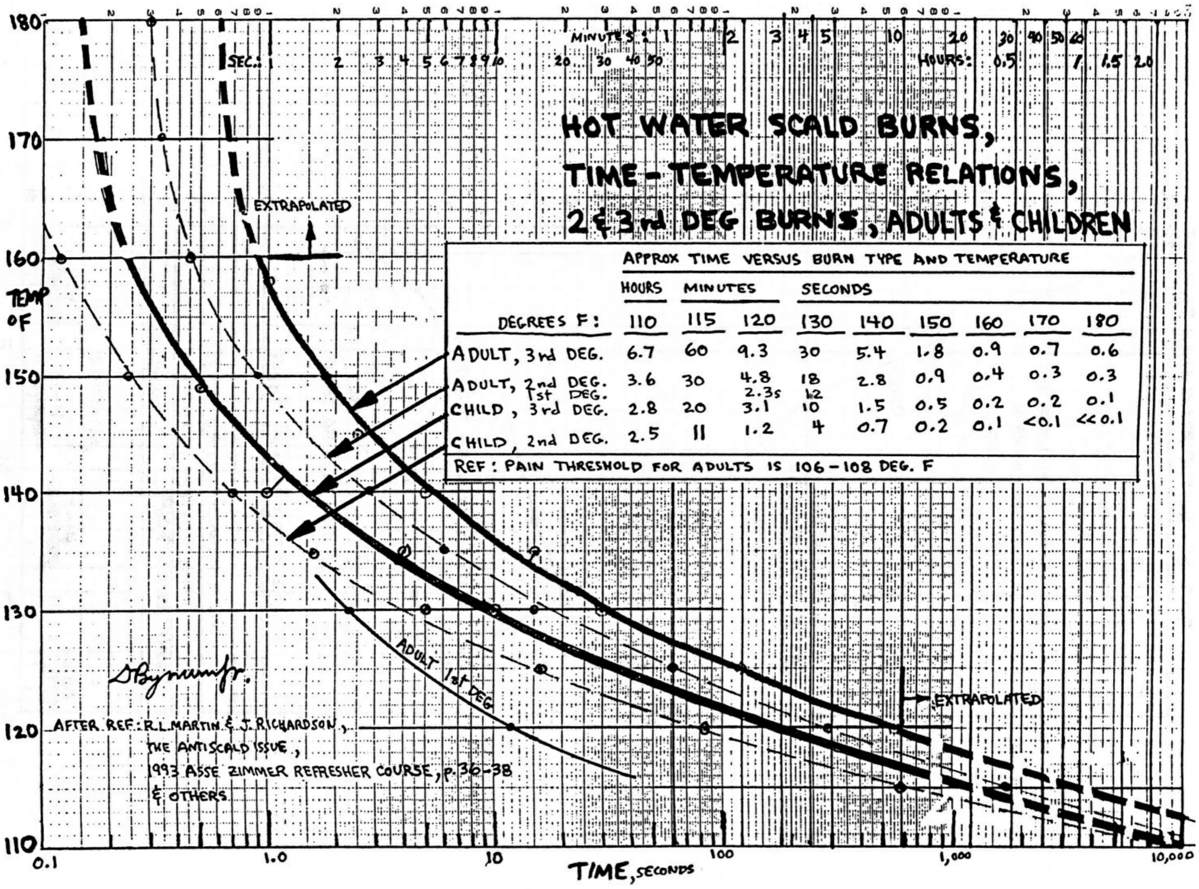
The standard for combination gas controls (thermostats) and the standard for uncirculated, tank-type water heaters (both above 75,000 btu/hr and 75,000 btu/hr or less) do not have tests to address temperature control accuracy for scald protection. It is widely known in the plumbing industry that the combination gas control (thermostat) standard allows a 10-degree variation at the thermostat level, and the water heater standards allow a 20-degree temperature differential from the thermostat level, inserted near the bottom of the tank, to the top of the water heater tank.

It is widely known in the plumbing industry that short, intermittent draws of hot water can cause thermal stacking in an uncirculated tank-type water heater, and that short, intermittent draws of hot water are a normal occurrence when cooking or cleaning. Together, these standards (standard for combination gas controls (thermostats) and the standard for uncirculated, tank-type water heaters) allow for 150F hot water to come out of a water heater when the thermostat is set to 120F. 150F hot water will cause irreversible scald burn injuries in an adult male in a less than one second, and burns can occur much quicker in women and children due to their thinner skin, compared to an adult male.

Simply relying on the thermostat on a water heater to supply hot water to a distribution system allows a variation in hot water temperature of up to 30 degrees F. If a pressure balancing type shower valve is installed, it cannot compensate for significant changes in incoming hot water temperature making it possible to significantly exceed the maximum allowable temperature after shower valve limit stops are adjusted at start-up (before stacking occurs).

A properly installed and adjusted shower or tub-shower valve, as required by these code sections, can also prevent thermal shock, as well as scalding. In addition, no water heater meeting the ASSE water heater temperature limiting control standard can address or control pressure imbalances at the fixture that lead to thermal shock. Therefore, the thermostat on any water heater used for shower and tub-shower applications should never be used for final temperature control at fixtures, as doing so will expose bathers to thermal shock, even when an ASSE water heater is installed.

This language prohibiting water heater thermostats from being the final temperature control for scald protection needs to be reinstated.



Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is clarifying language making it clear that the thermostat on the water heater cannot be relied on for final temperature control to prevent scalding. This is not adding new installation requirements to the code. This change does not add construction costs. This change will help prevent medical injury costs and reduce liability costs to owners.

P37-24

P38-24

IPC: 412.3, 412.4, 412.5, 412.10

Proponents: Ronald George, Plumb-Tech Design & Consulting Services LLC, Self (ron@plumb-techllc.com)

2024 International Plumbing Code

Revise as follows:

412.3 Individual shower valves.
Individual shower and tub-shower combination valves shall be balanced-pressure, thermostatic or combination balanced-pressure/thermostatic valves that conform to the requirements of ASSE 1016/ASME A112.1016/CSA B125.16 or ASME A112.18.1/CSA B125.1. Such valves shall be installed at the point of use. Shower control valves shall be rated for the flow rate of the installed shower head. ~~Shower and tub-shower combination valves required by this section shall be equipped with a means to limit the maximum setting of the valve to 120°F (49°C), which shall be field adjusted in accordance with the manufacturer's instructions to provide water at a temperature not to exceed 120°F (49°C).~~ The integral maximum temperature limit-stop adjustment on these valves shall be field adjusted in accordance with the manufacturer's instructions upon installation, and seasonally adjusted as in-coming cold water temperatures change, and adjusted every time there is a change to the domestic hot water distribution system temperature to limit the maximum temperature flowing from the fixture outlet to no greater than 115F (46.1C). In-line thermostatic valves shall not be utilized for compliance with this section.

412.4 Multiple (gang) showers.
Multiple (gang) showers supplied with a single, *tempered water* supply pipe shall have the water supply for such showers controlled by an *approved* automatic temperature control mixing valve that conforms to ASSE 1069 or CSA B125.3, or each shower head shall be individually controlled by a balanced-pressure, thermostatic or combination balanced-pressure/thermostatic valve that conforms to ASSE 1016/ASME A112.1016/CSA B125.16 or ASME A112.18.1/CSA B125.1 and that is installed at the point of use. Where a shower head is individually controlled, shower control valves shall be rated for the flow rate of the installed shower head. The integral maximum temperature limit-stop adjustment on these valves shall be field adjusted in accordance with the manufacturer's instructions upon installation, and seasonally adjusted as in-coming cold water temperatures change, and adjusted every time there is a change to the domestic hot water distribution system temperature to limit the maximum temperature flowing from the fixture outlet to no greater than 115F (46.1C).~~Such valves shall be equipped with a means to limit the maximum setting of the valve to 120°F (49°C), which shall be field adjusted in accordance with the manufacturer's instructions to provide water at a temperature not to exceed 120°F (49°C).~~ *Access* shall be provided to an ASSE 1069 or CSA B125.3 valve.

412.5 Bathtub and whirlpool bathtub valves.
Bathtubs and whirlpool bathtub valves shall have or be supplied by a water-temperature-limiting device that conforms to ASSE 1070/ASME A112.1070/CSA B125.70 or by a water heater complying with ASSE 1082 or ASSE 1084, except where such valves are combination tub/shower valves in accordance with Section 412.3. The water-temperature-limiting device required by this section shall be equipped with a means to limit the maximum setting of the device to 115 ~~120~~°F (49°C), and, where adjustable, shall be field adjusted in accordance with the manufacturer's instructions to provide *hot water* at a temperature not to exceed 115 ~~120~~°F (49°C). *Access* shall be provided to water-temperature-limiting devices that conform to ASSE 1070/ASME A112.1070/CSA B125.70.

Exception: *Access* shall not be required for nonadjustable water-temperature-limiting devices that conform to ASSE 1070/ASME A112.1070/CSA B125.70 and are integral with a fixture fitting, provided that the fixture fitting itself can be accessed for replacement.

412.10 Head shampoo sink faucets.
Head shampoo sink faucets shall be supplied with *hot water* that is limited to not more than 115 ~~120~~°F (49°C). Each faucet shall have integral check valves to prevent crossover flow between the hot and cold water supply connections. The means for regulating the maximum temperature shall be one of the following:

1. A limiting device conforming to ASSE 1070/ASME A112.1070/CSA B125.70.
2. A water heater conforming to ASSE 1082 or ASSE 1084.
3. A temperature-actuated, flow-reduction device conforming to ASSE 1062.

Reason: This code change lowers the maximum allowable shower and bathing temperature from 120 F to 115 F to improve safety.

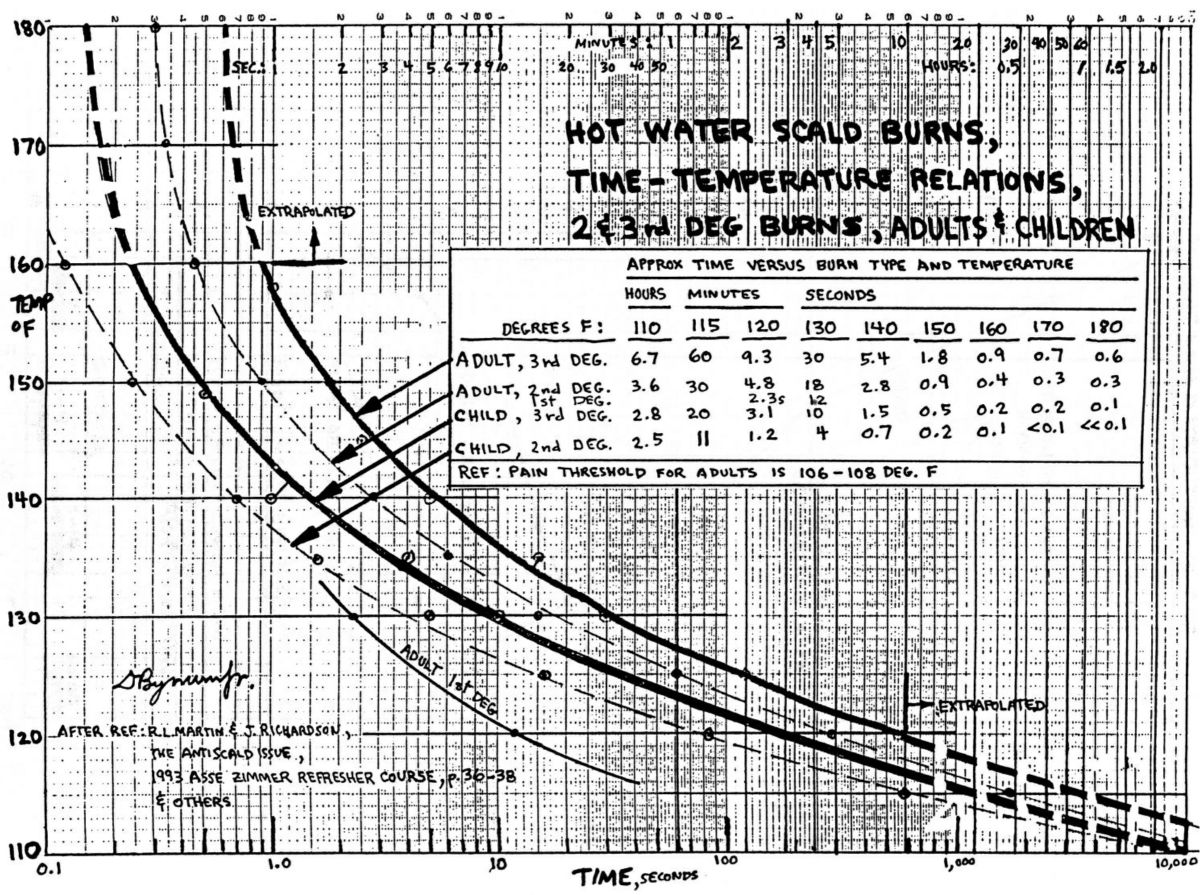
The table below extracted from the Moritz & Henriques Burn Studies shows that at 115 F it significantly increases the amount of time for a bather to get out of harm's way before a serious, irreversible, blistering 2nd degree burn injury occurs.

As you can see, 120 F only gives an adult male 4.8 minutes to get out of harm's way and before a serious burn injury occurs. Women, children & infants have thinner skin and can be burned in a much shorter time (1.2 minutes) when exposed to 120 F. Also a bathtub can be filled with 115 F water with heat loss during filling for a comfortable bath at around 102 - 105 F. Therefore, lowering the maximum allowable shower temperature to 115 will provide an increased level of safety for bathing and showering fixtures. The hot water delivery temperature to the shower valve or tub-shower valve can still be higher to control bacteria in the hot water distribution temperature and the maximum temperature limit stop is adjusted to a lower delivery temperature from the shower head or tub filler faucet.

The Moritz & Henriques burn Studies at Harvard Medical College burn study information is shown below:,

The time temperature exposure to hot water at 120 F vs 115 F water.

Temperature:	Time:	Adult/Child	Degree of Burn:
120 F	4.8 mins	Adult Male	2nd
115 F	30 mins	Adult Male	2nd
120 F	1.2 mins	Child	2nd
115 F	11 mins	Child	2nd



Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is simply changing the maximum allowable temperature adjustment, It will not increase the cost of construction, however it will significantly increase health and safety in the showering and bathing settings.

P38-24

P39-24

IPC: 412.4

Proponents: Ronald George, Plumb-Tech Design & Consulting Services LLC, Self (ron@plumb-techllc.com)

2024 International Plumbing Code

Revise as follows:

412.4 Multiple (gang) showers.
Multiple (gang) showers supplied with a single, *tempered water* supply pipe shall have the water supply for such showers controlled by an *approved* automatic temperature control mixing valve that conforms to ASSE 1069 or CSA B125.3, <u>and set to deliver tempered water within 5°F (2.7 C) plus or minus of 105°F (40.5 C)</u>, or each shower head shall be individually controlled by a balanced-pressure, thermostatic or combination balanced-pressure/thermostatic valve that conforms to ASSE 1016/ASME A112.1016/CSA B125.16 or ASME A112.18.1/CSA B125.1 and that is installed at the point of use. <u>The integral maximum temperature limit-stop adjustment on these valves shall be field adjusted in accordance with the manufacturer's instructions upon installation, and adjusted seasonally as in-coming cold water temperatures change, and adjusted every time there is a change to the domestic hot water distribution system temperature to limit the maximum temperature flowing from the fixture outlet to no greater than 115F (46.1C).</u> ~~Where a shower head is individually controlled, shower control valves shall be rated for the flow rate of the installed shower head. Such Individually valves shall be equipped with a means to limit the maximum setting of the valve to 120°F (49°C), which shall be field adjusted in accordance with the manufacturer's instructions to provide water at a temperature not to exceed 120°F (49°C).~~ *Access* shall be provided to an ASSE 1069 or CSA B125.3 valve.

Reason: Having a maximum temperature limit of 120 F on a gang shower with a single delivery temperature is unsafe.

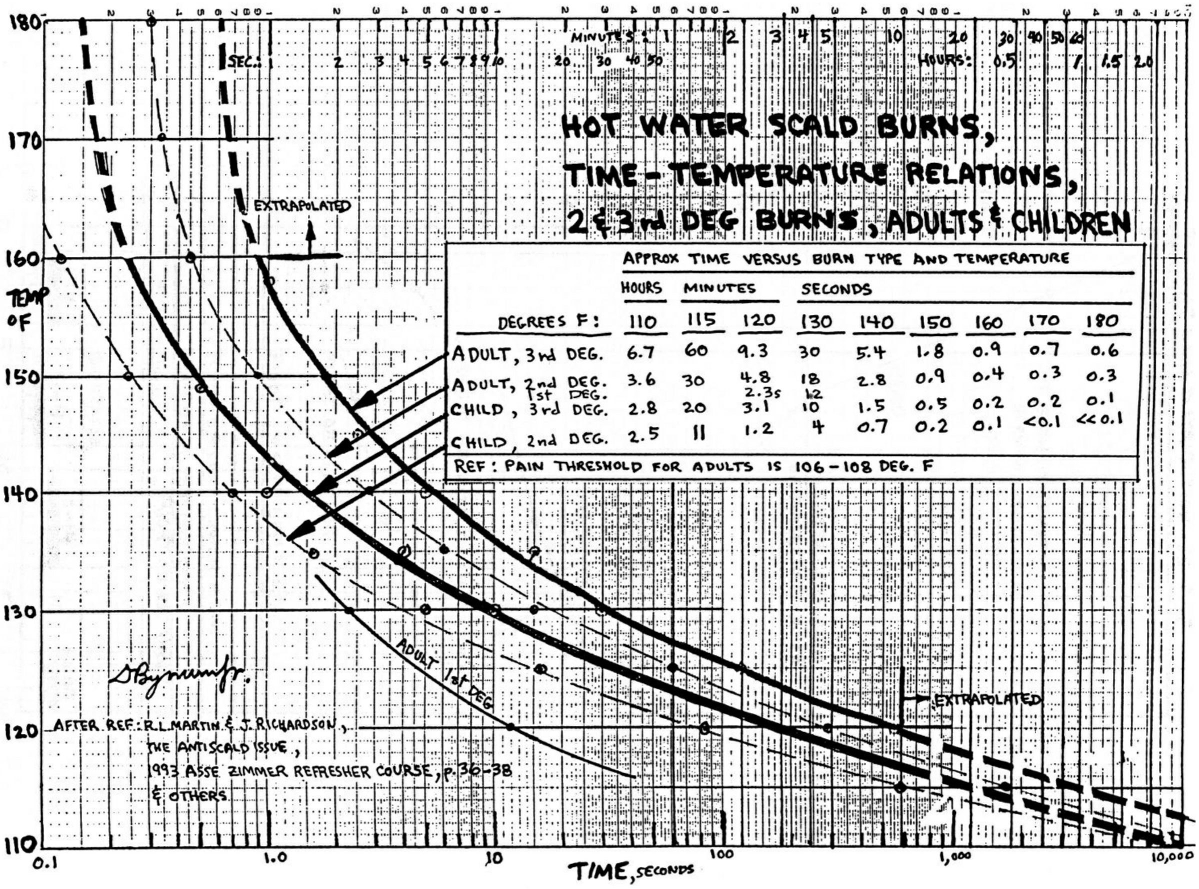
This code change simply gives a temperature setting range within a comfortable bathing temperature. Studies of bathing temperatures have shown showering temperatures generally range between 102 to 109 F. Setting the gang shower mixing valve to 105 F with a tolerance of 5 degrees above or below seems like a good and safe temperature requirement. Temperatures above 115 were painful in the Moritz & Henriques Burn Studies. This code change proposes 105 F plus or minus 5 degrees F. The second part of the code change lowers the maximum allowable shower temperature from 120 F to 115 F. The table below extracted from the Moritz & Henriques Burn Studies shows that at 115 F it significantly increases the amount of time for a bather to get out of harm's way before a serious, irreversible, blistering 2nd degree burn injury occurs.

As you can see, 120 F only gives an adult male 4.8 minutes to get out of harm's way and before a serious burn injury occurs. Women, children & infants have thinner skin and can be burned in a much shorter time (1.2 minutes) when exposed to 120 F. Also a bathtub can be filled with 115 F water with heat loss during filling for a comfortable bath at around 102 - 105 F. Therefore, lowering the maximum allowable shower temperature to 115 will provide an increased level of safety for bathing and showering fixtures.

The Moritz & Henriques burn Studies at Harvard Medical College burn study information is shown below:,

The time temperature exposure to hot water at 120 F vs 115 F water.

Temperature:	Time:	Adult/Child	Degree of Burn:
120 F	4.8 mins	Adult Male	2nd
115 F	30 mins	Adult Male	2nd
120 F	1.2 mins	Child	2nd
115 F	11 mins	Child	2nd



Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This code change simply edits the maximum temperature set point for shower valves. This code change will save lives and reduce scald injuries. There will be an increase in plumbing system safety and a reduction in medical costs associated with treating scald injuries.

P39-24

P40-24

IPC: 412.5

Proponents: Jason Shank, ASSE International, ASSE International (jshank@plumbers55.com); William Grayzar, DiClemente Siegel Design, Inc., Self (bill@dsdonline.com)

2024 International Plumbing Code

Revise as follows:

412.5 Bathtub and whirlpool bathtub valves.
Bathtubs and whirlpool bathtub valves shall have or be supplied by a water-temperature-limiting device that conforms to ASSE 1070/ASME A112.1070/CSA B125.70 or by a water heater complying with ~~ASSE 1082 or~~ ASSE 1084, except where such valves are combination tub/shower valves in accordance with Section 412.3. The water-temperature-limiting device required by this section shall be equipped with a means to limit the maximum setting of the device to 120°F (49°C), and, where adjustable, shall be field adjusted in accordance with the manufacturer's instructions to provide *hot water* at a temperature not to exceed 120°F (49°C). *Access* shall be provided to water-temperature-limiting devices that conform to ASSE 1070/ASME A112.1070/CSA B125.70.

Exception: *Access* shall not be required for nonadjustable water-temperature-limiting devices that conform to ASSE 1070/ASME A112.1070/CSA B125.70 and are integral with a fixture fitting, provided that the fixture fitting itself can be accessed for replacement.

Reason: [SHANKS]:

ASSE 1082 is designed for the following - This standard is for water heaters that control the outlet temperature to specific limits and are installed within a hot water distribution system but not at point-of-use. Being this code section is in regards to point of use the ASSE 1082 is the wrong application.

The correct application is the ASSE 1084 which is designed for the following - Water heaters covered by this standard have a cold-water inlet connection, a means of heating the water, a means of controlling the water temperature, a means of limiting the temperature to a maximum of 120 °F (48.9 °C), and have an outlet connection to connect to downstream fixture fittings. This water heater in regards to a ASSE 1082 is intended to supply tempered water at point of use in order to reduce and control the risks of scalding. This water heater as an ASSE 1082 is not intended to limit thermal shock. This water heater is not a substitute for an automatic compensative valve complying with ASSE 1016 / ASME A112.1016 / CSA B125.16.

Leaving the ASSE 1082 in this section of the code for this useage will go against other current code sections within the IPC such as 408.3 (Bidets) and 419.5 (Public Hand Washing Lavatories). Which causes not only a health and safety concern to the end user but confusion in the Plumbing Industry.

[GRAYZAR]:

ASSE Standard 1082 added in the 2021 code cycle is not suitable for a point-of-use applications. ASSE 1082 Standard does not include scald protection and is intended for steady state flow conditions.

The proposed revision is intended to remove ASSE Standard 1082 only from point-of use applications, while allowing it to remain in Chapter 6 of the code for distribution systems.

The ASSE Standard 1082 is similar to the ASSE Standard 1017 and is intended for controlling the water outlet temperature in a water distribution system and not intended for end use applications without the use of a point-of-use control valve as specified by ASSE 1016/ASME A112.1016/CSA B125.16, ASSE 1069, ASSE 1070/ ASME A112.1070/CSA B125.70, or other appropriate standard.

ASSE Standard 1082 does not include scald protection and is intended for various steady state flow conditions and has an outlet temperature range between 105ºF and 125ºF. The outlet temperature can vary as much as +/- 3ºF for flows less than 5 GPM, +/- 5ºF for flows between 5 GPM and 50 GPM, and as much a +/- 7ºF for flows above 50 GPM.

ASSE Standard 1084 added in the 2024 code cycle is the correct standard in addition to ASSE 1070/ASME A112.1070/BSA B125.70 for this application. An ASSE 1084 compliant device is intended to perform like a water heater with a ASSE 1070/ASME A112.1070/CSA B125.70 compliant water- temperature-limiting device.

ASSE Standard 1084 is intended for varying flow conditions, it is intended to include a level of scald protection consistent with ASSE 1070/ASME A112.1070/CSA B125.70, and it has an outlet temperature range between 100ºF and 110ºF with a maximum temperature of 110ºF for non-adjustable application and 120ºF for an adjustable application.

ASSE Standards 1082 and 1084 do not limit thermal shock and are not substitutes for automatic compensative valves complying with ASSE 1016/ASME A112.1016/CSA B125.16 Performance Requirements for Automatic Compensating Valves for Individual Showers and Tub/Shower Combinations.

Bibliography: [GRAYZAR]: ASSE Standard 1082-2018 - Performance Requirements for Water Heaters with Integral Temperature Control Devices For Hot Water Distribution Systems

ASSE Standard 1084-2018 - Performance Requirements for Water Heaters with Temperature Limiting Capacity

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

[SHANKS]: This proposed change will bring the current requirements for protection against hot water temperatures in the IPC 2024 Code in line with already existing Code Sections for the protection of health and safety of the public. The costs are already included in the construction of a Hot Water System currently in the Code.

[GRAYZAR] : The proposal has no cost impact it is editorial and removes the misapplied ASSE 1082 Standard, which applies hot water distribution systems, from being allowed in a point of use application.

P40-24

P41-24

IPC: 412.10

Proponents: Jason Shank, ASSE International, ASSE International (jshank@plumbers55.com); William Grayzar, DiClemente Siegel Design, Inc., Self (bill@dsdonline.com)

2024 International Plumbing Code

Revise as follows:

412.10 Head shampoo sink faucets.
Head shampoo sink faucets shall be supplied with *hot water* that is limited to not more than 120°F (49°C). Each faucet shall have integral check valves to prevent crossover flow between the hot and cold water supply connections. The means for regulating the maximum temperature shall be one of the following:

1. A limiting device conforming to ASSE 1070/ASME A112.1070/CSA B125.70.
2. A water heater conforming to ~~ASSE 1082 or~~ ASSE 1084.
3. A temperature-actuated, flow-reduction device conforming to ASSE 1062.

Reason: [SHANKS]:

ASSE 1082 is designed for the following - This standard is for water heaters that control the outlet temperature to specific limits and are installed within a hot water distribution system but not at point-of-use. Being this code section is in regards to point of use the ASSE 1082 is the wrong application.

The correct application is the ASSE 1084 which is designed for the following - Water heaters covered by this standard have a cold-water inlet connection, a means of heating the water, a means of controlling the water temperature, a means of limiting the temperature to a maximum of 120 °F (48.9 °C), and have an outlet connection to connect to downstream fixture fittings. This water heater in regards to a ASSE 1082 is intended to supply tempered water at point of use in order to reduce and control the risks of scalding. This water heater as an ASSE 1082 is not intended to limit thermal shock. This water heater is not a substitute for an automatic compensative valve complying with ASSE 1016 / ASME A112.1016 / CSA B125.16.

Leaving the ASSE 1082 in this section of the code for this useage will go against other current code sections within the IPC such as 408.3 (Bidets) and 419.5 (Public Hand Washing Lavatories). Which causes not only a health and safety concern to the end user but confusion in the Plumbing Industry.

[GRAYZAR]:

ASSE Standard 1082 added in the 2021 code cycle is not suitable for a point-of-use application. ASSE 1082 Standard does not include scald protection and is intended for steady state flow conditions.

The proposed revision is intended to remove ASSE Standard 1082 only from point-of use applications, while allowing it to remain in Chapter 6 of the code for distribution systems.

The ASSE Standard 1082 is similar to the ASSE Standard 1017 and is intended for controlling the water outlet temperature in a water distribution system and not intended for end use applications without the use of a point-of-use control valve as specified by ASSE 1016/ASME A112.1016/CSA B125.16, ASSE 1069, ASSE 1070/ ASME A112.1070/CSA B125.70, or other appropriate standard.

ASSE Standard 1082 does not include scald protection and is intended for various steady state flow conditions and has an outlet temperature range between 105°F and 125°F. The outlet temperature can vary as much as +/- 3°F for flows less than 5 GPM, +/- 5°F for flows between 5 GPM and 50 GPM, and as much a +/- 7°F for flows above 50 GPM.

ASSE Standard 1084 added in the 2024 code cycle is the correct standard in addition to ASSE 1070/ASME A112.1070/BSA B125.70 for this application. An ASSE 1084 compliant device is intended to perform like a water heater with a ASSE 1070/ASME A112.1070/CSA B125.70 compliant water- temperature-limiting device.

ASSE Standard 1084 is intended for varying flow conditions, it is intended to include a level of scald protection consistent with ASSE 1070/ASME A112.1070/CSA B125.70, and it has an outlet temperature range between 100ºF and 110ºF with a maximum temperature of 110ºF for non-adjustable application and 120ºF for an adjustable application.

ASSE Standards 1082 and 1084 do not limit thermal shock and are not substitutes for automatic compensative valves complying with ASSE 1016/ASME A112.1016/CSA B125.16 Performance Requirements for Automatic Compensating Valves for Individual Showers and Tub/Shower Combinations.

Bibliography: [GRAYZAR]: ASSE Standard 1082-2018 - Performance Requirements For Water Heaters With Integral Temperature Control Devices For Hot Water Distribution Systems.

ASSE Standard 1084-2018 - Performance Requirements For Water Heaters With Temperature Limiting Capacity

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

[SHANKS]: This proposed change will bring the current requirements for protection against hot water temperatures in the IPC 2024 Code in line with already existing Code Sections for the protection of health and safety of the public. The costs are already included in the construction of a Hot Water System currently in the Code.

[GRAYZAR]:

The proposal has no cost impact it is editorial and removes the misapplied ASSE 1082 Standard, which applies hot water distribution systems, from being allowed in a point of use application.

P41-24

P42-24 Part I

IPC: 413.1, ASME Chapter 15 (New)

Proponents: THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

Revise as follows:

413.1 Approval.
Floor drains shall conform to ASME A112.3.1~~,~~ or ASME A112.6.3 ~~or CSA B79~~. Trench drains shall comply with ASME ~~A112.6.3~~ A112.6.8/CSA B79.8.

Add new standard(s) as follows:

ASME

American Society of Mechanical Engineers
Two Park Avenue
New York, NY 10016-5990

A112.6.8/CSA B79.8–2022 Trench Drains

Staff Analysis: A review of the standard proposed for inclusion in the code, SME A112.6.8/CSA B79.8-2022 T*rench Drains*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

P42-24 Part I

P42-24 Part II

IRC: TABLE P2701.1, P2719.1, ASME Chapter 44 (New)

Proponents: Justin Cassamassino, ASME, A112 Main Committee (cassamassinoj@asme.org)

2024 International Residential Code

Revise as follows:

TABLE P2701.1 PLUMBING FIXTURES, FAUCETS AND FIXTURE FITTINGS

Portions of table not shown remain unchanged.

MATERIAL	STANDARD
Air gap fittings for use with plumbing fixtures, appliances and appurtenances	ASME A112.1.3
Bathtub/whirlpool pressure-sealed doors	ASME A112.19.15
Diverters for faucets with hose spray, anti-syphon type, residential application	ASME A112.18.1/CSA B125.1
Enameled cast-iron plumbing fixtures	ASME A112.19.1/CSA B45.2
Floor drains	ASME A112.6.3
Framing-affixed supports for off-the-floor water closets with concealed tanks	ASME A112.6.2
Hose connection vacuum breaker	ASSE 1052
Hot water dispensers, household storage type, electrical	ASSE 1023
Household disposers	ASSE 1008
Hydraulic performance for water closets and urinals	ASME A112.19.2/CSA B45.1
Individual automatic compensating valves for individual fixture fittings	ASME A112.18.1/CSA B125.1
Individual shower control valves anti-scald	ASSE 1016/ASME A112.1016/CSA B125.16
Macerating toilet systems and related components	ASME A112.3.4/CSA B45.9
Nonvitreous ceramic plumbing fixtures	ASME A112.19.2/CSA B45.1
Plastic bathtub units	CSA B45.5/IAPMO Z124; ASME A112.19.2/CSA B45.1
Plastic lavatories	CSA B45.5/IAPMO Z124
Plastic shower receptors and shower stalls	CSA B45.5/IAPMO Z124
Plastic sinks	CSA B45.5/IAPMO Z124
Plastic water closet bowls and tanks	CSA B45.5/IAPMO Z124
Plumbing fixture fittings	ASME A112.18.1/CSA B125.1
Plumbing fixture waste fittings	ASME A112.18.2/CSA B125.2; ASTM F409
Porcelain-enameled formed steel plumbing fixtures	ASME A112.19.1/CSA B45.2
Pressurized flushing devices for plumbing fixtures	ASSE 1016/ASME 112.1016/CSA B125.16; CSA B125.3
Specification for copper sheet and strip for building construction	ASTM B370
Stainless steel plumbing fixtures	ASME A112.19.3/CSA B45.4
Suction fittings for use in whirlpool bathtub appliances	ASME A112.19.7/CSA B45.10
Temperature-actuated, flow reduction valves to individual fixture fittings	ASSE 1062
Thermoplastic accessible and replaceable plastic tube and tubular fittings	ASTM F409
Trench drains	~~ASME A112.6.3~~ ASME A112.6.8/CSA B79.8
Trim for water closet bowls, tanks and urinals	ASME A112.19.5/CSA B45.15
Vacuum breaker wall hydrant-frost-resistant, automatic-draining type	ASSE 1019
Vitreous china plumbing fixtures	ASME A112.19.2/CSA B45.1
Wall-mounted and pedestal-mounted, adjustable and pivoting lavatory and sink carrier systems	ASME A112.19.12
Water closet flush tank fill valves	ASSE 1002/ASME A112.1002/CSA B125.12; CSA B125.3
Whirlpool bathtub appliances	ASME A112.19.7/CSA B45.10

P2719.1 Floor and trench drains.

Floor drains shall comply to ASME A112.6.3. Trench drains shall comply to ASME A112.6.8/CSA B79.8. *Floor drains* shall have waste outlets not less than 2 inches (51 mm) in diameter and a removable strainer. *Floor drains* shall be constructed so that the drain can be cleaned. Access shall be provided to the drain inlet. *Floor drains* shall not be located under or have their access restricted by permanently installed appliances.

Add new standard(s) as follows:

ASME

American Society of Mechanical Engineers
Two Park Avenue
New York, NY 10016-5990

A112.6.8/CSA B79.8–2022 Trench Drains

Staff Analysis: A review of the standard proposed for inclusion in the code, SME A112.6.8/CSA B79.8-2022 T*rench Drains*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: The ASME A112.6.3 was harmonized with CSA B79 such that the CSA B79 designation is not used. The updated standard designation will be proposed in Group B Administrative standard updates. Trench drains are now covered under ASME A112.6.8/CSA B79.3.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Clarification as to which standard is applicable to which product. Drains were already using the ASME standards for certification.

P42-24 Part II

P43-24

IPC: 414.1, ASME Chapter 15, ASME Chapter 15 (New)

Proponents: Justin Cassamassino, ASME, A112 Main Committee (cassamassinoj@asme.org)

2024 International Plumbing Code

Revise as follows:

414.1 Approval.
Sanitary floor sinks shall conform to the requirements of ASME A112.6.7/CSA B79.7.

ASME

American Society of Mechanical Engineers
Two Park Avenue
New York, NY 10016-5990

~~A112.6.7—2010 (R2024)~~ ~~Sanitary Floor Sinks~~

Add new standard(s) as follows:

ASME

American Society of Mechanical Engineers
Two Park Avenue
New York, NY 10016-5990

A112.6.7/CSA B79.7-2022 Sanitary Floor Sinks

Staff Analysis: A review of the standard proposed for inclusion in the code, ASME A112.6.7/CSA B79.7-2022 *Sanitary Floor Sinks*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: The ASME A112.6.7 was harmonized with CSA B79. The intent of this proposal is to replace the current standard with the new standard.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Products were already required to comply with ASME standard, this to clarify the ASME was harmonized with the CSA B79 standard.

P43-24

P44-24

IPC: 419.5

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov)

2024 International Plumbing Code

Revise as follows:

419.5 Tempered water for public hand-washing facilities.
~~*Tempered water* shall be delivered from lavatories and group wash fixtures located in *public* toilet facilities provided for customers, patrons and visitors.~~ Tempered water shall be delivered from lavatories and group wash fixtures located in public toilet facilities provided for any occupancy with primary users being children, such as elementary schools, Sunday bible schools, and child daycare facilities or for any occupancy serving primarily elderly or other vulnerable occupants, and for any lavatories and group wash fixtures located in public use toilet facilities that are provided with a single delivered temperature faucet. *Tempered water* shall be delivered through an *approved* water-temperature limiting device that conforms to ASSE 1070/ASME A112.1070/CSA B125.70.

Reason: Tempered water for public handwashing fixtures was the result of an overreach associated to trying to protect the users of bathtubs and showers from sudden changes in temperature. The protection for users of bathtubs and showers makes sense because the user is "captive" to the fixture when they use it. The same cannot be said for handwashing fixtures. This requirement was a massive overreach because the same risk level just isn't there. If a user of a handwashing fixture senses water is too hot or too cold, they can simply remove their hands from the stream of water. This proposal will still require protection for public facility users that would be most at risk, such as children and senior citizens in assisted care facilities.

Bibliography: See reason statement.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

Between $200-$500 for each unit that would no longer be required to be installed.

Estimated Immediate Cost Impact Justification (methodology and variables):

$100-$200 per unit and between $100-$300 for labor depending on the local labor costs.

P44-24

P45-24

IPC: 421.4

Proponents: Guy McMann, Jefferson County Colorado, CAPMO (gmcmann@jeffco.us)

2024 International Plumbing Code

Revise as follows:

421.4 Shower compartments. Shower compartments shall be not less than 900 square inches (0.58 m^2) in interior cross-sectional area. Shower compartments shall be not less than 30 inches (762 mm) in least dimension as measured from the finished interior dimension of the compartment, exclusive of fixture valves, showerheads, soap dishes and safety grab bars or rails. Except as required in Section 404, the minimum required area and dimension shall be measured from the finished interior dimension at a height equal to the top of the threshold and at a point tangent to its centerline and shall be continued to a height not less than 70 inches (1778 mm) above the shower drain outlet. Where curbs are installed, the curb shall be not less than 2 inches (51 mm) and not more than 9 inches (229 mm) deep when measured from the top of the curb to the top of the drain.

> **Exception:** Shower compartments having not less than 25 inches (635 mm) in minimum dimension measured from the finished interior dimension of the compartment, provided that the shower compartment has not less than 1,300 square inches (0.838 m^2) of cross-sectional area.

Reason: This added text will align with what's in the IRC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This a clarification because most showers have curbs yet there isn’t anything in the code about the height of the curb. Establishing a minimum height of a curb doesn’t change the cost of a curb installation because the cost of choosing to install the curb is already considered.

P45-24

P46-24

IPC: 423.3

Proponents: Jason Shank, ASSE International, ASSE International (jshank@plumbers55.com); William Grayzar, DiClemente Siegel Design, Inc., Self (bill@dsdonline.com)

2024 International Plumbing Code

Revise as follows:

423.3 Footbaths and pedicure baths.
The water supplied to specialty plumbing fixtures, such as pedicure chairs having an integral foot bathtub and footbaths, shall be limited to not greater than 120ºF (49ºC) by a water-temperature-limiting device that conforms to ASSE 1070/ASME A112.1070/CSA B125.70 or by a water heater complying with ~~ASSE 1082 or~~ 1084.

Reason: [SHANKS]: ASSE 1082 is designed for the following - This standard is for water heaters that control the outlet temperature to specific limits and are installed within a hot water distribution system but not at point-of-use. Being this code section is in regards to point of use the ASSE 1082 is the wrong application.

The correct application is the ASSE 1084 which is designed for the following - Water heaters covered by this standard have a cold-water inlet connection, a means of heating the water, a means of controlling the water temperature, a means of limiting the temperature to a maximum of 120 °F (48.9 °C), and have an outlet connection to connect to downstream fixture fittings. This water heater in regards to a ASSE 1082 is intended to supply tempered water at point of use in order to reduce and control the risks of scalding. This water heater as an ASSE 1082 is not intended to limit thermal shock. This water heater is not a substitute for an automatic compensative valve complying with ASSE 1016 / ASME A112.1016 / CSA B125.16.

Leaving the ASSE 1082 in this section of the code for this useage will go against other current code sections within the IPC such as 408.3 (Bidets) and 419.5 (Public Hand Washing Lavatories). Which causes not only a health and safety concern to the end user but confusion in the Plumbing Industry.

[GRAYZAR]:

ASSE Standard 1082 added in the 2021 code cycle is not suitable for a point-of-use application. ASSE 1082 Standard does not include scald protection and is intended for steady state flow conditions.

The proposed revision is intended to remove ASSE Standard 1082 only from point-of use applications, while allowing it to remain in Chapter 6 of the code for distribution systems.

The ASSE Standard 1082 is similar to the ASSE Standard 1017 and is intended for controlling the water outlet temperature in a water distribution system and not intended for end use applications without the use of a point-of-use control valve as specified by ASSE 1016/ASME A112.1016/CSA B125.16, ASSE 1069, ASSE 1070/ ASME A112.1070/CSA B125.70, or other appropriate standard.

ASSE Standard 1082 does not include scald protection and is intended for various steady state flow conditions and has an outlet temperature range between 105°F and 125°F. The outlet temperature can vary as much as +/- 3°F for flows less than 5 GPM, +/- 5°F for flows between 5 GPM and 50 GPM, and as much a +/- 7°F for flows above 50 GPM.

ASSE Standard 1084 added in the 2024 code cycle is the correct standard in addition to ASSE 1070/ASME A112.1070/BSA B125.70 for this application. An ASSE 1084 compliant device is intended to perform like a water heater with a ASSE 1070/ASME A112.1070/CSA B125.70 compliant water- temperature-limiting device.

ASSE Standard 1084 is intended for varying flow conditions, it is intended to include a level of scald protection consistent with ASSE 1070/ASME A112.1070/CSA B125.70, and it has an outlet temperature range between 100°F and 110°F with a maximum temperature of 110°F for non-adjustable application and 120°F for an adjustable application.

ASSE Standards 1082 and 1084 do not limit thermal shock and are not substitutes for automatic compensative valves complying with ASSE 1016/ASME A112.1016/CSA B125.16 Performance Requirements for Automatic Compensating Valves for Individual Showers and Tub/Shower Combinations.

Bibliography: [GRAYZAR]: ASSE Standard 1082-2018 - Performance Requirements for Water Heaters with Integral Temperature Control Devices For Hot Water Distribution Systems.

ASSE Standard 1084-2018 - Performance Requirements for Water Heaters with Temperature Limiting Capacity

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

[SHANKS]: This proposed change will bring the current requirements for protection against hot water temperatures in the IPC 2024 Code in line with already existing Code Sections for the protection of health and safety of the public. The costs are already included in the construction of a Hot Water System currently in the Code.

[GRAYZAR]: The proposal has no cost impact it is editorial and removes the misapplied ASSE 1082 Standard, which applies hot water distribution systems, from being allowed in a point of use application.

P46-24

P47-24 Part I

IPC: 425.1.3

Proponents: Justin Cassamassino, ASME, A112 Main Committee (cassamassinoj@asme.org)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

Revise as follows:

425.1.3 Dual flush water closets.
Water closets equipped with a dual flushing device shall comply with ~~ASME A112.19.14~~ ASME A112.19.2/CSA B45.1, ASME A112.19.3/CSA B45.4 or CSA B45.5/IAPMO Z124.

Staff Analysis: The proposed standards are currently referenced in the Code.

P47-24 Part I

P47-24 Part II

IRC: P2712.1

Proponents: Justin Cassamassino, ASME, A112 Main Committee (cassamassinoj@asme.org)

2024 International Residential Code

Revise as follows:

P2712.1 Approval.
Water closets shall conform to the water consumption requirements of Section P2903.2 and shall conform to ASME A112.19.2/CSA B45.1, ASME A112.19.3/CSA B45.4 or CSA B45.5/IAPMO Z124. Water closets shall conform to the hydraulic performance requirements of ASME A112.19.2/CSA B45.1. Water closet tanks shall conform to ASME A112.19.2/CSA B45.1, ASME A112.19.3/CSA B45.4 or CSA B45.5/IAPMO Z124. Water closets that have an invisible seal and unventilated space or walls that are not thoroughly washed at each discharge shall be prohibited. Water closets that allow backflow of the contents of the bowl into the flush tank shall be prohibited. Water closets equipped with a dual flushing device shall comply with ~~ASME A112.19.14~~ ASME A112.19.2/CSA B45.1, ASME A112.19.3/CSA B45.4 or CSA B45.5/IAPMO Z124.

Staff Note: The proposed standards are currently referenced in the Code.

Reason: ASME A112.19.14 has been discontinued. The requirements from ASME A112.19.14 for dual flush are now covered under ASME A112.19.2/CSA B45.1 for ceramic fixtures, ASME A112.19.3/CSA B45.4 for stainless steel fixtures or CSA B45.5/IAPMO Z124 for plastic fixtures.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The requirements remained the same so no new testing is needed for toilets to be certified, this change just clarification as to what standard is applicable.

P47-24 Part II

P48-24

IPC: 425.3 (New), IAPMO Chapter 15 (New)

Proponents: Terry Burger, IAPMO Group, IAPMO Group (terry.burger@asse-plumbing.org)

2024 International Plumbing Code

Add new text as follows:

425.3 Water closet seats. Water closets shall be equipped with seats of smooth, nonabsorbent material. Seats of water closets provided for *public* or employee toilet facilities shall be of the hinged open-front type. Integral water closet seats shall be of the same material as the fixture. Water closet seats shall be sized for the water closet bowl type. Plastic water closet seats shall conform to IAPMO Z124.5

Add new standard(s) as follows:

IAPMO

IAPMO Group
4755 E. Philadelphia Street
Ontario, CA 91761 USA

Z124.5 - 2013E1(R2018) Plastic toilet seats

Staff Analysis: A review of the standard proposed for inclusion in the code, IAPMO Z124.5-2023e1(R2018) *Plastic Toilet Seats* , with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: The water closet seat standard provides the performance and material requirements which provides a means to demonstrate performance and material requirements in addition to compliance to this section of the codes

Bibliography: IAPMO Z124.5 - 2013E1(R2018) Plastic toilet seats

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Product exist in the market place already compliant to the reference standard. This change has no cost impact.

P48-24

P49-24

IPC: SECTION 202 (New), SECTION 427 (New), 427.1 (New), 427.2 (New), 427.3 (New), IAPMO Chapter 15 (New)

Proponents: Misty Guard, Regulosity LLC, MAG Industries LLC (misty.guard@regulosity.com)

2024 International Plumbing Code

Add new definition as follows:

ASSISTIVE TABLE.
A product produced, generally available, or used by or for persons with a physical, or cognitive disability intended to facilitate and support personal care or hygiene with a changing surface to support a user in a reclined or lying position. Assistive Tables can be fixed or adjustable height and have integrated plumbing fittings and fixtures.

Add new text as follows:

SECTION 427
ASSISTIVE TABLES

427.1 Approval. Assistive tables shall conform to IAPMO Z1390. Assistive tables with an integrated water closet shall conform with Section 425. Assistive tables with an integrated bidet shall conform to Section 408. Assistive tables with an integrated faucet or fixture fitting shall conform to Section 412. Assistive tables with an integrated flushing device for a water closet shall conform to Section 415. Assistive tables with an integrated lavatory shall conform to Section 419. Assistive tables with an integrated sink shall conform to Section 422.

427.2 Waste outlet connection. Assistive tables with an integrated water closet shall have a waste outlet that connects to a 4 x 4 or 4 x 3 water closet flange. A 4-inch by 3-inch (102 mm by 76 mm) closet bend shall be acceptable.

427.3 Installation. Assistive tables shall be installed in accordance with Section 405.

Add new standard(s) as follows:

IAPMO

IAPMO Group
4755 E. Philadelphia Street
Ontario, CA 91761 USA

Z1390-xx Assistive Tables

Staff Analysis: A review of the standard proposed for inclusion in the code, IAPMO Z1390-xx *Assistive Tables*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: Assistive tables are plumbing products that facilitate and support the personal hygiene of individuals who are physically challenged, disabled, or elderly. While the assistive table is not a new product, the products are required in new commercial buildings and substantial renovations of existing bathrooms in Arkansas, Arizona, California, New Hampshire, and Pennsylvania. Massachusetts, Michigan, Minnesota, and Wisconsin have pending legislation for these products. A technical subcommittee of manufacturers, consultants, installers, and disability experts wrote the product performance and safety standard, IAPMO Z1390 Assistive Tables. IAPMO Z1390 covers 1) product design requirements for user weight, maximum loads, heights, operation, locking safety mechanisms, mechanical wear, cleaning and disinfection, changing surface, grab rails, safety restraint systems, electrical, support structure, integrated plumbing fittings, integrated plumbing fixtures, 2) performance requirements for height, vertical movement, locking mechanisms, changing surface tests, grab bars, support structures, waste fitting connections, and body part entrapment, 3) marking and signage requirements, and 4) installation documentation.

Bibliography: IAPMO Z1390: Assistive Table

Cost Impact: Increase

Estimated Immediate Cost Impact:

This requirement will increase the cost of these products by requiring the product manufacturer to obtain testing through a testing laboratory and third-party certification. Laboratory testing and third-party certification fees for products typically range between $3,000 to $20,000. The increase in cost is offset by the benefits to public health and safety of products that conform to product safety and performance standards resulting in a reduction of harm to users.

Estimated Immediate Cost Impact Justification (methodology and variables):

This requirement will increase the cost of these products by requiring the product manufacturer to obtain testing through a testing laboratory and third-party certification. The increase in cost is offset by the benefits to public health and safety of products that conform to product safety and performance standards resulting in a reduction of harm to users.

P49-24

P50-24

IPC: CHAPTER 5, SECTION 501, 501.10 (New)

Proponents: Ronald George, Plumb-Tech Design & Consulting Services LLC, Self (ron@plumb-techllc.com)

2024 International Plumbing Code

CHAPTER 5 WATER HEATERS

SECTION 501
GENERAL

Add new text as follows:

501.10 Minimum Storage Temperature in Storage Type Water Heaters. Storage type water heaters shall have a minimum water temperature of 140 F to control the growth of Legionella bacteria and other pathogens in the storage tank.

Reason: ASHRAE 188 and ASHRAE Guideline 12 dealing with control of Legionella in Building water systems recommends a minimum hot water storage temperature to kill bacteria. This code change is intended to bring the code in line with industry standards on Legionella. **Effects of Temperature on Legionella Bacteria**

Temperature[1]	Result
Below 68F (20C)	Legionella survives, but will not grow/multiply
68 F (20C)	Legionella will double its population in 8 days
77 F (25C)	Legionella will double its population in 3 days
68 to 122 F (20-50C)	Legionella bacteria growth temperature range[3]
95 to 115 F (35-46C)	Ideal Legionella bacteria growth temperature range
Abv 122F & Bel. 131 F	Legionella bacteria survives, will not grow/multiply[2,3]
131 F (55C)	Legionella bacteria dies in 5 to 6 hours[2]
140 F (60C)	Legionella bacteria dies in 32 minutes[2]
151 F (66C)	Legionella bacteria dies in 2 minutes[2]
158 F + (70C+)	Legionella bacteria dies instantly (Disinfection temp.)[2]

Notes:

1. These temperatures are based on laboratory tests. Field conditions may vary due to differences in water quality, insulating properties of host amoeba, biofilm,

   scale and sediment.

2. Verify that the water heater is capable of heating to non-growth or disinfection temperatures.

3. The coolest point in the hot water system (Hot water return pipe) should be a couple of degrees above the highest growth temperature as a safety factor.

   (122F + 2F = 124F, many temperature gauges have a + or – 2F accuracy Locate a temperature gauge just before HW Return connects to Water Heater/Mixing

   Valve return tee.)

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Raising the hot water storage temperature does not affect costs of construction as this is something that is done after construction. This proposal improves health & Safety.

P50-24

P51-24

IPC: 501.8, 501.8.1 (New), 501.8.2 (New)

Proponents: Ronald George, Plumb-Tech Design & Consulting Services LLC, Self (ron@plumb-techllc.com)

2024 International Plumbing Code

501.8 Temperature controls.
Hot water supply systems shall be equipped with automatic temperature controls capable of adjustments from the lowest to the highest acceptable temperature settings for the intended temperature operating range.

Add new text as follows:

501.8.1 Water Heater Outlet Temperature Controls. All water heaters in hospitals, medical facilities, nursing homes, senior housing facilities, hotels and motels shall have a temperature actuated mixing valve conforming to ASSE 1017, set to maintain the hot water temperature 2 degrees above the Legionella bacteria growth temperature of 122 F at all points in the storage and distribution system.

501.8.2 Water Heater Minimum Storage Temperature.
Storage type water heaters in hospitals, medical facilities, nursing homes, senior housing facilities, hotels and motels shall have a minimum water storage temperature of 140 F to control the growth of Legionella bacteria and other pathogens in the storage tank.

Staff Analysis: The proposed standard is in the current edition of the code.

Reason: This code change is intended to add a minimum storage temperature and temperature controls for for buildings with susceptible populations for Legionnaires disease. This code change will increase the cost of construction, but it will significantly increase the safety of building occupants in these facilities.

Cost Impact: Increase

Estimated Immediate Cost Impact:

$100 to $4,950

Estimated Immediate Cost Impact Justification (methodology and variables):

The cost of mixing valves depends on the size of the valve Mixing valves can cost anywhere between $100 to $4,950.0

The cost of a Legionella outbreak can be millions of dollars.

Estimated Life Cycle Cost Impact:

Not installing a mixing valve can leave a system susceptible to Legionella bacteria growth and one outbreak can bankrupt a company.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

To purchase a 1-1/2 inch Temperature actuated mixing valve ranges from $1,080 to $1,500

A Legionella Outbreak has cost some companies tens of millions of dollar

The idea of an outbreak of Legionnaires' Disease sends property managers and owners everywhere scurrying for cover. and News reporters and camera operators knocking on your door for a statement for the evening news.

Legionnaires disease spread through contaminated aerosolized water droplets, that when inhaled into the lungs, the bacteria flourishes in the warm, moist lining of he lungs where it multiplyas and eventually can cause pneumonia and many other complications.

According to The **Center for Disease Control and Prevention (CDC)**, between 8,000 and 18,000 people are hospitalized with Legionnaires' disease each year, and only about 20 percent of Legionnaires disease cases are reported. With the number of cases rapidly rising in the last ten years, and medical costs exceeding $360 million annually. Owners and managers of properties where outbreaks occur frequently find themselves the target of legal action by those who have contracted the disease, and the cost of an outbreak can quickly tally up to eight figures and beyond. Legionnaires disease is 100% preventable with a good system design, a water management plan to monitor and control the system to prevent conditions conducive to growth and with education.

What is the Price of Liability?

In the event of a Legionnaires' outbreak on your property, there are three main consequences that can cost you:

Expensive settlements and personal injury awards A Legionnaires' outbreak is serious business. An outbreak can affect dozens, and even hundreds, of people, with death rates between 20 and 40 percent, and many survivors facing weeks to months of hospitalization, six-figure medical bills, and permanent damage. Because of this, settlements and jury awards range from the hundreds of thousands to several million dollars.

Building closure and business interruption

On top of legal action, investigation and remediation of an outbreak usually results in a building closure, causing substantial business interruption. A 2009 outbreak at Miami's EPIC Hotel, for instance, reportedly caused daily income losses of about $200,000.

Irreparable negative publicity The damage to a companie's reputation, brand, and other intangibles may be harder to put a number on, but this damage is also often longer-lasting and less easily repaired.

P51-24

P52-24 Part I

IPC: SECTION 202 (New), 501.10 (New), ASSE Chapter 15 (New)

Proponents: David Nickelson, Uponor, Uponor (david.nickelson@uponor.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

Add new definition as follows:

HEAT INTERFACE UNIT. A unit including one or more double wall heat exchangers and control devices for transferring heat from a primary to a secondary system. The primary system may be a hot water heating system. The secondary system is the domestic hot water system within the dwelling or other space.

Add new text as follows:

501.10 Heat Interface Unit. Installed heat interface units shall contain a proportional control valve that is third-party certified to ASSE 1379.

Add new standard(s) as follows:

ASSE

ASSE International
18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448

1379-20xx	Proportional Flow Control Devices, with Protection from Cross Connection via Hydronic Water, for use in Potable Water Installation

Staff Analysis: A review of the standard proposed for inclusion in the code, ASSE 1379-20xx *Proportional Flow Control Devices, with Protection from Cross Connection via Hydronic Water, for use in Potable Water Installation*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: The Heat Interface Unit helps improve water quality, water and energy efficiency, water and energy conservation, and system performance.

A Heat Interface Unit system eliminates more than 50% of the Domestic Hot Water (DHW) volume. This is accomplished by eliminating much of the hot water piping and all the recirculation line piping. Since much of the hot water piping has been eliminated with a Heat Interface Unit system there is a much higher turnover of fresh water in the domestic system. The domestic hot-water piping that remains in the building is only the in-suite piping on the other side of the Heat Interface Unit. These are short runs of smaller-diameter piping that have little volume of water and cool quickly after use to help minimize the time in the optimal-bacterial-growth temperature range.

When designed properly, a Heat Interface Unit system can realize up to 35% reduction of energy used in the building by eliminating a central DHW system with its recirculation piping and pumps, and just using the 4-pipe HVAC system to distribute hot water to the Heat Interface Units.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0

Estimated Immediate Cost Impact Justification (methodology and variables):

The inclusion of an additional option does not in and of itself increase or decrease the overall cost impact of the code, because an option may or may not be chosen. The existing options are still relevant, and if chosen, have no cost impact on the actual code requirements.

P52-24 Part I

P52-24 Part II

IRC: SECTION 202 (New), P2805 (New), P2805.1 (New), ASSE Chapter 44 (New)

Proponents: David Nickelson, Uponor, Uponor (david.nickelson@uponor.com)

2024 International Residential Code

Add new definition as follows:

HEAT INTERFACE UNIT. A unit including one or more double wall heat exchangers and control elements for transferring heat from a primary to a secondary system. The primary system may be a hot water heating system. The secondary system is the domestic hot water system within the dwelling or other space.

Add new text as follows:

P2805
HEAT INTERFACE UNIT

P2805.1 Heat interface unit. Installed heat interface units shall contain proportional control valves that are third-party certified to ASSE 1379.

-

Add new standard(s) as follows:

ASSE

ASSE International
18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448

1379-20xx	Proportional Flow Control Devices, with Protection from Cross Connection via Hydronic Water, for use in Potable Water Installations

Reason: The Heat Interface Unit helps improve water quality, water and energy efficiency, water and energy conservation, and system performance.

A Heat Interface Unit system eliminates more than 50% of the Domestic Hot Water (DHW) volume. This is accomplished by eliminating much of the hot water piping and all the recirculation line piping. Since much of the hot water piping has been eliminated with a Heat Interface Unit system there is a much higher turnover of fresh water in the domestic system. The domestic hot-water piping that remains in the building is only the in-suite piping on the other side of the Heat Interface Unit. These are short runs of smaller-diameter piping that have little volume of water and cool quickly after use to help minimize the time in the optimal-bacterial-growth temperature range.

When designed properly, a Heat Interface Unit system can realize up to 35% reduction of energy used in the building by eliminating a central DHW system with its recirculation piping and pumps, and just using the 4-pipe HVAC system to distribute hot water to the Heat Interface Units.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0

Estimated Immediate Cost Impact Justification (methodology and variables):

The inclusion of an additional option does not in and of itself increase or decrease the overall cost impact of the code, because an option may or may not be chosen. The existing options are still relevant, and if chosen, have no cost impact on the actual code requirements.

P52-24 Part II

P53-24 Part I

IPC: SECTION 202 (New), 501.10 (New), ASSE Chapter 15 (New)

Proponents: David Nickelson, Uponor, Uponor (david.nickelson@uponor.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

Add new definition as follows:

INDIRECT-FIRED WATER HEATER. A water heater equipped with an internal or external heat exchanger used to transfer heat from an external source to heat potable water. The equipment either contains heated potable water or water supplied from an external source.

Add new text as follows:

501.10 Indirect-fired water heaters. Where indirect-fired water heaters contain proportional control valves, such valves shall be third-party certified to ASSE 1379.

Add new standard(s) as follows:

ASSE

ASSE International
18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448

1379-20xx	Proportional Flow Control Devices, with Protection from Cross Connection via Hydronic Water, for use in Potable Water Installations

Staff Analysis: A review of the standard proposed for inclusion in the code, ASSE 1379-20xx *Proportional Flow Control Devices, with Protection from Cross Connection via Hydronic Water, for use in Potable Water Installation*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: An indirect-fired water heater helps improve water quality, water and energy efficiency, water and energy conservation, and system performance.

An indirect-fired water heater system eliminates more than 50% of the Domestic Hot Water (DHW) volume. This is accomplished by eliminating much of the hot water piping and all the recirculation line piping. Since much of the hot water piping has been eliminated with an indirect-fired water heater system there is a much higher turnover of fresh water in the domestic system. The domestic hot-water piping that remains in the building is only the in-suite piping on the other side of the indirect-fired water heater. These are short runs of smaller-diameter piping that have little volume of water and cool quickly after use to help minimize the time in the optimal-bacterial-growth temperature range. When designed properly, an indirect-fired water heater system can realize up to 35% reduction of energy used in the building by eliminating a central DHW system with its recirculation piping and pumps, and just using the 4-pipe HVAC system to distribute hot water to the indirect-fired water heater.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0

Estimated Immediate Cost Impact Justification (methodology and variables):

The inclusion of an additional option does not in and of itself increase or decrease the overall cost impact of the code, because an option may or may not be chosen. The existing options are still relevant, and if chosen, have no cost impact on the actual code requirements.

Estimated Life Cycle Cost Impact:

Estimated Life Cycle Cost Impact Justification (methodology and variables):

P53-24 Part II

IRC: SECTION 202 (New), SECTION P2805 (New), P2805.1 (New), ASSE Chapter 44 (New)

Proponents: David Nickelson, Uponor, Uponor (david.nickelson@uponor.com)

2024 International Residential Code

Add new definition as follows:

[MP] INDIRECT-FIRED WATER HEATER. A water heater equipped with an internal or external heat exchanger used to transfer heat from an external source to heat potable water. The equipment either contains heated potable water or water supplied from an external source.

Add new text as follows:

SECTION P2805
INDIRECT-FIRED WATER HEATERS

P2805.1 Indirect-fired water heaters. Where indirect-fired water heaters contain a proportional control valve, such valves shall be third-party certified to ASSE 1379.

Add new standard(s) as follows:

ASSE

ASSE International
18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448

1379-20xx	Proportional Flow Control Devices, with Protection from Cross Connection via Hydronic Water, for use in Potable Water Installation

Reason: An indirect-fired water heater helps improve water quality, water and energy efficiency, water and energy conservation, and system performance.

An indirect-fired water heater system eliminates more than 50% of the Domestic Hot Water (DHW) volume. This is accomplished by eliminating much of the hot water piping and all the recirculation line piping. Since much of the hot water piping has been eliminated with an indirect-fired water heater system there is a much higher turnover of fresh water in the domestic system. The domestic hot-water piping that remains in the building is only the in-suite piping on the other side of the indirect-fired water heater. These are short runs of smaller-diameter piping that have little volume of water and cool quickly after use to help minimize the time in the optimal-bacterial-growth temperature range. When designed properly, an indirect-fired water heater system can realize up to 35% reduction of energy used in the building by eliminating a central DHW system with its recirculation piping and pumps, and just using the 4-pipe HVAC system to distribute hot water to the indirect-fired water heater.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0

Estimated Immediate Cost Impact Justification (methodology and variables):

The inclusion of an additional option does not in and of itself increase or decrease the overall cost impact of the code, because an option may or may not be chosen. The existing options are still relevant, and if chosen, have no cost impact on the actual code requirements.

P53-24 Part II

P54-24 Part I

IPC: SECTION 202 (New), SECTION 502, 502.1, SECTION 506 (New), 506.1 (New), 506.2 (New), 506.3 (New), 506.3.1 (New), 506.3.2 (New), 506.4 (New), 506.5 (New), 506.5.1 (New), TABLE 506.5.1 (New), 506.5.2 (New), TABLE 506.5.2 (New), 506.5.3 (New), 506.5.4 (New)

Proponents: Jim Lutz, self (jdlutz@hotwaterresearch.net), Gary Klein (gary@garykleinassociates.com)

2024 International Plumbing Code

Add new definition as follows:

WATER HEATER, HEAT PUMP, AIR SOURCE. A water heating system, containing a heat pump and storage tank, where the heat pump uses ambient air as a heat source to heat water. There are two types:

1. Unitary systems where the heat pump and storage tank are a single assembly. The heat pump is generally mounted on top of the storage tank.
2. Split systems where the heat pump and storage tank are separate assemblies.

SECTION 502 INSTALLATION

Revise as follows:

502.1 General. Water heaters shall be installed in accordance with the manufacturer's instructions. Oil-fired water heaters shall conform to the requirements of this code and the *International Mechanical Code*. Electric water heaters shall conform to the requirements of this code and provisions of NFPA 70. Gas-fired water heaters shall conform to the requirements of the *International Fuel Gas Code.* Solar thermal water heating systems shall conform to the requirements of the *International Mechanical Code* and ICC 900/SRCC 300. Air source heat pump water heaters shall be installed in accordance with Section 506.

Add new text as follows:

SECTION 506 Heat Pump Water Heaters

506.1 Air-source heat pump water heaters (HPWH). Air-source heat pump water heaters (HPWH) shall comply with Sections 506.2. through 506.5.

506.2 Obstructions and clearances. Air intakes, exhaust outlets, filters, heating elements, wiring connections, condensate drains, temperature and pressure relief valves shall not be obstructed. Clearances shall be provided for maintenance and replacement in accordance with Section 502.5.

506.3 Seismic Supports. Seismic supports shall comply with Section 502.4. Restraints shall not obstruct components specified in Section 506.2.

506.3.1 Unitary HPWH. Seismic restraints for unitary HPWHs shall be located at points within the upper one-third and lower one-third of the vertical dimensions of the storage tank, and not on the heat pump portion.

506.3.2 Split System HPWH. For split systems, the seismic restraints for the storage tank shall be in accordance with Section 506.3.1. The heat pump portion of the split system shall be installed in accordance with the manufacturer's instructions.

506.4 Condensate Drains. Condensate drain lines from air source HPWHs shall be in accordance with Section 314.2.

506.5 Ventilation. The ventilation requirements for air-source HPWH shall be in accordance with Sections 506.5.1 through 506.5.4. The minimum dimensions for the space volume where the HPWH is installed shall be 3.5 x 3.5 x 8 = 98 cubic feet.

506.5.1 Space volume method. Ventilation shall comply with the provisions Table 506.5.1.

TABLE 506.5.1 MINIMUM SPACE VOLUME FOR INSTALLING AIR-SOURCE HPW

Heat Pump Capacity (BTU/Hour)	<1,000	≥1,000 and <2,000	≥2,000 and <3,000	≥3,000 and <4,000	≥4,000 and <5,000	≥5,000 and <6,000	≥6,000 and <7,000	≥7,000 and <8,000	≥8,000 and <9,000	≥9,000 and <10,000	≥10,000 and <11,000	≥11,000 and <12,000	≥12,000 and <13,000	≥13,000 and <14,000	≥14,000 and <15,000	≥15,000 and <16,000	≥16,000 and <17,000	≥17,000 and <18,000
Space Volume (cubic feet)	175	350	525	700	875	1,050	1,225	1,400	1,575	1,750	1,925	2,100	2,275	2,450	2,625	2,800	2,975	3,150

For SI units: 1 cubic foot = 0.0283 m^3, 1000 British thermal units per hour = 0.293 kW

506.5.2 Passive ventilation method. Where the location of the HPWH is in a space smaller than required in Table 506.5.1, additional ventilation shall be provided in accordance with Table 506.5.2. Passive ventilation shall be into an adjacent space that shares the same pressure zone with the HPWH. The sum of the volume of the space where the HPWH is located and the volume in the adjacent space shall be not less than the space volume required for the capacity shown in Table 506.5.2. The net free area of the passive ventilation shall be equally distributed between high and low openings. These openings shall be in the top quarter and bottom quarter of the space where the HPWH is located.

TABLE 506.5.2 MINIMUM NET FREE AREA FOR INSTALLING AIR-SOURCE HPWH

Space Volume (cubic feet)	Heat Pump Capacity (BTU/Hour)																	
	<1,000	≥1,000 and <2,000	≥2,000 and <3,000	≥3,000 and <4,000	≥4,000 and <5,000	≥5,000 and <6,000	≥6,000 and <7,000	≥7,000 and <8,000	≥8,000 and <9,000	≥9,000 and <10,000	≥10,000 and <11,000	≥11,000 and <12,000	≥12,000 and <13,000	≥13,000 and <14,000	≥14,000 and <15,000	≥15,000 and <16,000	≥16,000 and <17,000	≥17,000 and <18,000
≥3,150																		0
≥2,975 and <3,150																	0	80
≥2,800 and <2,975																0	80	100
≥2,625 and <2,800															0	80	100	120
≥2,450 and <2,625														0	80	100	120	140
≥2,275 and <2,450													0	80	100	120	140	160
≥2,100 and <2,275												0	80	100	120	140	160	180
≥1,925 and <2,100											0	80	100	120	140	160	180	200
≥1,750 and <1,925										0	80	100	120	140	160	180	200	220
≥1,575 and <1,750									0	80	100	120	140	160	180	200	220	240
≥1,400 and <1,575								0	80	100	120	140	160	180	200	220	240	260

≥1,225 and <1,400							0	80	100	120	140	160	180	200	220	240	260	280
≥1,050 and <1,225						0	80	100	120	140	160	180	200	220	240	260	280	300
≥875 and <1,050					0	80	80	120	140	160	180	200	220	240	260	280	300	320
≥700 and <875				0	80	80	100	140	160	180	200	220	240	260	280	300	320	340
≥525 and <700			0	80	100	120	140	160	180	200	220	240	260	280	300	320	340	360
≥350 and <525		0	120	160	200	240	280	320	360	400	440	480	520	560	600	640	680	720
≥175 and <350	0	120	180	240	300	360	420	480	540	600	660	720	780	840	900	960	1020	1080
≥100 and <175	70	140	210	280	350	420	490	560	630	700	770	840	910	980	1050	1120	1190	1260
<100	70	140	210	280	350	420	490	560	630	700	770	840	910	980	1050	1120	1190	1260

For SI units: 1 cubic foot = 0.0283 m3, 1000 British thermal units per hour = 0.293 kW

506.5.3 Ducted ventilation method. Where the location of the HPWH is in a space smaller than required in Table 506.5.1, and it is not possible to comply with the provisions for passive ventilation in accordance with Table 506.5.2, the HPWH shall be ducted in accordance with the manufacturer's instructions. Air intake and exhaust ducts shall come from and go to the same pressure zone. The termination of the ducts in the remote space shall be directed so that they draw from and exhaust to different parts of the pressure zone. It is permissible to install a combination of passive and ducted ventilation to meet the air flow requirements of the HPWH.

506.5.4 New construction. Ventilation shall comply with the provisions in Sections 506.5.1, 506.5.2 and 506.5.3 for the 18,000 BTU per Hour capacity column in Tables 506.5.1 and 506.5.2.

Exception: For HPWHs larger than 18,000 BTU per hour, the minimum space volume shall be not less than 0.175 cubic feet per BTU per hour as rated by the manufacturer. Net free area and ducting shall be in accordance with the manufacturer's instructions.

P54-24 Part I

P54-24 Part II

IRC: SECTION 202 (New), CHAPTER 20, SECTION M2005, M2005.1, P2805 (New), P2805.1 (New), P2805.2 (New), P2805.3 (New), P2805.3.1 (New), P2805.3.2 (New), P2805.4 (New), P2805.5 (New), P2805.5.1 (New), TABLE 2805.5.1 (New), P2805.5.2 (New), TABLE 2805.5.2 (New), P2805.5.3 (New), P2805.5.4 (New)

Proponents: Jim Lutz, self (jdlutz@hotwaterresearch.net), Gary Klein (gary@garykleinassociates.com)

2024 International Residential Code

Add new definition as follows:

Water Heater, Heat Pump, Air Source.
A water heating system, containing a heat pump and storage tank, where the heat pump uses ambient air as a heat source to heat water. There are two types:

(1) Unitary systems where the heat pump and storage tank are a single assembly. The heat pump is generally mounted on top of the storage tank.

(2) Split systems where the heat pump and storage tank are separate assemblies.

CHAPTER 20 BOILERS AND WATER HEATERS

SECTION M2005 WATER HEATERS

Revise as follows:

M2005.1 General. Water heaters shall be installed in accordance with Chapter 28, the manufacturer's instructions and the requirements of this code. Water heaters installed in an *attic* shall comply with the requirements of Section M1305.1.2. Gas-fired water heaters shall comply with the requirements in Chapter 24. Domestic electric water heaters shall comply with UL 174. Oiled-fired water heaters shall comply with UL 732. Solar thermal water heating systems shall comply with Chapter 23 and ICC 900/SRCC 300. Solid fuel-fired water heaters shall comply with UL 2523. Air source heat pump water heaters shall comply with the requirements in Section P2805.

Add new text as follows:

P2805 Heat Pump Water Heaters

P2805.1 Air-source HPWHs. Air-source heat pump water heaters (HPWH) shall comply with Section P2805.2. through Section P2805.5.

P2805.2 Obstructions and clearances. Air intakes, exhaust outlets, filters, heating elements, wiring connections, condensate drains, temperature and pressure relief valves shall not be obstructed. Clearances shall be provided for maintenance and replacement in accordance with Section M1305.

P2805.3 Seismic bracing. Seismic bracing shall comply with Section P2801.8. Restraints shall not obstruct components specified in Section P2805.2.

P2805.3.1 Unitary HPWH. For unitary HPWHs seismic restraints shall be located at points within the upper one-third and lower one-third of the vertical dimensions of the storage tank, and not on the heat pump portion.

P2805.3.2 Split System HPWH. For split systems the seismic restraints for the storage tank shall be in accordance with Section

P2805.3.1. The heat pump portion of the split system shall be installed in accordance with the manufacturer's instructions.

P2805.4 Condensate drains. Condensate drain lines from air source HPWHs shall be in accordance with Section M1411.3.

P2805.5 Ventilation. The ventilation requirements for air-source HPWH shall be in accordance with Sections P2805.5.1 through P2805.5.4. The minimum dimensions for the space volume where the HPWH is installed shall be 3.5 x 3.5 x 8 = 98 cubic feet.

P2805.5.1 Space volume method. Ventilation shall comply with the provisions Table P2805.5.1.

TABLE 2805.5.1 MINIMUM SPACE VOLUME FOR INSTALLING AIR-SOURCE HPW

Heat Pump Capacity (BTU/Hour)	<1,000	≥1,000 and <2,000	≥2,000 and <3,000	≥3,000 and <4,000	≥4,000 and <5,000	≥5,000 and <6,000	≥6,000 and <7,000	≥7,000 and <8,000	≥8,000 and <9,000	≥9,000 and <10,000	≥10,000 and <11,000	≥11,000 and <12,000	≥12,000 and <13,000	≥13,000 and <14,000	≥14,000 and <15,000	≥15,000 and <16,000	≥16,000 and <17,000	≥17,000 and <18,000
Space Volume (cubic feet)	175	350	525	700	875	1,050	1,225	1,400	1,575	1,750	1,925	2,100	2,275	2,450	2,625	2,800	2,975	3,150

For SI units: 1 cubic foot = 0.0283 m^3, 1000 British thermal units per hour = 0.293 kW

P2805.5.2 Passive ventilation method. Where the location of the HPWH is in a space smaller than required in Table P2805.5.1, additional ventilation shall be provided in accordance with Table P2805.5.2. Passive ventilation shall be into an adjacent space that shares the same pressure zone with the HPWH. The sum of the volume of the space where the HPWH is located and the volume in the adjacent space shall be not less than the space volume required for the capacity shown in Table P2805.5.2. The net free area of the passive ventilation shall be equally distributed between high and low openings. These openings shall be in the top quarter and bottom quarter of the space where the HPWH is located.

TABLE 2805.5.2 MINIMUM NET FREE AREA FOR INSTALLING AIR-SOURCE HPWH

Space Volume (cubic feet)	Heat Pump Capacity (BTU/Hour)																	
	<1,000	≥1,000 and <2,000	≥2,000 and <3,000	≥3,000 and <4,000	≥4,000 and <5,000	≥5,000 and <6,000	≥6,000 and <7,000	≥7,000 and <8,000	≥8,000 and <9,000	≥9,000 and <10,000	≥10,000 and <11,000	≥11,000 and <12,000	≥12,000 and <13,000	≥13,000 and <14,000	≥14,000 and <15,000	≥15,000 and <16,000	≥16,000 and <17,000	≥17,000 and <18,000
≥3,150																		0
≥2,975 and <3,150																	0	80
≥2,800 and <2,975																0	80	100
≥2,625 and <2,800															0	80	100	120
≥2,450 and <2,625														0	80	100	120	140
≥2,275 and <2,450													0	80	100	120	140	160
≥2,100 and <2,275												0	80	100	120	140	160	180
≥1,925 and <2,100											0	80	100	120	140	160	180	200
≥1,750 and <1,925										0	80	100	120	140	160	180	200	220
≥1,575 and <1,750									0	80	100	120	140	160	180	200	220	240

≥1,400 and <1,575								0	80	100	120	140	160	180	200	220	240	260
≥1,225 and <1,400							0	80	100	120	140	160	180	200	220	240	260	280
≥1,050 and <1,225						0	80	100	120	140	160	180	200	220	240	260	280	300
≥875 and <1,050					0	80	80	120	140	160	180	200	220	240	260	280	300	320
≥700 and <875				0	80	80	100	140	160	180	200	220	240	260	280	300	320	340
≥525 and <700			0	80	100	120	140	160	180	200	220	240	260	280	300	320	340	360
≥350 and <525		0	120	160	200	240	280	320	360	400	440	480	520	560	600	640	680	720
≥175 and <350	0	120	180	240	300	360	420	480	540	600	660	720	780	840	900	960	1020	1080
≥100 and <175	70	140	210	280	350	420	490	560	630	700	770	840	910	980	1050	1120	1190	1260
<100	70	140	210	280	350	420	490	560	630	700	770	840	910	980	1050	1120	1190	1260

For SI units: 1 cubic foot = 0.0283 m3, 1000 British thermal units per hour = 0.293 kW

P2805.5.3 Ducted ventilation method. Where the location of the HPWH is in a space smaller than required in Table P2805.5.1, and it is not possible to comply with the provisions for passive ventilation in accordance with Table P2805.5.2, the HPWH shall be ducted in accordance with the manufacturer's instructions. Air intake and exhaust ducts shall come from and go to the same pressure zone. The termination of the ducts in the remote space shall be directed so that they draw from and exhaust to different parts of the pressure zone. It is permissible to install a combination of passive and ducted ventilation to meet the air flow requirements of the HPWH.

P2805.5.4 New construction. Ventilation shall comply with the provisions in Sections P2805.5.1, P2805.5.2 and P2805.5.3 for the 18,000 BTU per Hour capacity column in Tables P2805.5.1 and P2805.5.2.

Exception: For HPWHs larger than 18,000 BTU per hour, the minimum space volume shall be not less than 0.175 cubic feet per BTU per hour as rated by the manufacturer. Net free area and ducting shall be in accordance with the manufacturer's instructions.

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Reason: The purpose of this proposal is to add an option to the plumbing code so that installers of heat pump water heaters (HPWH) have clear provisions in the chapterson Water Heaters regarding their proper installation. HPWH are water heaters, and most of the provisions regarding the installation of all water heaters apply. A key requirement that does not exist is that they need to be installed so that they operate in heat pump mode for the majority of their duty cycle.

For air source HPWH, the type of water heater discussed in this proposal, this means special attention must be paid to the air flow requirements. They need a source of "warm" air to extract energy and they need a sink for the cold air they discharge to be absorbed. The source and the sink need be matched. This can be challenging in cold climates.

To accommodate the energy exchange required by the source and the sink, the sizes of which depend on the capacity of the heat pump, there needs to be

1. A minimum volume of the space where the HPWH is installed. Energy exchange happens within that space.

2. Passive ventilation into an adjacent space if the space where the HPWH is located is not large enough. The volume of the two spaces must meet the minimum volume requirements for the HPWH's capacity. The two spaces must share a common pressure zone.

3. Ducted ventilation into an adjacent or remote space if the minimum volume or passive ventilation requirements cannot be me. The HPWH needs to be ducted to and from a location with the ability to support required energy exchange. When ducted, the remote terminals for the intake need to come from, and exhaust ducts to, the same pressure zone so that they do not adversely affect the performance of other mechanical systems.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal adds an option to the existing code. It does not add or remove existing options or solutions to the existing code. If this option is not chosen, the existing solutions/options are the existing costs of the previous code language.

P54-24 Part II

P55-24

IPC: 502.11 (New)

Proponents: Ronald George, Plumb-Tech Design & Consulting Services LLC, Self (ron@plumb-techllc.com)

2024 International Plumbing Code

Add new text as follows:

502.11 Hot water Generators, Heat Exchangers, Pre-heaters, Solar water heaters. Hot water generators, heat exchangers, pre-heaters, and solar water heaters that utilize heat exchangers to heat or pre-heat domestic hot water shall have a temperature-actuated mixing valve complying with ASSE 1017 located downstream of any hot water generators, heat exchangers, pre-heaters, or solar water heaters to limit and control the water temperature supplied to the potable hot water distribution system to a stable, temperature. The potability of the water shall be maintained throughout the domestic hot water distribution system. Requirements for the heat source piping systems shall be in accordance with the International Mechanical Code.

Staff Analysis: The proposed standard is in the current edition of the code.

Reason: Heat exchangers used as pre-heaters or hot water generators have the ability to overheat the domestic hot water when steam or heating hot water valves stick open or when flue gasses are extremely hot. This code change assures that a temperature actuated mixing valve will mix the hot water downstream of the device to a stable and desired temperature. A specific temperature is not given, because in some applications the distribution temperature may need to be slightly above 140 F in order to keep the circulated return above a Legionella bacteria growth temperature in larger buildings with significant heat loss in the system. Having the mixing valve downstream of these heat exchangers and HW generators can control the temperature when the heat recovery or pre-heater system heats the water well beyond the desired hot water system temperature.

Cost Impact: Increase

Estimated Immediate Cost Impact:

This will slightly increase the cost of construction, but adds a significant level of safety.

The retail cost of a 3/4-inch valves starts at $88.89 and the wholesale price is typically 40% less than retail price. The installed cost with a labor rate of $95/hr can start at $183.

Estimated Immediate Cost Impact Justification (methodology and variables):

This will save lives for as little as $183.00 on smaller systems and up to a few thousand dollars on larger systems. The value of this safety device is cheap compared to the increase in safety. This code change is needed to provide a safe hot water distribution system. The retail cost of a 3/4-inch valves starts at $88.89 and the wholesale price is typically 40% less than retail price. The installed cost starts at about $183 for Water heaters up to 80 gallons or a maximum of gpm.

For larger systems, Bronze Thermostatic Mixing Valves 1" in size cost is about $100.00 to $300.00; Bronze Tempering Valves 3" in size cost about $2,400.00 to $3,925.00.

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Estimated Life Cycle Cost Impact:

This cost is much less than the cost of a burn injury which can reach millions of dollars in medical costs, and affect entire families who have to help care for burn victims. The physical, emotional, phycological and ongoing medical costs can be immense. Then add any litigation costs associated with litigation. Insurance companies should support this as a safer installation and a total reduction in overall medical and liability costs.

When a facility has an unsafe hot water system (Without temperature controls to prevent overheating conditions) injuries and deaths can occur. injuries include costs for medical treatment which includes burn care, debridement to scrape off dead tissue still attached to the body, skin grafting to cover burned areas with skin from the burn victim to prevent rejection issues, Ongoing surgeries to splice in skin as the body grows, because the scar tissue does not grow or have elasticity. Additional medical costs associated with related medical conditions, psychological counseling, etc. Another cost not accounted for is the Litigation cost associated with a burn injury.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

The average size of a cold water make-up valve in an institutional building is about 3 inches in size.

In my experience dealing with scald litigation, the judge and jury awards for scald cases have included costs to cover medical expenses, and ongoing medical equipment, assistance and treatments including punitive damages totaling in excess of 16 million dollars for one incident at a facility that had hot water systems that were not safely designed, controlled and maintained and caused burn injuries. According to Internet research, In Western countries and other democracies, estimates for the value of a statistical life typically range from $1 million US dollars to $10 million US Dollars; for example, the United States Federal Emergency Management Agency (FEMA) estimated the value of a statistical life at $7.5 million US Dollars in 2020.
The cost of a valve is far less expensive than the injury, pain, suffering, Medical and physical therapy expenses, and litigation expenses. Or the emotional issues from a serious burns or loss of life from a scald injury.

P55-24

P56-24

IPC: 503.3 (New)

Proponents: Ronald George, Plumb-Tech Design & Consulting Services LLC, Self (ron@plumb-techllc.com)

2024 International Plumbing Code

Add new text as follows:

503.3 Water Heaters, Heat Exchangers and Heat Recovery Device Appurtenances. Each water heater, heat exchanger, or heat recovery device serving the domestic hot water system shall have isolation valves located on the inlet and on the outlet pipe connections. The isolation valves shall be located outside of de-liming tees with 3/4-inch hose valve connections, and outside of a temperature and pressure gauge on each connection.

Reason: Water heaters, heat exchangers, and heat recovery devices need temperature and pressure gauges in order to see how the equipment is performing. For example, when heat exchangers or heat recovery devices are used to pre-heat domestic cold water that is supplied to the water heater, it is important to understand what the temperature is coming into the water heater in order to avoid sending water into the distribution system that is a higher temperature than the water heater thermostat setting.

Water heaters, heat exchangers, and heat recovery devices are susceptible to temperature and pressure changes due to the heating fluid temperature and pressure changes associated with scale and water quality.

Valved de-liming connections allow for descaling operations to take place when service is scheduled or required.

Cost Impact: Increase

Estimated Immediate Cost Impact:

This will increase of the cost of construction initially but will save thousands of dollars in fuel costs by keeping the system running efficiently. This will reduce the emission of greenhouse gasses.

Estimated Immediate Cost Impact Justification (methodology and variables):

The cost of the small valves and pressure gauges here are minimal.

Estimated Life Cycle Cost Impact:

By allowing the operators to see the pressure drop and temperature changes, they will know when the heat exchanger is fouled. De-liming the heat exchanger will allow the equipment to go back to full efficiency. If a heat exchanger fouls 10% per year because of hard water, then each additional year, the fuel required to heat the water or application will increase by 10 %. Theoretically, after 5 years the additional fuel required would be 50% more fuel required to perform the same amount of work. The compounded additional expenses on fuel bills justifies having these devices to allow the operator to see what the system is doing. If the equipment requires $1,000 in fuel per month to operate, at the end of the first year each month it will waste an extra $200 or an average of $100 per month over the first year. ($1,200 for the first year wasted energy, by the 5th year the wasted energy could be in excess of $6,000) The cost of these devices in minimal compared to the potential energy wasted and additional greenhouse gasses created.

P56-24

P57-24

IPC: 504.2

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov)

2024 International Plumbing Code

Revise as follows:

504.2 Vacuum relief valve.
Bottom fed storage water heaters and bottom fed tanks connected to water heaters shall have a vacuum relief valve installed. The vacuum relief valve shall comply with ANSI Z21.22.

Reason: This section was originally intended to protect storage tanks and storage tank type water heaters from being siphoned which could result in the tanks being dry when energized causing the elements to burn out or in the case of a gas fired water heater, it could result in the tank liner fracturing prematurely. Due to the current language in the code, this is also being applied to tankless water heaters. Tankless water heaters typically have flow switches which prove there is ample water inside the unit before they can energize, thus they are already protected from accidental damage.

Bibliography: See reason statement.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

Between $160 - $480 per unit.

Estimated Immediate Cost Impact Justification (methodology and variables):

Between $60 - $180 per unit depending on markup by the contractor and $100-$300 for labor depending on the local labor rates.

P57-24

P58-24 Part I

IPC: 504.4, 504.4.1

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

Revise as follows:

504.4 Relief valve. Storage water heaters operating above atmospheric pressure shall be provided with an *approved*, self-closing (levered) pressure relief valve and temperature relief valve or combination thereof. The relief valve shall conform to ANSI Z21.22. The relief valve shall not be used as a means of controlling thermal expansion. Tankless instantaneous water heaters shall not be required to be provided with pressure or temperature relief valves unless required by the manufacturer's installation instructions.

504.4.1 Installation.
Storage water heaters shall have ~~S~~such valves ~~shall be~~ installed in the shell of the water heater tank. Temperature relief valves shall be located in the tank so as to be actuated by the water in the top 6 inches (152 mm) of the tank served. For installations with separate storage tanks, the *approved*, self-closing (levered) pressure relief valve and temperature relief valve or combination thereof conforming to ANSI Z21.22 valves shall be installed on both the storage water heater and storage tank. There shall not be a check valve or shutoff valve between a relief valve and the heater or tank served.

P58-24 Part I

P58-24 Part II

IRC: P2804.4

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Residential Code

Revise as follows:

P2804.4 Temperature relief valves. Temperature relief valves shall have a relief rating compatible with the temperature conditions of the *appliances* or equipment protected. The valves shall be installed such that the temperature-sensing element monitors the water within the top 6 inches (152 mm) of the tank. The valve shall be set to open at a temperature of not greater than 210°F (99°C).

> **Exception:** Tankless instantaneous water heaters shall not be required to be provided with pressure or temperature relief valves unless required by the manufacturer's installation instructions.

Reason: This proposal clarifies requirements for relief valves for tankless instantaneous water heaters. Typically, these are specified for the manufacturer only in specific installations, such as providing hot water for space heating applications.

This proposal is submitted by the ICC Plumbing Mechanical Gas Code Action Committee (PMGCAC)

PMGCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 PMGCAC has held 26 virtual meetings open to any interested party. In addition, there were several virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the PMGCAC website at PMGCAC.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

Approximately $100 per tankless water heater installation.

Estimated Immediate Cost Impact Justification (methodology and variables):

The existing code language was not clear to all users such that temperature valves may have been required by some code officials in tankless installations, which was not the intent of the existing code. The proposal reduces costs by the elimination of the temperature relief valve ($20), the associated plumbing ($30), and the labor ($50) to install those components.

Estimated Life Cycle Cost Impact:

N/A

Estimated Life Cycle Cost Impact Justification (methodology and variables):

N/A

P58-24 Part II

P59-24

IPC: 504.6

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov)

2024 International Plumbing Code

Revise as follows:

504.6 Requirements for discharge piping.
The discharge piping serving a pressure relief valve, temperature relief valve or combination thereof shall:

1. Not be directly connected to the drainage system.
2. Discharge through an *air gap* located in the same room as the water heater.
3. Not be smaller than the diameter of the outlet of the valve served and shall discharge full size to the *air gap*.
4. Serve a single relief device and shall not connect to piping serving any other relief device or equipment.
5. Discharge to the floor, to the pan serving the water heater or storage tank where the water heater or storage tank is not elevated off of the floor, to a waste receptor, or to the outdoors.
6. Discharge in a manner that does not cause personal injury or structural damage.
7. Discharge to a termination point that is readily observable by the building occupants.
8. Not be trapped.
9. Be installed so as to flow by gravity.
10. Terminate not more than 6 inches (152 mm) above and not less than two times the discharge pipe diameter above the floor or *flood level rim* of the waste receptor.
11. Not have a threaded connection at the end of such piping.
12. Not have valves or tee fittings.
13. Be constructed of those materials listed in Section 605.4 or materials tested, rated and *approved* for such use in accordance with ASME A112.4.1.
14. Be one nominal size larger than the size of the relief valve outlet, where the relief valve discharge piping is installed with insert fittings. The outlet end of such tubing shall be fastened in place.

Reason: When water heaters are elevated off the floor, discharging to the pan can create splashing that will result in scalding if persons are standing near the water heater or below the water heater. This potential would violate item #6 of this section.

Bibliography: See reason statement.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is for clarification only to ensure that people are not put at risk by ensuring users of the code understand the section and how it should be applied.

P59-24

P60-24

IPC: 504.6

Proponents: George Istefan, Watts Water Technologies (george.istefan@wattswater.com)

2024 International Plumbing Code

Revise as follows:

504.6 Requirements for discharge piping.
The discharge piping serving a pressure relief valve, temperature relief valve or combination thereof shall:

1. Not be directly connected to the drainage system.
2. Discharge through an *air gap* located in the same room as the water heater.
3. Not be smaller than the diameter of the outlet of the valve served and shall discharge full size to the *air gap*.
4. Serve a single relief device and shall not connect to piping serving any other relief device or equipment.
5. Discharge to the floor, to the pan serving the water heater or storage tank, to a waste receptor or to the outdoors.
6. Discharge in a manner that does not cause personal injury or structural damage.
7. Discharge to a termination point that is readily observable by the building occupants. Where the discharge termination point is not readily visible and observable, a leak detection monitoring device with alarm notification (and not automatic shut-off), or a building management system shall be required.
8. Not be trapped.
9. Be installed so as to flow by gravity.
10. Terminate not more than 6 inches (152 mm) above and not less than two times the discharge pipe diameter above the floor or *flood level rim* of the waste receptor.
11. Not have a threaded connection at the end of such piping.
12. Not have valves or tee fittings.
13. Be constructed of those materials listed in Section 605.4 or materials tested, rated and *approved* for such use in accordance with ASME A112.4.1.
14. Be one nominal size larger than the size of the relief valve outlet, where the relief valve discharge piping is installed with insert fittings. The outlet end of such tubing shall be fastened in place.

Reason: Approval of this code change will allow design flexibility, and more importantly, provide for the allowance of leak detection technology to warn building occupants and managers of a problem with a safety device.

Current code language just requires visibility of the termination point, but if there is a significant discharge of the valve there may not be any awareness of the problem for an extended period. This can especially be a problem when a building is unoccupied and then significant flood damage can result.

This proposal does not intend to require the devices, just allow their use if the termination point is not visible. The allowance of leak detection technology makes for safer, smarter buildings.

Bibliography: Links date: 11-29-2023

https://www.homedepot.com/p/MOEN-Smart-Leak-Detectors-1-Pack-920-004/312855333

https://www.prowaterheatersupply.com/sentinel-hydrosolutions-leak-defense-system-lds-3-200.html

Cost Impact: Increase

Estimated Immediate Cost Impact:

Residential: Moen retail $50

Commercial: Sentinel Systems $2,500 - $3,500 retail depending on size

Residential Installation Cost: $0

Commercial Installation Cost: Labor 2 hours at $100/hr.

Estimated Immediate Cost Impact Justification (methodology and variables):

Residential: Moen retail $50

Commercial: Sentinel Systems $2,500 - $3,500 retail depending on size

Residential Installation Cost: $0

Commercial Installation Cost: Labor 2 hours at $100/hr.

Estimated Life Cycle Cost Impact:

Life Cycle Cost: $0

Estimated Life Cycle Cost Impact Justification (methodology and variables):

Life Cycle Cost: $0

P60-24

P61-24 Part I

IPC: 504.7, 504.7.2

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

Revise as follows:

504.7 Required pan.
Where a storage tank-type water heater or a hot water storage tank is installed in ~~a~~ <u>an elevated</u> location where water leakage from the tank will cause damage <u>or personal injury</u>, the tank shall be installed in a pan constructed of one of the following:

1. Galvanized steel or aluminum of not less than 0.0236 inch (0.6010 mm) in thickness.
2. Plastic not less than 0.036 inch (0.9 mm) in thickness.
3. Other *approved* materials.

A plastic pan installed beneath a gas-fired water heater shall be constructed of material having a flame spread index of 25 or less and a smoked-developed index of 450 or less when tested in accordance with ASTM E84 or UL723. Water heaters installed in pans shall comply with Section 314.2.3.2.

<u>**Exception:**In existing buildings, a pan shall not be required where one was not previously installed unless the room or space can accommodate a pan and the drain can be run to an approved place of disposal.</u>

504.7.2 Pan drain termination.
The pan drain shall extend full size and terminate over a suitably located indirect waste receptor or floor drain or extend to the exterior of the building and terminate not less than 6 inches (152 mm) and not more than 24 inches (610 mm) above the adjacent ground surface. ~~Where a pan drain was not previously installed, a pan drain shall not be required for a replacement water heater installation.~~

P61-24 Part I

P61-24 Part II

IRC: P2801.5, P2801.5.1

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov)

2024 International Residential Code

Revise as follows:

P2801.5 Required pan.
Where a storage tank-type water heater or a *hot water* storage tank is installed in ~~a~~ an elevated location where water leakage from the tank will cause damage or personal injury, the tank shall be installed in a pan constructed of one of the following:

1. Galvanized steel or aluminum of not less than 0.0236 inch (0.6010 mm) in thickness.
2. Plastic not less than 0.036 inch (0.9 mm) in thickness.
3. Other *approved* materials.

A plastic pan beneath a gas-fired water heater shall be constructed of material having a *flame spread index* of 25 or less and a *smoke-developed index* of 450 or less when tested in accordance with ASTM E84 or UL 723.
EXCEPTION: In existing buildings, a pan shall not be required where one was not previously installed unless the room or space can accommodate a pan and the drain can be run to an approved place of disposal.

P2801.5.1 Pan size and drain.
The pan shall be not less than $1^1/_2$ inches (38 mm) deep and shall be of sufficient size and shape to receive dripping or condensate from the tank or water heater. The pan shall be drained by an *indirect waste pipe* of not less than $^3/_4$ inch (19 mm) diameter. Piping for safety pan drains shall be of those materials indicated in Table P2906.5.
~~Where a pan drain was not previously installed, a pan drain shall not be required for a replacement water heater installation.~~

Reason: The idea that a water heater pan will prevent damage from leaks, dripping, or condensate is nothing more than a sales pitch. Especially if you consider the pan drain is not required to be terminated to a waste receptor if there wasn't one previously installed (ref. P2801.6.1). A pan drain cannot handle a full open discharge of a 3/4-inch T&P discharge pipe. The bottom line is if we are actually trying to protect people, protect them from an actual danger, such as when the water heaters are elevated then that is what we should focus on in the code. Elevated water heaters have a significantly higher possibility of resulting in an injury when the T&P valve discharges. Regardless of how high they are elevated; the discharge can now splash up high on a person's leg is they are nearby when it happens. The risk to injury is even higher when associated to leaks or drips when the water heater is located above a ceiling.

Bibliography: In over 30 + years working in the plumbing industry, with over 14 years as a plumbing inspector, I have yet to see a situation where a leaking water heater caused a building to fail. The bigger danger exists only when the water heaters are elevated and pose a greater risk of personal injury.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

Water heater pan costs range anywhere between approximately $20 to over $200 each.

Estimated Immediate Cost Impact Justification (methodology and variables):

Actual cost impact is dependent on numerous factors, such as the type of construction (new, remodel/repair), the building use group, the method chosen for installation, the type of pan, the local labor rates, and the mark-up factor the contractor uses.

P61-24 Part II

P62-24 Part I

IPC: 504.7.1, 504.7.2, IAPMO Chapter 15 (New)

Proponents: Jay Peters, Codes and Standards International LLC, IPS Corporation (peters.jay@me.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

Revise as follows:

504.7.1 Pan size and drain.
The pan shall be not less than 1$^{1}/_{2}$ inches (38 mm) in depth and shall be of sufficient size and shape to receive all dripping or condensate from the tank or water heater. The pan shall be drained by an indirect waste pipe having a diameter of not less than $^{3}/_{4}$ inch (19 mm) or shall be equipped with a device complying with CAN/IAPMO Z1349 to automatically shut off the water supply to the water heater upon detection of a leak.. Piping for safety pan drains shall be of those materials listed in Table 605.4.

504.7.2 Pan drain termination.
The pan drain shall extend full size and terminate over a suitably located indirect waste receptor or floor drain or extend to the exterior of the building and terminate not less than 6 inches (152 mm) and not more than 24 inches (610 mm) above the adjacent ground surface. Where a pan drain was not previously installed, a pan drain shall not be required for a replacement water heater installation where equipped with a device complying with CAN/IAPMO Z1349 to detect and automatically shut off the water supply to the water heater in the event of a leak..

Add new standard(s) as follows:

IAPMO

IAPMO Group
4755 E. Philadelphia Street
Ontario, CA 91761 USA

ANSI/CAN/IAPMO Z1349-2021 Standard for Detection, Monitoring or Control of Plumbing Systems

Staff Analysis: A review of the standard proposed for inclusion in the code, ANSI/CAN.IAPMO Z1349 -2021 *Standard for Detection, Monitoring or Control of Plumbing Systems*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: The pan and drainage piping are intended to relieve small leaks. Although it might be small, a leak should not occur and is the first sign of a possible pending catastrophic event with no indication to the owner of any possible problem, as it is typically out of sight. In other instances, it can be extremely onerous to provide piping to an approved location in existing construction.

These listed devices are approved as options in many jurisdictions across Texas, California and more. In come cases, they are required in lieu of a pan and/or drain. They are reliable and sense a minuscule bit of moisture (one drop) and immediately shut off the water supply to the specific appliance. There are multiple manufacturers and well over a million units have been installed. Leading water heater manufacturers, such as Rheem and AO Smith, have already incorporated this leak sensing technology into their equipment. This provision will raise the level of safety and protection for installations without integral devices.

T**he first change above** provides an option, could be a less expensive installation in some cases, raises the level of safety, has the potential to reduce injuries and save millions of dollars in water damages to structures.

T**he second change above** provides a much higher level of safety and corrects a potential safety hazard. The original provision allows for a noncompliant (unsafe) installation to be replaced and remain noncompliant in perpetuity regardless of whether it is above an occupied space or any other potential unsafe location. If a leak occurs above an occupied space, the pan may collect and have no place to drain. This new addition would now require a replacement water heater to have a pan drain or have an integral device or an approved external device to shut off the water to the heater in the event of a leak.

The code should not incentivize substandard installations and provide exceptions for noncompliant unsafe conditions that could cause damage and bodily harm just because it was already done previously.

Sample Local Jurisdiction Code Language:

Fort Worth, Texas

Exception: When a water heater retrofit or replacement occurs on a slab foundation and the line cannot be discharged to an approved location the T& P discharge line can be piped to the water heater pan provided with all of the following:

1. the water heater when water is detected inside the pan;

2. A device is installed that will sound an audible alarm when water is detected inside the pan to alert the occupants that a leak has occurred.

Frisco Texas

P2801.9 Water heaters installed in attics or with living space below: Water heaters, other than tankless, when located in an attic space or a space located above living space, shall be equipped with a WAGS, Floodstop or other approved device to automatically shut off the water supply if a water leak is detected.**Exception:** Replacement water heaters that were permitted on or before December 31, 2013, shall not be required to be equipped with an automatic Shut off device.

The following standard for the testing and certification of these devices has also beed proposed to the list of approved standards in the IRC and the IPC: **ANSI/CAN/IAPMO Z1349 Standard for Devices for Detection, Monitoring or Control of Plumbing Systems.**

This standard supports the proposals in the IRC and IPC to allow these devices as an additional option. It is an ANSI Standard

Cost Impact: Decrease

Estimated Immediate Cost Impact:

No Cost Impact. ($0)

Estimated Immediate Cost Impact Justification (methodology and variables):

The proposal only provides an additional option that could potentially reduce construction and installation costs and does not have a cost impact since it is merely an option. The provision could save construction and installation costs, not to mention prevent leaks from becoming damaging over time or even catastrophic. Since **it is only another option, and not a required provision, it should never increase the cost of construction** if the decision is made on cost alone. This provision could save construction and installation costs, not to mention prevent leaks from becoming damaging over time or even catastrophic. The proposal corrects an unsafe provision and could also potentially save tens thousands of dollars per leak incident.

P62-24 Part I

P62-24 Part II

IRC: P2801.5.1, IAPMO Chapter 44 (New)

Proponents: Jay Peters, Codes and Standards International LLC, IPS Corporation (peters.jay@me.com)

2024 International Residential Code

Revise as follows:

P2801.5.1 Pan size and drain. The pan shall be not less than $1^{1}/_{2}$ inches (38 mm) deep and shall be of sufficient size and shape to receive dripping or condensate from the tank or water heater. The pan shall be drained by an *indirect waste pipe* of not less than $^{3}/_{4}$ inch (19 mm) diameter or be equipped with a device complying with CAN/IAPMO Z1349 to automatically shut off the water supply to the water heater upon detection of a leak. Piping for safety pan drains shall be of those materials indicated in Table P2906.5. Where a pan drain was not previously installed, a pan drain shall not be required for a replacement water heater installation when equipped with a device complying with CAN/IAPMO Z1349 to automatically shut off the water supply to the water heater upon detection of a leak.

Add new standard(s) as follows:

IAPMO

IAPMO Group
4755 E. Philadelphia Street
Ontario, CA 91761-USA

ANSI/CAN/IAPMO Z1349-2021 Devices for Detection, Monitoring or Control of Plumbing Systems

Staff Analysis: A review of the standard proposed for inclusion in the code, ANSI/CAN/IAPMO Z1349-21 *Standard for Devices for Detection, Monitoring or Control of Plumbing Systems*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: The pan and drainage piping are intended to relieve small leaks. Although it might be small, a leak should not occur and is the first sign of a possible pending catastrophic event with no indication to the owner of any possible problem, as it is typically out of sight. In other instances, it can be extremely onerous to provide piping to an approved location in existing construction.

These listed devices are approved as options in many jurisdictions across Texas, California and more. In come cases, they are required in lieu of a pan and/or drain. They are reliable and sense a minuscule bit of moisture (one drop) and immediately shut off the water supply to the specific appliance. There are multiple manufacturers and well over a million units have been installed. Many water heater manufacturers, such as Rheem and AO Smith, have already incorporated this leak sensing technology into the equipment. This provision will raise the level of safety and protection for installations without integral devices.

T**he first change above** provides an option, could be a less expensive installation in some cases, raises the level of safety, has the potential to reduce injuries and save millions of dollars in water damages to structures.

T**he second change above** provides a much higher level of safety and corrects a potential safety hazard. The original provision allows for a noncompliant (unsafe) installation to be replaced and remain noncompliant in perpetuity regardless of whether it is above an occupied space or any other potential unsafe location. If a leak occurs above an occupied space, the pan may collect and have no place to drain. This new addition would now require a replacement water heater to have a pan drain or have an integral device or an approved external device to shut off the water to the heater in the event of a leak.

The code should not incentivize substandard installations and provide exceptions for noncompliant unsafe conditions that could cause damage and bodily harm just because it was already done previously.

Sample Local Jurisdiction Code Language:

Fort Worth, Texas

Exception: When a water heater retrofit or replacement occurs on a slab foundation and the line cannot be discharged to an approved location the T& P discharge line can be piped to the water heater pan provided with all of the following:

1. the water heater when water is detected inside the pan;

2. A device is installed that will sound an audible alarm when water is detected inside the pan to alert the occupants that a leak has

occurred.

<u>Frisco Texas</u>

P2801.9 Water heaters installed in attics or with living space below: Water heaters, other than tankless, when located in an attic space or a space located above living space, shall be equipped with a WAGS, Floodstop or other approved device to automatically shut off the water supply if a water leak is detected.**Exception:** Replacement water heaters that were permitted on or before December 31, 2013, shall not be required to be equipped with an automatic Shut off device.

The following standard for the testing and certification of these devices has also beed proposed to the list of approved standards in the IRC and the IPC. **ANSI/CAN/IAPMO Z1349 Standard for Devices for Detection, Monitoring or Control of Plumbing Systems.**

This standard supports the proposals in the IRC and IPC to allow these devices as an additional option. It is an ANSI Standard

Cost Impact: Decrease

Estimated Immediate Cost Impact:

No Cost Impact. ($0)

Estimated Immediate Cost Impact Justification (methodology and variables):

The proposal only provides an additional option that could potentially reduce construction and installation costs and does not have a cost impact since it is merely an option.
This provision could save construction and installation costs, not to mention prevent leaks from becoming damaging over time or even catastrophic. Since it is **<u>only another option, and not a required provision, it should never increase the cost of construction</u>** if the decision is made on cost alone.The proposal corrects an unsafe provision and could also potentially save tens thousands of dollars per leak incident.

Estimated Life Cycle Cost Impact:

None

Estimated Life Cycle Cost Impact Justification (methodology and variables):

None

P62-24 Part II

P63-24

IPC: 504.7.3 (New)

Proponents: Brian Kelleher, Kelleher Home Solutions, LLC, Self (bkelleher@kelleherhvac.com)

2024 International Plumbing Code

Add new text as follows:

504.7.3 Pan drain termination cap. A protection device shall be installed on the drain pan adaptor to deter pest and air exchange from passing through but still allowing water to discharge when necessary.

Attached Files

- **dyno-cap.jpg**
  https://www.cdpaccess.com/proposal/9327/28398/files/download/3923/

Reason: To deter unwanted pest and outside air from entering the home through this required 1" PVC open pipe but without compromising water to discharge when necessary. Safety and efficiency! Deter mice, snakes, scorpions, insects from entering. Prevents unconditioned outside air from entering the home environment.

Bibliography: Please see supporting documentation, including videos, and analysis at the following link:
https://www.dropbox.com/scl/fo/7admcn4t757e5xcd4ko3n/h?rlkey=o8ndpvv7k5ukrxa684n3hmpi3&dl=0 This site was created and updated on 8 January 2024.

“Performance Video 1” shows the product in place on a drain line. When the water in the pan contacts the diaphragm, it dissolves in under 5 seconds (actually about 1-3 seconds). This video uses a push on version of the device with a thin metal retaining nut previously installed on the drain line.

Performance Video 2 shows the product in place on a drain line. This video uses a push on version of the device with a larger CPVC retaining nut previously installed on the drain line. When the water in the pan contacts the diaphragm, it dissolves in under 5 seconds (actually about 1-3 seconds).

Performance Video 3 shows the product in place on a drain line. This video uses a screw on version of the device with a thin metal retaining nut previously installed on the drain line. When the water in the pan contacts the diaphragm, it dissolves in under 5 seconds (actually about 1-3 seconds).

The video “Mouse vs Dyno-Cap” video shows the ease with which a mouse can access the inside of a home via an open 1” drain line. It further shows that with the proposed product in place, the mouse is deterred from entering the house. Similar effect is expected with insects, small snakes, etc…

The video “Temperature vs Dyno Cap” shows the resistance that the proposed product has to ingress of outside air into the home. It shows temperature at the cap to be 69-F when in place, and then rapidly decreasing to below freezing in under 2 minutes when the cap is removed.

The File “Results of Temperature” is a PDF document reviewing the equipment set up and and results as seen on the “Temperature vs Dyno cap” video.

The file “Statement of pros and cons” shows supporting discussion for the cost effectiveness of the proposed product.

The File "Proposed product" contains photo of the product in 3 different potential versions.

Cost Impact: Increase

Estimated Immediate Cost Impact:

A very small cost impact of $19/water heater is expected as a one time cost for the protection product which takes less than 10 seconds to install.

Estimated Immediate Cost Impact Justification (methodology and variables):

As the inventor of the product, manufacturing cost estimates support the cost at or below $19. The product design will be available for licensing and additional manufactures may market the product for less.

P63-24

P64-24

IPC: 504.8 (New)

Proponents: Ronald George, Plumb-Tech Design & Consulting Services LLC, Self (ron@plumb-techllc.com)

2024 International Plumbing Code

Add new text as follows:

504.8 Temperature Actuated Mixing Valves. All water heaters serving facilities with domestic hot water for bathing, washing, or showering shall have a temperature actuated mixing a valve conforming to ASSE 1017.

Staff Analysis: The proposed standard are is in the current edition of the code.

Reason: It's time to require temperature controls on water heaters! Currently, there are no temperature controls on water heaters. The combination gas controls (thermostats) serving gas-fired, storage type water heaters are burner controls, and these are located near the bottom of the water heater to sense cold water coming in and to turn "on" the burner. The heating element on electric water heaters are energy controls, and they are not intended to accurately control outlet temperature in the tight temperature ranges to prevent scalding.

The water heater thermostats do not sense or control the water temperature leaving the top of a tank type water heater. Tank type heaters allow hot water temperatures leaving the top of the water heater to vary up to 30 degrees Fahrenheit (30F) from the thermostat set point temperature.

Stacking occurs when there are short, intermittent draws of hot water that draw in a little cold water to the bottom of the water heater, and this causes the burner or heating element to cycle "ON." The standards for a water heater and combination gas control valve, combined, allow a 30F rise in temperature from the level of the thermostat to the top of the water heater. A 30F rise is not safe. At 120F, it takes about 4.8 minutes to cause serious blistering burn injuries in an adult male. At 150F, an adult male can receive serious blistering burn injuries in less than one second. This is so fast, that the bather would not have time to react and get out of harm's way. Women & children have thinner skin and can be burned in less time than an adult male.

This code change to require thermostatic or temperature actuated temperature controls on water heaters is intended to protect bathers, especially children, the elderly, and handicapped persons. The inability of storage type water heaters to accurately control the outlet temperature presents a scald danger.

Because storage type water heaters do not have the ability to control the outlet temperature in ranges to avoid scalding dangers, engineers, contractors, medical personnel, and researchers have been calling for thermostatic or temperature actuated mixing valves to be installed on water heaters serving the hot water distribution system. According to researchers at Johns Hopkins University and injury lawyers that specialize in scald burns, who have researched the costs associated with burn injuries, burn injuries are very expensive to treat. Serious burn injuries have many complications—some physical, some medical, some psychological, some financial. A severely burned injury victim can end up permanently disabled and suffering from post-traumatic stress disorder (PTSD).

Burn injuries are often expensive to treat because a serious injury can cause multiple medical problems. Some of the physical injuries and medical costs that can result from burn injuries include skin damage, skin loss, and scarring and disfigurement:* Follow-up surgeries to scrape off or cut off and remove dead tissue (Debridement)

* Sepsis infection from dead tissue that rots on or in the body (Sepsis Shock)
* Contracture (Skin Tightening that limits future mobility)
* Damage to or loss of soft tissues, such as ligaments, tendons, and muscles
* Damage to bones (with severe burn injuries)
* Nerve damage
* Loss of vision

* Lung damage

* Other internal organ damage, often from medical complications.

Burn injuries often require hospital stays that are much longer than stays for non-burn injuries; the average is 8.1 days for burn victims and 4.5 days for those with non-burn injuries. Costs run much higher as well, often more than twice as high for burn-injury sufferers. The American Burn Association has stated that a burn accident survivor with 40 to 60 percent of their body burned will be in the hospital an average of 54 days, at an average cost of $780,000. If burns are more serious, costs can skyrocket. Severe burns without complications cost $1.6 million on average.

Medical Complications Increase Medical Costs of Burn Injury Victims Quickly:

* Burn injuries cause loss of skin leaving burn victims vulnerable to infections, which can add up to $120,000 in costs (occurs, on average, in 35 percent of cases).

* Skin grafts and slow healing can increase costs to $110,000 (occurs, on average, in 32 percent of cases).

* Fragile skin and skin breakdown can increase costs to $107,000 (occurs, on average, in 55 percent of cases).

* PSTD and other psychological issues can add $75,000 to hospital costs (occurs, on average, in 57 percent of cases).

* Disfigurement, scarring, and contracture can increase costs to $35,000 (occurs, on average, in 66 percent of cases).

* Serious burn injuries can require a multitude of specialists:

* Surgeons, including plastic and reconstructive surgeons

* Anesthesiologists

* Pain management specialists

* Wound-care professionals

* Various types of therapists, including physical, occupational, speech, and psychological, depending on the injuries

* Mental health professionals and social workers.

Such specialized care is not inexpensive. On top of that, the many medications—at the minimum, pain relief and antibiotics—are costly, along with specialized wound dressings, pressure bandages to help limit scarring, and blood transfusions.

Post-hospital, costs can mount if it is necessary to modify the home or the family vehicle to accommodate the new disability. Other items that can add to costs are wheelchairs or walkers, prosthetics, and orthotics. Often, specialized home health care is required.

The family of the burn victim can also suffer from financial loss after the injury, if the scald victim was the breadwinner. However, if the injury was caused by another party’s negligence or recklessness, a number of economic and non-economic damages are recoverable. “Economic damages” are things such as past and future medical bills; the cost of rehabilitation, assistive devices and prostheses; and lost wages. Typical “non-economic” damages are compensation for pain and suffering, and for mental anguish resulting from the injury. No amount of compensation will undo a serious scald burn injury.This code change should eliminate most of the scald injuries and reduce litigation and liability costs, which should also help reduce the retail cost of water heaters.

Bibliography: Related research:

“Burn injuries in the older population and understanding the common causes to influence accident prevention,” published in the journal Burns in June 2023, finds: “The main cause of burn injuries in the elderly of Yorkshire and Humber [England] was food preparation. The majority of the food preparation burn injuries were a scald burn due to the handling of hot fluids, either from a saucepan or a kettle. A prevention strategy aiming to make people aware of this finding can help reduce burn injuries in the over 65 years old age group.”

“Pediatric major burns: a monocentric retrospective review of etiology and outcomes (2008–2020),”

published in the European Journal of Plastic Surgery in April 2022, finds: “Scalds were the main mechanism of injury (70.1%) and upper extremity was the most frequent location affected (68%). The 28.6% of patients suffered some complication, but the mortality rate was low (0.7%).”

“A state-wide analysis of pediatric scald burns by tap water, 2016–2018,”

published in Burns in December 2020, finds “a significant number of scald burn injuries by tap water in children, particularly under 5 years.”

“Burn Injury,”

published in Nature Reviews, Disease Primers, in February 2020, finds, “Development of international burn registries should facilitate better understanding of burn injury aetiologies in many vulnerable populations.”

“Pediatric Burns:

A Single Institution Retrospective Review of Incidence, Etiology, and Outcomes in 2273 Burn Patients (1995–2013)” published in the Journal of Burn Care & Research in November 2016, finds “children 6 years or younger accounted for more than half of the burn-associated hospitalizations, and were more likely to be male children suffering scald burns.” Also, “Geographical analysis revealed significantly higher incidence of burns in areas with lower incomes.”

“Preventing childhood scalds within the home: Overview of systematic reviews and a systematic review of primary studies,” published in Burns in August 2015, finds, “The paucity of evidence we found highlights the need for research to investigate the effect of interventions on reducing the incidence of childhood scalds in the home, the safe handling of food and drinks, and safe kitchen and cooking practices.”

Cost Impact: Increase

- **Berkley Nat Lab WH Retail Price Database for DOE1997-1999.pdf**
  https://www.cdpaccess.com/proposal/10283/30697/documentation/147338/attachments/download/4326/

Estimated Immediate Cost Impact:

$70 - $250 Materials Plumber's cost to consumer for a thermostatic mixing valve

$120 - $240 for a plumber to install a thermostatic mixing valve on site.

Total price range to install a thermostatic nixing valve on a water heater discharge piping at a jobsite = $190 - $490

$35-$55 Materials wholesale price for manufacturer to purchase Thermostatic Mixing Valves in bulk
$7-$15 to install a thermostatic mixing valve on a factory assembly line

Total price range to install a thermostatic mixing valve on a Water heater in a factory assembly line = $42 - $70

Estimated Immediate Cost Impact Justification (methodology and variables):

Reducing burn injuries is a health & safety issue that will save hundreds of thousands of dollars in medical costs and long term care for over 17,000 tap water scald burn victims each year.
According to Researchers at John’s Hopkins University and prominent burn injury lawyers, that have researched burn injuries, and determined that costs associated with burn injuries are very expensive.

Burn Injury Treatment And Expenses: January 23, 2018 / Catastrophic Injuries.

Serious burn injuries have many complications—some physical, some medical, some psychological, some financial. A severely burned injury victim can end up permanently disabled and suffering from post-traumatic stress disorder (PTSD). If the burn injury occurred because of someone else’s negligence or recklessness, you may have an actionable lawsuit for lost income and other damages.

Between 2016 and 2018, 52,088 people in the U.S. visited emergency departments for tap water scald burns (Over 17,000 per year).

An additional 7,270 were hospitalized and 110 died at the hospital.

In total, the cost of visits added up to $29.79 million for emergency department visits and $206.69 million for hospital stays.

Among those who were hospitalized, 41% were white, 28% were Black and 17% were Hispanic. About 9% were listed as “others” and data was missing for 5%. Race data were not available for emergency department visits.

Also, Medicaid and Medicare paid for 67% of inpatient stays and 47% of emergency department visits, reflecting that scald burns disproportionally affect older adults and lower-income populations. Medicaid covers people whose income is below a certain government threshold, while Medicare covers people who are 65 and older, regardless of income. Both programs cover people who have disabilities.

“We’re all paying these costs with federal dollars, and it has a simple engineering solution,” says a researcher at John’s Hopkins University.

Burn Injuries Are Extremely Costly To Treat Burn injuries are often expensive to treat because a serious injury can cause multiple medical problems. Some of the physical injuries that can result from burn injuries include:

kin damage, skin loss, and scarring and disfigurement. (Elephant Man Syndrome)

ollow-up surgeries to scrape off or cut off and remove dead tissue (Debridement)

epsis infection from dead tissue that rots on or in the body

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Burn injuries often require hospital stays that are much longer than stays for non-burn injuries; the average is 8.1 days for burn victims and 4.5 days for those with non-burn injuries. Costs run much higher as well, often more than twice as high for burn-injury sufferers. The American Burn Association has stated that a burn accident survivor with 40 to 60 percent of their body burned will be in the hospital an average of 54 days, at an average cost of $780,000. If burns are more serious, costs can skyrocket. Severe burns without complications cost $1.6 million on average.

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Post-hospital, costs can mount if it is necessary to modify the home or the family vehicle to accommodate the new disability. Other items that can add to costs are wheelchairs or walkers, prosthetics, and orthotics. Often, specialized home health care is required as well.

The family of the burn victim can also suffer from financial loss after the injury, if the scald victim was the breadwinner. However, if the injury was caused by another party's negligence or recklessness, a number of economic and non-economic damages are recoverable. "economic damages" are things such as past and future medical bills; the cost of rehabilitation, assistive devices and prostheses; and lost wages. typical "non-economic" damages are compensation for pain and suffering, and for mental anguish resulting from the injury. No amount of compensation will undo a serious scald burn injury.

But facts and figures do not come close to touching the heart of the matter. The human costs—the burn victim's physical and emotional suffering, as well as the emotional pain of family members—mean that everyone suffers when a serious burn injury occurs.

Estimated Life Cycle Cost Impact:

Between 2016 and 2018, 52,088 people in the U.S. visited emergency departments for tap water scald burns (Over 17,000 per year).

An additional 7,270 were hospitalized and 110 died at the hospital.

In total, the cost of visits added up to $29.79 million for emergency department visits and $206.69 million for hospital stays.

Among those who were hospitalized, 41% were white, 28% were Black and 17% were Hispanic. About 9% were listed as "others" and data was missing for 5%. Race data were not available for emergency department visits.

Also, Medicaid and Medicare paid for 67% of inpatient stays and 47% of emergency department visits, reflecting that scald burns disproportionally affect older adults and lower-income populations. Medicaid covers people whose income is below a certain government threshold, while Medicare covers people who are 65 and older, regardless of income. Both programs cover people who have disabilities.

"We're all paying these costs with federal dollars, and it has a simple engineering solution," says a researcher at John's Hopkins University.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

See Berkley LAbs report on WH Retail Pricing.

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IPC: 602.2

Proponents: Kyle Thompson, Technical Director, Plumbing Manufacturers International, Plumbing Manufacturers International (kthompson@safeplumbing.org)

2024 International Plumbing Code

Revise as follows:

602.2 Potable water required.
Only potable water shall be supplied to plumbing fixtures that provide water for drinking, bathing or culinary purposes, or for the processing of food, medical or pharmaceutical products. Unless otherwise provided in this code, potable water shall be supplied to all plumbing fixtures. <u>Water closets supplied by an alternate non-potable water source for use in flushing shall also be supplied with an equal-sized potable water line that is dry until in use.</u>

Reason: The objective of this proposal is to safeguard an individual's freedom to choose between a conventional flush toilet and a smart toilet or personal hygiene device (bidet seat) for their home, ensuring that the code upholds this right.

The current code incorporates provisions for providing non-potable water indoors specifically for toilet flushing and other applications. In instances where a building is plumbed with a non-potable water supply line to the toilet, residents opting for a smart toilet or personal hygiene device, whether out of necessity or choice, must connect to the available non-potable water supply or re-pipe with a potable water supply line for proper installation of the smart toilet – often incurring prohibitive expenses. The code restricts the use of non-potable water for activities like bathing, washing with faucets, showerheads, tub spouts, etc. This same consideration should be extended to personal hygiene devices and smart toilets, crucial for many Americans due to medical conditions, or preferred for reasons of cleanliness, health, and environmental awareness.

Making an allowance in the existing code for the inclusion of these products, which adhere to all major plumbing codes and boast a longstanding presence in the market, is important for ensuring public health and safety. The U.S. smart toilet market, valued at $1.8 billion, is anticipated to surpass $3 billion within the next five years. Individuals across the United States incorporate these products into their bathrooms, with some relying on them for maintaining dignity, privacy, and self-reliance, especially those with special needs or limited mobility.

Ensuring ease of cleaning is immediately beneficial and crucial for seniors, significantly impacting their hygiene. Moreover, individuals facing colorectal issues like hemorrhoids, irritable bowel syndrome (IBS), and inflammatory bowel disease (IBD),[1.] along with pregnant women experiencing severe constipation or postpartum recovery,[2.] derive additional hygiene-related advantages from these products. They also contribute to maintaining hand hygiene, a critical factor in preventing the spread of diseases.[3.]

Beyond hygiene, many smart toilets feature health monitoring capabilities that analyze stool or urine to detect health issues such as sugar levels in diabetics. These innovations have proven especially beneficial for stroke rehabilitation[4.]. For certain individuals who cannot use toilet paper due to medical reasons, personal hygiene devices are indispensable. Additionally, these devices have demonstrated a reduction in instances of rashes, hemorrhoids, and urinary tract infections.

In essence, these products are vital for numerous individuals across the United States in preserving their health. However, the existing code could impede the installation of such products in residential bathrooms where the building is plumbed with a non-potable water supply line to the toilet.

This proposal aims to guarantee residents the freedom to choose personal hygiene devices or smart toilets for their homes. It specifies the availability of a potable water supply if builders opt to install non-potable water lines for toilet flushing. To prevent stagnant water conditions, the proposal necessitates keeping the potable water line dry until it is in use. Achieving this could involve installing a water line from the lavatory and incorporating a labeled shutoff valve at the lavatory.

Furthermore, the code already approves using personal hygiene devices that conform to ASME A112.4.2/CSA B45.16. This industry standard requires that a personal hygiene device includes backflow protection through an atmospheric vacuum breaker, air space type vacuum breaker, or air gap fitting.

Non-potable water treated to the level for use in toilet flushing that is compliant with the code, applicable laws, rules, ordinances, and NSF/ANSI 350 or IGC 324 is not equivalent to the level of safety that is dictated by federal law for potable water. Many individuals that use smart toilets and personal hygiene devices do so out of necessity due to disabilities and/or underlying health issues (e.g., arthritis, urinary tract infections, hemorrhoids, anal fissures). The quality level of water that is used with smart toilets and personal hygiene devices must be free of any pathogens, etc., that could cause infection or disease, and therefore, must be treated at a minimum in accordance with regulations for potable water.

Though it is always wise to consult a building official before tackling a new project, the codes do not require a permit to be pulled for every installation in a residential occupancy. For example, the IRC allows for the removal and reinstallation of a toilet without a permit if the installation does not involve or require the replacement or rearrangement of valves, pipes, or fixtures (Section R105.2). A personal hygiene device or smart toilet would meet this exemption as they are installed using the existing plumbing components and piping configuration.

Bibliography:
1. "How to Decide If You Need a Bidet," by Amber J. Tresca, 2019, Verywell Health, https://www.verywellhealth.com/do-i-need-a-bidet-1942839

2. "The Effect of Bidet Use on Severity of Constipation and Quality of Life Among Pregnant Women," by Sultan Alan, Ebru Gozuyesil and Sule Gokyildiz Surucu, August 2020, Yonago Acta Medica (YAM), Journal of Medical Sciences, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7435113/

3. "The Use of Electric Toilet Seats with Water Supply Is Efficacious in Maintaining Hand Hygiene in Experimental Model," by Shigeharu Oie, Hiromi Aoshika, Emiko Arita and Akira Kamiya, 2018, Japanese Journal of Infectious Diseases, https://www.jstage.jst.go.jp/article/yoken/71/4/71_JJID.2017.515/_article/-char/en

4. "Technology-assisted toilets: Improving independence and hygiene in stroke rehabilitation," by David Yachnin, Georges Gharib, Jeffrey Jutai and Hillel Finestone, August 2017, Journal of Rehabilitation and Assistive Technologies Engineering, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6453101/

Cost Impact: Increase

Estimated Immediate Cost Impact:

Increase cost of $175 for rough in of potable water supply line that is dry until in use.

Estimated Immediate Cost Impact Justification (methodology and variables):

a. Rough-in of potable water line that is dry until in use:
i. Parts: shutoff valve ($40), 20 ft copper pipe ($60).
ii. Plumbing Labor: 0.5-hour labor @$150/hr ($75).
iii. Total $175

Estimated Life Cycle Cost Impact:

Savings of $775 for re piping when compared with the cost of rough in of potable supply pipe.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

a. Re-pipe for potable water supply line after construction:
i. Construction
1. Parts: Estimate Drywall $2.50/sq ft., Tile $10/sq ft.
2. Construction Labor: $100/hr.
3. Construction Subtotal: Remove and restore 20sq ft of drywall and tile. 2 hr labor plus parts (Sub Total $450).
ii. Plumbing
1. Parts: Shutoff valve ($40), 20 ft copper pipe ($60).

2. Plumbing Labor: $150/hr.

3. Plumbing Subtotal: Reframe for new plumbing, pipe and fitting installation. 2 hr labor plus parts (Sub Total: $400).

iii. Permit: $100.

iv. Total $950 for re-pipe after construction.

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IPC: 602.2.1 (New), ASHRAE Chapter 15 (New)

Proponents: Emily Toto, ASHRAE, ASHRAE (etoto@ashrae.org)

2024 International Plumbing Code

Add new text as follows:

602.2.1 Pathogen Control. Where required, water supply and distribution systems shall be designed and maintained to control Legionella and other pathogens in accordance with ASHRAE 188 and ASHRAE 514.

Add new standard(s) as follows:

ASHRAE

ASHRAE
180 Technology Parkway
Peachtree Corners, GA 30092

ASHRAE 188-2021	Legionellosis: Risk Management for Building Water Systems
ASHRAE 514-2023	Risk Management for Building Water Systems: Physical, Chemical, and Microbial Hazards

Staff Analysis: A review of the standard proposed for inclusion in the code, ASHRAE 188-2021 *Legionellosis: Risk Management for Building Water Systems* and ASHRAE 514-2023 *Risk Management for Building Water Systems: Physical, Chemical, and Microbial Hazards,* with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: ASHRAE Standard 188 provides minimum legionellosis risk management requirements for the design, construction, commissioning, operation, maintenance, repair, replacement, and expansion of new and existing buildings and their associated (potable and non-potable) water systems and components.

Standard 188 has been in development for over 12 years by a cross-section of expert stakeholders. It has been supported by the CDC and was adopted as the basis for their Legionella Toolkit. It is increasingly being adopted by state and local jurisdictions, for example New York and Michigan. Additionally, the Alliance to Prevent Legionnaires' Disease endorses the use of ASHRAE Standard 188 by building owners and operators holistically to support risk management against legionella for the entire building.

ASHRAE Standard 188 gives building owners a structured approach to develop water management plans designed for their specific facility to assist with legionella prevention. Further, it takes into consideration the risks of incoming water quality that can result in building and residential water quality and bacterial issues, which is sometimes overlooked.

In contrast, ASHRAE Standard 514 is broader in scope to include chemical, physical, and microbial hazards. Thus, having both references will ensure the necessary steps are taken to maintain optimal water quality.

Cost Impact: Increase

Estimated Immediate Cost Impact:

The cost will vary based on the specifics of the water management plan. However, the cost is associated with developing and carrying out a water management plan will be orders of magnitude less than the cost of remediation and possible litigation should there be an outbreak.

An estimated cost based on a previous project is $4,000 in upfront cost (for a consultant) and $1600 - $2600 annual cost for training and testing.

Estimated Immediate Cost Impact Justification (methodology and variables):

Consultant cost for generating water plan: $4,000 assuming 40 hours of work.

Staff training: $600 per year assuming 2 hour training session at a rate of $20/hr per person and 15 people being trained.

Testing: $1,000 - $2,000 per year assuming 20 tests/year.

P66-24

P67-24

IPC: 604.4, 604.4.1 (New), 604.4.2 (New), TABLE 604.4

Proponents: Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C., Bradley Corp. (jbengineer@aol.com)

2024 International Plumbing Code

Revise as follows:

604.4 Maximum flow and water consumption.
The maximum water consumption flow rates and quantities for all plumbing fixtures and fixture fittings shall be in accordance with Table 604.4.

~~**Exceptions:**~~

1. ~~Blowout design water closets having a water consumption not greater than $3^{1}/_{2}$ gallons (13 L) per flushing cycle.~~
2. ~~Vegetable sprays.~~
3. ~~Clinical sinks having a water consumption not greater than $4^{1}/_{2}$ gallons (17 L) per flushing cycle.~~
4. ~~Service sinks.~~
5. ~~Emergency showers.~~

Add new text as follows:

604.4.1 Group wash fixtures. Group wash fixtures used as public lavatories shall have a maximum water consumption flow rate in accordance with Table 604.4 based on each 16 inches of rim space.

604.4.2 Emergency fixtures. The maximum flow rates in Table 604.4 shall not apply to emergency fixtures.

Revise as follows:

TABLE 604.4 MAXIMUM FLOW RATES AND CONSUMPTION FOR PLUMBING FIXTURES AND FIXTURE FITTINGS

PLUMBING FIXTURE OR FIXTURE FITTING	MAXIMUM FLOW RATE OR QUANTITY[b]
Clinical sink	4.5 gallons per flushing cycle
Lavatory, private	2.2 gpm at 60 psi
Lavatory, public (metering)	0.25 gallon per metering cycle
Lavatory, public (other than metering)	0.5 gpm at 60 psi
Shower head[a, c]	2.0 gpm at 80 psi
~~Sink~~ Kitchen sink faucet	2.2 gpm at 60 psi
Urinal	1.0 gallon per flushing cycle
Water closet	1.6 gallons per flushing cycle
Water closet, blowout	3.5 gallons per flushing cycle

For SI: 1 gallon = 3.785 L, 1 gallon per minute = 3.785 L/m, 1 pound per square inch = 6.895 kPa.

a. A hand-held shower spray is a shower head.

b. Consumption tolerances shall be determined from referenced standards.

c. Shower heads shall comply with all requirements for high-efficiency showerheads in ASME A112.18.1-2020/CSA B125.1.

Reason: This proposal is an alternative approach for addressing the exceptions currently listed in Section 604.4. Clinical sink and blowout water closets have been added to the table since there are water consumption requirements. These are not exceptions.

The other change to the table is the addition of the word “kitchen” in front of sink faucet in Table 604.4. The Federal water conservation requirements are very clear in listing kitchen faucets. The use of the term “sink faucets” has led to some of the confusion regarding what sinks are regulated for water conservation.

A new subsection is proposed for determining the water consumption use for group wash fixtures used as public lavatories. Section 419.1 lists a rim space to be classified as a lavatory. However, for water consumption applications, the spacing listed is not consistent with the use of the fixture. The manufacturers have allocated the water use for each 16 inches of rim space.

The other new subsection states that emergency fixtures, showers, eyewash, or facewash, are not regulated by Table 604.4. This is consistent with the Federal requirements.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This change is editorial. If one reviews the change, they will notice that there is no additional requirements for plumbing fixtures. The text is simplified into a table format for better understanding. Hence, this has no impact on the cost of construction.

P67-24

P68-24

IPC: 604.4, 604.4.1 (New), 604.4.2 (New), 604.4.3 (New), 604.4.4 (New), TABLE 604.4

Proponents: Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C., Bradley Corp. (jbengineer@aol.com)

2024 International Plumbing Code

Revise as follows:

604.4 Maximum flow and water consumption.
The maximum water consumption flow rates and quantities for all plumbing fixtures and fixture fittings shall be in accordance with Table 604.4 and Section 604.4.1 through 604.4.4.

~~**Exceptions:**~~

1. ~~Blowout design water closets having a water consumption not greater than 3$^{1}/_{2}$ gallons (13 L) per flushing cycle.~~
2. ~~Vegetable sprays.~~
3. ~~Clinical sinks having a water consumption not greater than 4$^{1}/_{2}$ gallons (17 L) per flushing cycle.~~
4. ~~Service sinks.~~
5. ~~Emergency showers.~~

Add new text as follows:

604.4.1 Blowout water closets. Blowout design water closets shall have a maximum water consumption of 3-1/2 gallons (13 L) per flushing cycle.

604.4.2 Clinical Sinks. Clinical sinks shall have a maximum water consumption of 4-1/2 gallons (17 L) per flushing cycle.

604.4.3 Group wash fixtures. Group wash fixtures used as public lavatories shall have a maximum water consumption flow rate in accordance with Table 604.4 based on each 16 inches of rim space.

604.4.4 Vegetable sprays, service sinks, and emergency fixtures. The maximum flow rates in Table 604.4 shall not apply to vegetable sprays, service sinks, and emergency fixtures.

Revise as follows:

TABLE 604.4 MAXIMUM FLOW RATES AND CONSUMPTION FOR PLUMBING FIXTURES AND FIXTURE FITTINGS

PLUMBING FIXTURE OR FIXTURE FITTING	MAXIMUM FLOW RATE OR QUANTITY[b]
Lavatory, private	2.2 gpm at 60 psi
Lavatory, public (metering)	0.25 gallon per metering cycle
Lavatory, public (other than metering)	0.5 gpm at 60 psi
Shower head[a, c]	2.0 gpm at 80 psi
Kitchen ~~Sink~~ sink faucet	2.2 gpm at 60 psi
Urinal	1.0 gallon per flushing cycle
Water closet	1.6 gallons per flushing cycle

For SI: 1 gallon = 3.785 L, 1 gallon per minute = 3.785 L/m, 1 pound per square inch = 6.895 kPa.

a. A hand-held shower spray is a shower head.

b. Consumption tolerances shall be determined from referenced standards.

c. Shower heads shall comply with all requirements for high-efficiency showerheads in ASME A112.18.1-2020/CSA B125.1.

Reason: The primary purpose of this proposal is to remove the exceptions from Section 604.4. Many of the exceptions are not exceptions, they are additional requirements. As such, the requirements belong as subsections of the main section. The fixtures that are not listed as not having applicable requirements are technically not even listed in Table 604.4. However, these fixtures were added as exceptions to clarify that the table requirements do not apply. Rather than removing these fixtures from the additional requirements, they have been combined and added as the last subsection indicating that the water consumption requirements do not apply.

For the other items, blowout water closets and clinical sinks, the water consumption requirements are included in the first two subsections. However, it should be noted that both of these fixtures could be added to Table 604.4 since there are maximum water consumption requirements for the fixtures.

The final additional subsection is for determining the water consumption use for group wash fixtures used as public lavatories. Section 419.1 lists a rim space to be classified as a lavatory. However, for water consumption applications, the spacing listed is not consistent with the use of the fixture. The manufacturers have allocated the water use for each 16 inches of rim space.

The final modification is the addition of the word “kitchen” in front of sink faucet in Table 604.4. The Federal water conservation requirements are very clear in listing kitchen faucets. The use of the term “sink faucets” has led to some confusion regarding what sinks are regulated for water conservation.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This change is editorial as current code requirements are being reformatted for clarity.

P68-24

P69-24

IPC: TABLE 604.4

Proponents: Anthony Floyd, City of Scottsdale, City of Scottsdale (afloyd@scottsdaleaz.gov); Edward R. Osann, Natural Resources Defense Council, Natural Resources Defense Council (eosann@nrdc.org)

2024 International Plumbing Code

Revise as follows:

TABLE 604.4 MAXIMUM FLOW RATES AND CONSUMPTION FOR PLUMBING FIXTURES AND FIXTURE FITTINGS

PLUMBING FIXTURE OR FIXTURE FITTING	MAXIMUM FLOW RATE OR QUANTITY[b]
Lavatory, private	2.2 gpm at 60 psi
Lavatory, public (metering)	0.25 gallon per metering cycle
Lavatory, public (other than metering)	0.5 gpm at 60 psi
Shower head[a, c]	2.0 gpm at 80 psi
Sink faucet	2.2 gpm at 60 psi
Urinal	~~1.0~~0.5 gallon per flushing cycle
Water closet	1.6 gallons per flushing cycle

For SI: 1 gallon = 3.785 L, 1 gallon per minute = 3.785 L/m, 1 pound per square inch = 6.895 kPa.

a. A hand-held shower spray is a shower head.

b. Consumption tolerances shall be determined from referenced standards.

c. Shower heads shall comply with all requirements for high-efficiency showerheads in ASME A112.18.1-2020/CSA B125.1.

Reason: Urinals can account for a significant amount of indoor water usage in commercial and institutional buildings. A typical urinal getting 18 flushes a day over 260 weekdays will draw and discharge nearly 5,000 gallons of water per year if operating at the IPC's maximum flush volume of 1 gallon per flush. In light if this, in 2009 the US EPA WaterSense Program published a voluntary specification for flushing urinals, with a maximum flush volume of 0.5 gallons per flush while conforming with all other applicable industry standards. Manufacturers responded with scores of urinal models having a maximum flush rate of 0.5 gallons or less without sacrificing product performance.

All flushing urinals produce calcite build-up in the urinal trapway and drain pipes caused by the bonding of the mineral ions in the flush water with the sediment in urine. As such, build-up occurs in all flushing urinals from 1.0 gpf down to 0.1 gpf and is not any greater for 0.5 gpf urinals.

Based on WaterSense product listings from January 2024, there are 19 brands and 399 models of flushing urinals and 17 brands and 407 models of urinal flush valves sold separately that meet the 0.5 gpf criterion, demonstrating the commercial viability and availability of water-efficient urinals. To date, 12 states (including New York and California) and the District of Columbia have adopted requirements limiting new urinals to a maximum flush volume of 0.5 gallons or less.

The installation of urinals that conform to this proposal will save building owners on water and wastewater charges (see cost impact statement below) and help protect public water supplies by reducing unnecessary water use over the life of the building.

Bibliography: EPA WaterSense
- https://www.epa.gov/watersense/urinals

Considerations for Reduced Water Consumption Rates of Urinal Fixtures (Sloan Valve) - https://www.sloan.com/sites/default/files/2016-01/hybrid-urinal-whitepaper.pdf

Cost Impact: Decrease

Estimated Immediate Cost Impact:

The code change proposal will decrease the cost of construction, with a likely range of cost reduction of $30 to $0 per urinal. In most cases, there is little cost difference between urinals that flush at 0.5 gpf, as proposed here, and those that flush at 1.0 gpf, the volume allowed in the IPC. Numerous examples are found where the price of 0.5 gpf units are the same or less.

Our review (below) of current pricing information reaffirms what the US EPA WaterSense program found comparing 1.0 gpf units with 0.5 gpf units in 2017, when it stated:

"Our product research has found that high-efficiency urinal fixtures and flushing devices are no more expensive than their standard (1.0 gpf) counterparts. The average price of a new high-efficiency or standard urinal fixture is about $350 and the average cost for a high-efficiency or standard pressurized flushing device (flushometer valve) is approximately $200. Because there is very little to no cost difference between high-efficiency flushing urinals and standard flushing urinals, installing high-efficiency models in new construction or as part of the natural replacement process is cost-effective with immediate payback in water cost savings."

See https://19january2017snapshot.epa.gov/www3/watersense/pubs/faq_lfu.html#two.

Estimated Immediate Cost Impact Justification (methodology and variables):

Pricing information is from the W. W. Grainger web site,

<https://www.grainger.com/category/plumbing?analytics=nav> accessed January 8, 2024, and illustrates this point.

Urinal flush valves and urinal fixtures are frequently sold separately, as well as in combination. Urinal fixture models can be found that are rated to operate at *both* 1.0 gpf and 0.5 gpf, allowing for a flush valve of either 0.5 gpf or 1.0 gpf to be affixed to the fixture. Thus, for a significant group of urinal fixtures, there is *no difference* in cost because the same fixture can perform at either flush volume, as controlled by the specific flush valve selected. Among wall-mounted washout urinals with a top spud, the least expensive fixture model carried by Grainger is the Gerber Lafayette, rated at both 1.0 gpf and 0.5 gpf, offered at $137. Other examples include American Standard Maybrook, rated at 0.1, 0.25, and 0.5 gpf, priced at $197; Sloan, rated at 0.1, 0.25, and 0.5 gpf, priced at $195.50; and Kohler Darfield, rated at both 1.0 gpf and 0.5 gpf, priced at $412. For wall-mounted urinals with back spuds, all seven of the models offered by Grainger were rated at 0.5 gpf or less.

Urinal flush valves can vary in cost based on spud and inlet dimensions and internal mechanism. But where manufactures are offering comparable products that differ only in flush volume, there is little difference in price. For American Standard piston-type manual valves with 3/4 in spud coupling and 3/4 in inlet, the 1.0 gpf model is priced at $143.21 and the 0.5 gpf model is priced at $143.83. Similarly, Toto offers a comparable piston-type valve priced at $276.42 for the 1.0 gpf model and $280.40 for the 0.5 gpf model, a difference of less than 2%. In manual diaphragm-type valves, the Zurn Aquaflush Z6003 rated at 1.0 gpf is priced at $176.21, while the same model rated at 0.5 gpf is priced at $134.12, significantly less. The Sloan Royal diaphragm-type valve with the same dimensions flushing at 1.0 gpf is priced at $253.63, while the comparable model flushing at 0.5 gpf is priced at $223.15, also significantly less. Automatic flush valves are significantly more expensive than manual valves, but again, several examples can be found of manufacturers offering valves that are similar in all dimensions and differ only in flush volume, with models rated at 1.0 gpf and 0.5 gpf being priced at nearly the same levels. For example, Zurn's Metroflush ZEM6203 electric valves are priced identically in both 1.0 gpf and 0.5 gpf models.

Estimated Life Cycle Cost Impact:

Cost savings attributable to reduced water and sewer charges to the building owner ($22 per year) over a 30-year period have a present value of approximately $430 in current dollars.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

Water savings to the building owner or tenant will vary by usage, of course. But for a urinal receiving typical usage of 18 flushes per day over 260 weekdays per year (assumptions used by WaterSense in their own analysis), the savings in water and wastewater charges from flushing at 0.5 gpf rather than 1.0 gpf amount to about $22 per year per urinal, based on a national average $9.09/kgal for the quantity charge for water and wastewater service to commercial customers as of July 2022, as reported by the Water and Wastewater Rate Survey produced by the American Water Works Association, Raftelis Financial Consultants, Inc, and posted here: https://ellio.raftelis.com/Account/AWWA. Applying a 3% discount rate over 30 years, these savings have a present value of $431 per urinal, based on standard discounted cash flow analysis.

See: https://www.gigacalculator.com/calculators/dcf-calculator.php

P69-24

P70-24 Part I

IPC: TABLE 604.4

Proponents: Diana Burk, Energy Solutions, Energy Solutions (dburk@energy-solution.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

Revise as follows:

TABLE 604.4 MAXIMUM FLOW RATES AND CONSUMPTION FOR PLUMBING FIXTURES AND FIXTURE FITTINGS

PLUMBING FIXTURE OR FIXTURE FITTING	MAXIMUM FLOW RATE OR QUANTITY[b]
Lavatory, private	~~2.2~~ 1.2 gpm at 60 psi
Lavatory, public (metering)	0.25 gallon per metering cycle
Lavatory, public (other than metering)	0.5 gpm at 60 psi
Shower head[a, c]	2.0 gpm at 80 psi
Sink faucet	~~2.2~~ 1.8 gpm at 60 psi[d]
Urinal	1.0 gallon per flushing cycle
Water closet	1.6 gallons per flushing cycle

For SI: 1 gallon = 3.785 L, 1 gallon per minute = 3.785 L/m, 1 pound per square inch = 6.895 kPa.

a. A hand-held shower spray is a shower head.

b. Consumption tolerances shall be determined from referenced standards.

c. Shower heads shall comply with all requirements for high-efficiency showerheads in ASME A112.18.1-2020/CSA B125.1.

d. Kitchen faucets shall be permitted to temporarily increase the flow above the maximum rate, but not to exceed 2.2 gpm at 60 psi provided that the faucet reverts to a maximum flow rate of 1.8 gpm at 60 psi upon valve closure.

Reason: Residential Lavatory Faucets: This proposal requires a maximum flow rate of 1.2 gallon per minute (gpm) at 60 psi standard for residential lavatory faucets. These standards have been adopted in multiple states, including California, Hawaii, Oregon, Washington, Maine, and New York. There is wide technological availability—of the 12,602 lavatory faucets and aerators listed in DOE's Compliance Certification Database, 10,607 or 85% meet the 1.2 gpm standard. In their analysis to establish this standard in 2013, the California Energy Commission found no or very low incremental costs for compliant products.[1] Plumbing and sewer systems in older buildings are not expected to be negatively impacted as the standards allow for only 20% less water to flow.

Res Kitchen Faucets: This proposal requires a maximum flow rate of 1.8 gpm (with a 2.2 gpm override) at 60 psi for kitchen faucets. These standards have been adopted in multiple states including Maine, Massachusetts, New Jersey, New York and Vermont. This standard provides water savings but maintains consumer utility for pot filling allowing a 2.2 gpm override. 2.2 gpm is the same level as the current Watersense standard. There is wide technological availability—of the 11,519 kitchen faucets and aerators listed in DOE's Compliance Certification Database, 7,173 or 62% meet the 1.8 gpm standard. In plumbing systems in older buildings are not expected to be negatively impacted as the standards allow for only 18% less water to flow.

This proposal would save 5,200 gallons of water per year and result in $1,000 in cost savings over the lifetime of the faucet for a typical residence.

Bibliography: [1]https://efiling.energy.ca.gov/GetDocument.aspx?tn=71768&DocumentContentId=8103#:~:text=The%20proposed%20standard%20for%20kitchen,flow%20rate%20to%202.2%20gpm.

[2]https://efiling.energy.ca.gov/GetDocument.aspx?tn=71768&DocumentContentId=8103#:~:text=The%20proposed%20standard%20for%20kitchen,flow%20rate%20to%202.2%20gpm.

[3]https://www.calmac.org/publications/Del13B_CS_Report_Appl-Stds_FINAL_2021-06-30.pdf

[4] https://appliance-standards.org/sites/default/files/States%20Go%20First.pdf

[5]https://www.safeplumbing.org/files/safeplumbing.org/documents/misc/7-1-19-WaterSense-2019-Report.pdf

[6]https://appliance-standards.org/sites/default/files/States%20Go%20First.pdf
[7]https://www.eia.gov/consumption/residential/data/2020/#waterheating

[8] https://www.eia.gov/electricity/monthly/epm_table_grapher.php?t=epmt_5_3
[9] https://www.eia.gov/dnav/ng/ng_pri_sum_dcu_nus_a.htm
[10] https://www.eia.gov/dnav/pet/pet_pri_wfr_dcus_nus_m.htm

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0. In their analysis to establish this standard in 2013, the California Energy Commission found no or very low incremental costs for compliant products.[2]

Estimated Immediate Cost Impact Justification (methodology and variables):

The California Energy Commission report found very little price difference between higher and lower efficiency faucets and faucet accessories. The CEC reviewed the whole sale catalog of NEOPERL, a major manufacturer, and found there was no cost difference between qualifying and non-qualifying product.[2]

Estimated Life Cycle Cost Impact:

This proposal would save 5,200 gallons of water per year and result in $1,000 in cost savings over the lifetime of the faucets in a typical dwelling unit.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

To estimate the roughly $1,000 in life cycle cost savings, a conservative assumption of saving 1,140 gallons of water per year resulting in 91kWh of electricity savings and 4.6 therms/year of savings from a natural gas or oil water heater was made based on savings estimates from the appliance standards awareness program[3] and an appliance standards evaluation report for California.[4] It was assumed that a typical dwelling unit has roughly 3.5 lavatory faucets and 1 kitchen faucet.[5] Water and waste water prices were estimated at $11 per thousand gallons and the effective useful life of the faucet was estimated to be 10 years.[6] It was assumed that 48% of water heaters were natural gas, 46% were electric and 6% were fuel oil based on the 2020 Residential Energy Consumption Survey.[7]Electricity was estimated to cost $0.15/kWh[8], fuel oil was estimated at $3.06/therm[10] and natural gas was estimated at $1.42/therm[9] using annual prices from the Energy Information Administration.

P70-24 Part I

P70-24 Part II

IRC: TABLE P2903.2

Proponents: Diana Burk, Energy Solutions, Energy Solutions (dburk@energy-solution.com)

2024 International Residential Code

Revise as follows:

TABLE P2903.2 MAXIMUM FLOW RATES AND CONSUMPTION FOR PLUMBING FIXTURES AND FIXTURE FITTINGS [b]

PLUMBING FIXTURE OR FIXTURE FITTING	MAXIMUM FLOW RATE OR QUANTITY
Lavatory faucet	~~2.2~~1.2 gpm at 60 psi
Shower head [a]	2.5 gpm at 80 psi
Sink faucet	~~2.2~~1.8 gpm at 60 psi[c]
Water closet	1.6 gallons per flushing cycle

For SI: 1 gallon per minute = 3.785 L/m, 1 pound per square inch = 6.895 kPa.c

a. A hand-held shower spray shall be considered to be a shower head.

b. Consumption tolerances shall be determined from referenced standards.

c. Kitchen faucets shall be permitted to temporarily increase the flow above the maximum rate, but not to exceed 2.2 gpm at 60 psi provided that the faucet reverts to a maximum flow rate of 1.8 gpm at 60 psi upon valve closure.

Reason: Residential Lavatory Faucets: This proposal requires a maximum flow rate of 1.2 gallon per minute (gpm) at 60 psi standard for residential lavatory faucets. These standards have been adopted in multiple states, including California, Hawaii, Oregon, Washington, Maine, and New York. There is wide technological availability—of the 12,602 lavatory faucets and aerators listed in DOE's Compliance Certification Database, 10,607 or 85% meet the 1.2 gpm standard. In their analysis to establish this standard in 2013, the California Energy Commission found no or very low incremental costs for compliant products.[1] Plumbing and sewer systems in older buildings are not expected to be negatively impacted as the standards allow for only 20% less water to flow.

Res Kitchen Faucets: This proposal requires a maximum flow rate of 1.8 gpm (with a 2.2 gpm override) at 60 psi for kitchen faucets. These standards have been adopted in multiple states including Maine, Massachusetts, New Jersey, New York and Vermont. This standard provides water savings but maintains consumer utility for pot filling allowing a 2.2 gpm override. 2.2 gpm is the same level as the current Watersense standard. There is wide technological availability—of the 11,519 kitchen faucets and aerators listed in DOE's Compliance Certification Database, 7,173 or 62% meet the 1.8 gpm standard. In plumbing systems in older buildings are not expected to be negatively impacted as the standards allow for only 18% less water to flow.

For a typical single family home, this proposal would save 5,200 gallons of water per year and result in $1,000 in cost savings over the lifetime of the faucets.

Bibliography: [1]https://efiling.energy.ca.gov/GetDocument.aspx?tn=71768&DocumentContentId=8103#:~:text=The%20proposed%20standard%20for%20kitchen,flow%20rate%20to%202.2%20gpm.

[2]https://efiling.energy.ca.gov/GetDocument.aspx?tn=71768&DocumentContentId=8103#:~:text=The%20proposed%20standard%20for%20kitchen,flow%20rate%20to%202.2%20gpm.

[3]https://www.calmac.org/publications/Del13B_CS_Report_Appl-Stds_FINAL_2021-06-30.pdf

[4] https://appliance-standards.org/sites/default/files/States%20Go%20First.pdf

[5]https://www.safeplumbing.org/files/safeplumbing.org/documents/misc/7-1-19-WaterSense-2019-Report.pdf

[6]https://appliance-standards.org/sites/default/files/States%20Go%20First.pdf

[7]https://www.eia.gov/consumption/residential/data/2020/#waterheating

[8] https://www.eia.gov/electricity/monthly/epm_table_grapher.php?t=epmt_5_3

[9] https://www.eia.gov/dnav/ng/ng_pri_sum_dcu_nus_a.htm

[10] https://www.eia.gov/dnav/pet/pet_pri_wfr_dcus_nus_m.htm

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0. In their analysis to establish this standard in 2013, the California Energy Commission found no or very low incremental costs for compliant products.[2]

Estimated Immediate Cost Impact Justification (methodology and variables):

The California Energy Commission report found very little price difference between higher and lower efficiency faucets and faucet accessories. The CEC reviewed the whole sale catalog of NEOPERL, a major manufacturer, and found there was no cost difference between qualifying and non-qualifying product.[2]

Estimated Life Cycle Cost Impact:

This proposal would save 5,200 gallons of water per year and result in $1,000 in cost savings over the lifetime of the faucet.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

To estimate the roughly $1,000 in life cost savings, a conservative assumption of saving 1,140 gallons of water per year resulting in 91 kWh of electricity savings and 4.6 therms/year of savings from a natural gas or oil water heater was made based on savings estimates from the appliance standards awareness program[3] and an appliance standards evaluation report for California.[4] It was assumed that a typical single family home which has roughly 3.5 lavatory faucets and 1 kitchen faucet.[5] Water and waste water prices were estimated at $11 per thousand gallons and the effective useful life of the faucet was estimated to be 10 years.[6] It was assumed that 48% of water heaters were natural gas, 46% were electric and 6% were fuel oil based on the 2020 Residential Energy Consumption Survey.[7]Electricity was estimated to cost $0.15/kWh[8], fuel oil was estimated at $3.06/therm[10] and natural gas was estimated at $1.42/therm[9] using annual prices from the Energy Information Administration.

P70-24 Part II

P71-24

IPC: TABLE 604.4

Proponents: Diana Burk, Energy Solutions, Energy Solutions (dburk@energy-solution.com)

2024 International Plumbing Code

Revise as follows:

TABLE 604.4 MAXIMUM FLOW RATES AND CONSUMPTION FOR PLUMBING FIXTURES AND FIXTURE FITTINGS

PLUMBING FIXTURE OR FIXTURE FITTING	MAXIMUM FLOW RATE OR QUANTITY[b]
Lavatory, private	2.2 gpm at 60 psi
Lavatory, public (metering)	0.25 gallon per metering cycle
Lavatory, public (other than metering)	0.5 gpm at 60 psi
Shower head[a, c]	2.0 gpm at 80 psi
Sink faucet	2.2 gpm at 60 psi
Urinal	~~1.0~~ 0.125 gallon per flushing cycle
Water closet	1.6 gallons per flushing cycle

For SI: 1 gallon = 3.785 L, 1 gallon per minute = 3.785 L/m, 1 pound per square inch = 6.895 kPa.

a. A hand-held shower spray is a shower head.

b. Consumption tolerances shall be determined from referenced standards.

c. Shower heads shall comply with all requirements for high-efficiency showerheads in ASME A112.18.1-2020/CSA B125.1.

Reason: This proposal requires a maximum of 0.125 gallons per flush (gpf) for urinals. These standards have been adopted in multiple states including New York State, Washington and California. There is wide technological availability and very cost-effective water savings. The proposed standards are significantly more efficient than the current requirements in the 2024 International Plumbing Code. Urinal requirements provide significant additional benefit while still maintaining consumer satisfaction. There is wide technological availability—of the 166 urinals listed in DOE's Compliance Certification Database, 59 or 36% meet the 0.125 gpf standard. Since urinals only manage liquid waste and are installed almost exclusively in non-residential settings, it is not expected that plumbing challenges would be faced regarding insufficient sewage movement. For a typical office building which has roughly 6 urinals, this proposal would result in no increase in construction costs but would save approximately 14,040 gallons of water per year and result in $312 in water/sewer cost savings over the lifetime of the urinal.

Bibliography: [1] https://droughtresilience.com/wp-content/uploads/2018/08/CEC-400-2014-007-SD.pdf

[2]https://www.calmac.org/publications/Del13B_CS_Report_Appl-Stds_FINAL_2021-06-30.pdf

[3] https://www.safeplumbing.org/files/safeplumbing.org/documents/misc/7-1-19-WaterSense-2019-Report.pdf

[4] https://appliance-standards.org/sites/default/files/States%20Go%20First.pdf

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0. There is no immediate cost impact.

Estimated Immediate Cost Impact Justification (methodology and variables):

In their analysis to establish this standard in 2015, the California Energy Commission found the incremental cost for urinals is zero because there is no cost premium for a compliant product.[1]

Estimated Life Cycle Cost Impact:

For a typical office building which has roughly 6 urinals, this proposal would save approximately 14,040 gallons of water per year and result in $312 in water/sewer cost savings over the lifetime of the urinal.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

To estimate the roughly $312 in lifecycle cost savings, it was assumed the urinal would save 2,340 gallons of water per year.[2] It was assumed that a typical office building has roughly 6 urinals.[3]Water and waste water prices were estimated at $11 per thousand gallons and the effective useful life of the urinal was estimated to be 12 years.[4]

P71-24

P72-24 Part I

IPC: TABLE 604.4

Proponents: Diana Burk, Energy Solutions, Energy Solutions (dburk@energy-solution.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

Revise as follows:

TABLE 604.4 MAXIMUM FLOW RATES AND CONSUMPTION FOR PLUMBING FIXTURES AND FIXTURE FITTINGS

PLUMBING FIXTURE OR FIXTURE FITTING	MAXIMUM FLOW RATE OR QUANTITY[b]
Lavatory, private	2.2 gpm at 60 psi
Lavatory, public (metering)	0.25 gallon per metering cycle
Lavatory, public (other than metering)	0.5 gpm at 60 psi
Shower head[a, c]	2.0 gpm at 80 psi
Sink faucet	2.2 gpm at 60 psi
Urinal	1.0 gallon per flushing cycle
Water closet	~~1.6~~ 1.28 gallons per flushing cycle[d]

For SI: 1 gallon = 3.785 L, 1 gallon per minute = 3.785 L/m, 1 pound per square inch = 6.895 kPa.

a. A hand-held shower spray is a shower head.

b. Consumption tolerances shall be determined from referenced standards.

c. Shower heads shall comply with all requirements for high-efficiency showerheads in ASME A112.18.1-2020/CSA B125.1.

d. The flush volume for a dual-flush water closet is defined as the composite, average flush volume of two reduced flushes and one full flush.

Reason: This proposal requires a maximum of 1.28 gallons per flush (gpf). 1.28 gpf is the same level as the current Watersense standard. There is wide technological availability and very cost-effective water savings. Of the 2,215 water closets listed in DOE's Compliance Certification Database, 566 or 25% meet the 1.28 gpf standard. Plumbing systems in older buildings are not expected to be negatively impacted as the standards allow for only 20% less water to flow. While this proposal results in significant water savings, the incremental impact for a building's plumbing system is negligible. For a typical office building which has roughly 13 toilets, this proposal would not increase construction costs but could save approximately 6,300 gallons of water per year and result in $850 in water/sewer cost savings over the lifetime of the toilet.

Bibliography: [1] https://droughtresilience.com/wp-content/uploads/2018/08/CEC-400-2014-007-SD.pdf

[2]https://appliance-standards.org/sites/default/files/States%20Go%20First.pdf

[3] https://www.safeplumbing.org/files/safeplumbing.org/documents/misc/7-1-19-WaterSense-2019-Report.pdf

[4] https://appliance-standards.org/sites/default/files/States%20Go%20First.pdf

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0. There is no immediate cost impact.

Estimated Immediate Cost Impact Justification (methodology and variables):

In their analysis to establish this standard in 2015, the California Energy Commission found the incremental cost for toilets is zero because there is no cost premium for a compliant product.[1]

Estimated Life Cycle Cost Impact:

For a typical office building which has roughly 13 toilets, this proposal would not increase construction costs but could save approximately 6,300 gallons of water per year and result in $850 in water/sewer cost savings over the lifetime of the toilet.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

To estimate the roughly $850 in lifecycle cost savings, we assumed the toilet would save 488 gallons of water per year.[2] It was assumed that a typical office building has roughly 13 toilets.[3]Water and waste water prices were estimated at $11 per thousand gallons and the effective useful life of the toilet was estimated to be 12 years.[4]

P72-24 Part I

P72-24 Part II

IRC: TABLE P2903.2

Proponents: Diana Burk, Energy Solutions, Energy Solutions (dburk@energy-solution.com)

2024 International Residential Code

Revise as follows:

TABLE P2903.2 MAXIMUM FLOW RATES AND CONSUMPTION FOR PLUMBING FIXTURES AND FIXTURE FITTINGS [b]

PLUMBING FIXTURE OR FIXTURE FITTING	MAXIMUM FLOW RATE OR QUANTITY
Lavatory faucet	2.2 gpm at 60 psi
Shower head [a]	2.5 gpm at 80 psi
Sink faucet	2.2 gpm at 60 psi
Water closet	~~1.6~~ 1.28 gallons per flushing cycle[c]

For SI: 1 gallon per minute = 3.785 L/m, 1 pound per square inch = 6.895 kPa.

a. A hand-held shower spray shall be considered to be a shower head.

b. Consumption tolerances shall be determined from referenced standards.

c. The flush volume for a dual-flush water closet is defined as the composite, average flush volume of two reduced flushes and one full flush.

Reason: This proposal requires a maximum of 1.28 gallons per flush (gpf). 1.28 gpf is the same level as the current Watersense standard. There is wide technological availability and very cost-effective water savings. Of the 2,215 water closets listed in DOE’s Compliance Certification Database, 566 or 25% meet the 1.28 gpf standard. Plumbing systems in older buildings are not expected to be negatively impacted as the standards allow for only 20% less water to flow. While this proposal results in significant water savings, the incremental impact for a building’s plumbing system is negligible.

For a typical single family home which has roughly 2.4 toilets, this could proposal would result in no increase in incremental costs and could save approximately 861 gallons of water per year and result in $584 in lifetime water/sewer cost savings over the 25 year lifetime of the toilet.

Bibliography: [1] https://droughtresilience.com/wp-content/uploads/2018/08/CEC-400-2014-007-SD.pdf

[2]https://appliance-standards.org/sites/default/files/States%20Go%20First.pdf

[3] https://www.safeplumbing.org/files/safeplumbing.org/documents/misc/7-1-19-WaterSense-2019-Report.pdf

[4] https://appliance-standards.org/sites/default/files/States%20Go%20First.pdf

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0. There is no immediate cost impact.

Estimated Immediate Cost Impact Justification (methodology and variables):

In their analysis to establish this standard in 2015, the California Energy Commission found the incremental cost for toilets is zero because there is no cost premium for a compliant product.[1]

Estimated Life Cycle Cost Impact:

For a typical single family home which has roughly 2.4 toilets, this could save approximately 861 gallons of water per year and result in $584 in lifetime water/sewer cost savings over the 25 year lifetime of the toilet.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

To estimate the roughly $584 in lifetime cost savings, we assumed the toilet would save 861 gallons of water per year.[2] It was assumed that a typical single family home has roughly 2.4 toilets.[3]Water and waste water prices were estimated at $11 per thousand gallons and the effective useful life of the toilet was estimated to be 25 years.[4]

P73-24 Part I

IPC: 604.8, ASSE Chapter 15 (New)

Proponents: George Istefan, Watts Water Technologies (george.istefan@wattswater.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

Revise as follows:

604.8 Water pressure-reducing valve or regulator.
Where water pressure within a building exceeds 80 psi (552 kPa) static, an *approved* water pressure-reducing valve conforming to ASSE 1003, ASSE 1103, or CSA B356 with strainer shall be installed to reduce the pressure in the building water distribution piping to not greater than 80 psi (552 kPa) static.

> **Exception:** Service lines to sill cocks and outside hydrants, and main supply risers where pressure from the mains is reduced to 80 psi (552 kPa) or less at individual fixtures.

Add new standard(s) as follows:

ASSE

ASSE International
18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448

1103-202x Pilot operated Water Pressure Reducing Valves for Potable Water

Staff Analysis: A review of the standard proposed for inclusion in the code, ASSE 1103-202x *Pilot operated Water Pressure Reducing Valves for Potable Water*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: There are currently 2 types of pressure reducing valves allowed in the plumbing code. The ASSE 1003 Water Pressure Reducing Valves for Potable Water Distribution Systems, a directing acting valve in sizes ½" through 4" and the AWWA C530 Pilot Operated Control Valve. The ASSE 1103 valve is as the title states, a pilot operated valve in sizes 1-1/2" through 60". AWWA C530 valves were approved in the 2024 code cycle to provide an approved pressure reducing valve larger than 4" for systems that have larger volume requirements.

The new ASSE Standard 1103 "Pilot Operated Water Pressure Reducing Valves for Potable Water" will allow the use of pilot operated pressure control valves that are specifically intended for potable water applications. As such the standard requires compliance with NSF 61 and NSF 372.

The approval of this proposal will allow designers the flexibility to specify, and AHJs to approve, potable water pressure controllers with a valve specifically intended for use in potable water systems.

Bibliography: Link Date: 01/02/2024

Direct acting: https://www.zoro.com/zurn-water-pressure-reducing-valve-2-12-in-212-500xl/i/G5064236/?campaignid=19725397607&productid=G5064236&v=&gad_source=1

Pilot operated: https://masterbuildermercantile.com/products/zurn-wilkins-212-zw209-2-1-2-pressure-reducing-valve-pilot-controlled-lead-free

Cost Impact: Increase

Estimated Immediate Cost Impact:

Product Cost: 2½" Zurn ASSE 1003 PRV @ Zorro - $2,635 vs Pilot operated $2,089

Installation Cost: Same cost to install

Estimated Immediate Cost Impact Justification (methodology and variables):

Product Cost: 2½" Zurn ASSE 1003 PRV @ Zorro - $2,635 vs Pilot operated $2,089

Installation Cost: Same cost to install

Estimated Life Cycle Cost Impact:

Comparatively same cost for repair/maintenance kits for each, so no increase or reduction. 30year Lifetime repair cost estimated $200-$300, parts and labor.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

Comparatively same cost for repair/maintenance kits for each, so no increase or reduction. 30year Lifetime repair cost estimated $200-$300, parts and labor.

P73-24 Part I

P73-24 Part II

IRC: P2903.3.2, ASSE Chapter 44 (New)

Proponents: George Istefan, Watts Water Technologies (george.istefan@wattswater.com)

2024 International Residential Code

Revise as follows:

P2903.3.2 Maximum pressure.
The static water pressure shall be not greater than 80 psi (551 kPa). Where the *main* pressure exceeds 80 psi (551 kPa), an *approved* pressure-reducing valve conforming to ASSE 1003, ASSE 1103, or CSA B356 shall be installed on the domestic water branch *main* or riser at the connection to the water service pipe.

Add new standard(s) as follows:

ASSE

ASSE International
18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448

1103-202x Pilot operated Water Pressure Reducing Valves for Potable Water

Staff Analysis: A review of the standard proposed for inclusion in the code, ASSE 1103-202x *Pilot operated Water Pressure Reducing Valves for Potable Water*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Staff Analysis: A review of the standard proposed for inclusion in the code, ASSE 1103-202x *Pilot operated Water Pressure Reducing Valves for Potable Water*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: The addition of the new ASSE Standard 1103 Pilot Operated Water Pressure Reducing Valves for Potable Water will allow system designers another option for valve selection, particularly when sizes than 3" are required. These types of valves are capable of maintaining tighter control of the set pressure. The standard also requires their compliance with NSF 61 and NSF 372 in applications where the water is intended for human consumption.

Bibliography: Link Date: 01/02/2024

Direct acting: https://www.zoro.com/zurn-water-pressure-reducing-valve-2-12-in-212-500xl/i/G5064236/?campaignid=19725397607&productid=G5064236&v=&gad_source=1

Pilot operated: https://masterbuildermercantile.com/products/zurn-wilkins-212-zw209-2-1-2-pressure-reducing-valve-pilot-controlled-lead-free

Cost Impact: Increase

Estimated Immediate Cost Impact:

Product Cost: 2½" Zurn ASSE 1003 PRV @ Zorro - $2,635 vs Pilot operated $2,089

Installation Cost: Same cost to install

Estimated Immediate Cost Impact Justification (methodology and variables):

Product Cost: 2½" Zurn ASSE 1003 PRV @ Zorro - $2,635 vs Pilot operated $2,089

Installation Cost: Same cost to install

Estimated Life Cycle Cost Impact:

Life Cycle Cost: Comparatively same cost for repair/maintenance kits for each, so no increase or reduction. 30year Lifetime repair cost estimated $200-$300, parts and labor.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

Life Cycle Cost: Comparatively same cost for repair/maintenance kits for each, so no increase or reduction. 30year Lifetime repair cost estimated $200-$300, parts and labor.

P73-24 Part II

P74-24

IPC: TABLE 605.3, TABLE 605.4, TABLE 605.5, TABLE 702.1, TABLE 702.2, TABLE 702.3, TABLE 702.4, TABLE 702.6

Proponents: Abraham MURRA, Abraham Murra Consulting, Abraham Murra Consulting

2024 International Plumbing Code

Revise as follows:

TABLE 605.3 WATER SERVICE PIPE

MATERIAL	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic pipe	ASTM D1527; ASTM D2282
Chlorinated polyvinyl chloride (CPVC) plastic pipe	ASTM D2846*; ASTM F441*; ASTM F442*; CSA B137.6*
Chlorinated polyvinyl chloride/aluminum/chlorinated polyvinyl chloride (CPVC/AL/CPVC)	ASTM F2855
Copper or copper-alloy pipe	ASTM B42; ASTM B43; ASTM B302
Copper or copper-alloy tubing (Type K, WK, L, WL, M or WM)	ASTM B75; ASTM B88; ASTM B251; ASTM B447
Cross-linked polyethylene (PEX) plastic pipe and tubing	ASTM F876; AWWA C904; CSA B137.5
Cross-linked polyethylene/aluminum/cross-linked polyethylene (PEX-AL-PEX) pipe	ASTM F1281; ASTM F2262; CSA B137.10
Cross-linked polyethylene/aluminum/high-density polyethylene (PEX-AL-HDPE)	ASTM F1986
Ductile iron water pipe	AWWA C115/A21.15; AWWA C151/A21.51
Galvanized steel pipe	ASTM A53
Polyethylene (PE) plastic pipe	ASTM D2239; ASTM D3035; AWWA C901; CSA B137.1
Polyethylene (PE) plastic tubing	ASTM D2737; AWWA C901; CSA B137.1
Polyethylene/aluminum/polyethylene (PE-AL-PE) pipe	ASTM F1282; CSA B137.9
Polyethylene of raised temperature (PE-RT) plastic tubing	ASTM F2769; CSA B137.18
Polypropylene (PP) plastic pipe or tubing	ASTM F2389; CSA B137.11
Polyvinyl chloride (PVC) plastic pipe	ASTM D1785*; ASTM D2241*; ASTM D2672; CSA B137.3*
Stainless steel pipe (Type 304/304L)	ASTM A269/A269M; ASTM A312; ASTM A778
Stainless steel pipe (Type 316/316L)	ASTM A269/A269M; ASTM A312; ASTM A778
Stainless steel tubing (Type 304/304L)	ASTM A269/A269M; ASTM A312; ASTM A778
Stainless steel tubing (Type 316/316L)	ASTM A269/A269M; ASTM A312; ASTM A778

*These standards, which are referenced in appliance standards ANSI Z21.10.1 • CSA 4.1, ANSI Z21.10.3 • CSA 4.3, ANSI Z21.13 • CSA 4.9, and CSA/ANSI Z21.47 • CSA 2.3, do not specify requirements for venting of combustion gases. UL 1738 specifies requirements for pipe, fittings, and accessories intended for venting of combustion gases.

TABLE 605.4 WATER DISTRIBUTION PIPE

MATERIAL	STANDARD
Chlorinated polyvinyl chloride (CPVC) plastic pipe and tubing	ASTM D2846*; ASTM F441*; ASTM F442*; CSA B137.6*
Chlorinated polyvinyl chloride/aluminum/chlorinated polyvinyl chloride (CPVC/AL/CPVC)	ASTM F2855
Copper or copper-alloy pipe	ASTM B42; ASTM B43; ASTM B302
Copper or copper-alloy tubing (Type K, WK, L, WL, M or WM)	ASTM B75; ASTM B88; ASTM B251; ASTM B447
Cross-linked polyethylene (PEX) plastic tubing	ASTM F876; CSA B137.5
Cross-linked polyethylene/aluminum/cross-linked polyethylene (PEX-AL-PEX) pipe	ASTM F1281; ASTM F2262; CSA B137.10
Cross-linked polyethylene/aluminum/high-density polyethylene (PEX-AL-HDPE)	ASTM F1986
Ductile iron pipe	AWWA C115/A21.15; AWWA C151/A21.51
Galvanized steel pipe	ASTM A53
Polyethylene/aluminum/polyethylene (PE-AL-PE) composite pipe	ASTM F1282
Polyethylene of raised temperature (PE-RT) plastic tubing	ASTM F2769; CSA B137.18
Polypropylene (PP) plastic pipe or tubing	ASTM F2389; CSA B137.11
Stainless steel pipe (Type 304/304L)	ASTM A312; ASTM A778
Stainless steel pipe (Type 316/316L)	ASTM A312; ASTM A778
Stainless steel tubing (Type 304/304L)	ASTM A269/A269M; ASTM A312; ASTM A778
Stainless steel tubing (Type 316/316L)	ASTM A269/A269M; ASTM A312; ASTM A778

*These standards, which are referenced in appliance standards ANSI Z21.10.1 • CSA 4.1, ANSI Z21.10.3 • CSA 4.3, ANSI Z21.13 • CSA 4.9, and CSA/ANSI Z21.47 • CSA 2.3, do not specify requirements for venting of combustion gases. UL 1738 specifies requirements for pipe, fittings, and accessories intended for venting of combustion gases.

TABLE 605.5 PIPE FITTINGS

MATERIAL	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic	ASTM D2468

MATERIAL	STANDARD
Cast iron	ASME B16.4
Chlorinated polyvinyl chloride (CPVC) plastic	ASSE 1061; ASTM D2846*; ASTM F437†; ASTM F438†; ASTM F439†; CSA B137.6*
Copper or copper alloy	ASME B16.15; ASME B16.18; ASME B16.22; ASME B16.26; ASME B16.51; ASSE 1061; ASTM F1476; ASTM F1548; ASTM F3226
Cross-linked polyethylene/aluminum/high-density polyethylene (PEX-AL-HDPE)	ASTM F1986
Fittings for cross-linked polyethylene (PEX) plastic tubing	ASSE 1061; ASTM F877; ASTM F1807; ASTM F1960; ASTM F2080; ASTM F2098; ASTM F2159; ASTM F2434; ASTM F2735; ASTM F3347; ASTM F3348;CSA B137.5
Fittings for polyethylene of raised temperature (PE-RT) plastic tubing	ASSE 1061; ASTM D3261; ASTM F1807; ASTM F2098; ASTM F2159; ASTM F2735; ASTM F2769; ASTM F3347; ASTM F3348; CSA B137.18
Gray iron and ductile iron	ASTM F1476; ASTM F1548; AWWA C110/A21.10; AWWA C153/A21.53;
Insert fittings for polyethylene/aluminum/polyethylene (PE-AL-PE) and cross-linked polyethylene/aluminum/cross-linked polyethylene (PEX-AL-PEX)	ASTM F1281; ASTM F1282; ASTM F1974; CSA B137.9; CSA B137.10
Malleable iron	ASME B16.3
Metal (copper alloy) insert fittings for polyethylene/aluminum/polyethylene (PE-AL-PE) and cross-linked polyethylene/aluminum/cross-linked polyethylene (PEX-AL-PEX)	ASTM F1974
Polyethylene (PE) plastic pipe	ASTM D2609; ASTM D2683; ASTM D3261; ASTM F1055; CSA B137.1
Polypropylene (PP) plastic pipe or tubing	ASTM F2389; CSA B137.11
Polyvinyl chloride (PVC) plastic	ASTM D2464; ASTM D2466; ASTM D2467; CSA B137.2; CSA B137.3*
Stainless steel (Type 304/304L)	ASTM A269;ASTM A312; ASTM A778; ASTM F1476; ASTM F1548; ASTM F3226
Stainless steel (Type 316/316L)	ASTM A269;ASTM A312; ASTM A778; ASTM F1476; ASTM F1548; ASTM F3226
Steel	ASME B16.9; ASME B16.11; ASME B16.28; ASTM F1476; ASTM F1548;ASTMF3226

*These standards, which are referenced in appliance standards ANSI Z21.10.1 • CSA 4.1, ANSI Z21.10.3 • CSA 4.3, ANSI Z21.13 • CSA 4.9, and CSA/ANSI Z21.47 • CSA 2.3, do not specify requirements for venting of combustion gases. UL 1738 specifies requirements for pipe, fittings, and accessories intended for venting of combustion gases.

†These standards do not specify requirements for venting of combustion gases. UL 1738 specifies requirements for pipe, fittings, and accessories intended for venting of combustion gases.

TABLE 702.1 ABOVE-GROUND DRAINAGE AND VENT PIPE

MATERIAL	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic pipe in IPS diameters, including Schedule 40, DR 22 (PS 200) and DR 24 (PS 140); with a solid, cellular core or composite wall	ASTM D2661*; ASTM F628†; ASTM F1488; CSA B181.1*
Cast-iron pipe	ASTM A74; ASTM A888; CISPI 301
Copper or copper-alloy pipe	ASTM B42; ASTM B43; ASTM B302
Copper or copper-alloy tubing (Type K, L, M or DWV)	ASTM B75; ASTM B88; ASTM B251; ASTM B306
Galvanized steel pipe	ASTM A53
Glass pipe	ASTM C1053
Polyolefin pipe	ASTM F1412; ASTM F3371†; CSA B181.3
Polyvinyl chloride (PVC) plastic pipe in IPS diameters, including Schedule 40, DR 22 (PS 200), and DR 24 (PS 140); with a solid, cellular core or composite wall	ASTM D2665*; ASTM F891*; ASTM F1488; CSA B181.2*
Polyvinyl chloride (PVC) plastic pipe with a 3.25-inch O.D. and a solid, cellular core or composite wall	ASTM D2949; ASTM F1488
Polyvinylidene fluoride (PVDF) plastic pipe	ASTM F1673; CSA B181.3
Stainless steel drainage systems, Types 304 and 316L	ASME A112.3.1

*These standards, which are referenced in appliance standards ANSI Z21.10.1 • CSA 4.1, ANSI Z21.10.3 • CSA 4.3, ANSI Z21.13 • CSA 4.9, and CSA/ANSI Z21.47 • CSA 2.3, do not specify requirements for venting of combustion gases. UL 1738 specifies requirements for pipe, fittings, and accessories intended for venting of combustion gases.

†These standards do not specify requirements for venting of combustion gases. UL 1738 specifies requirements for pipe, fittings, and accessories intended for venting of combustion gases.

TABLE 702.2 UNDERGROUND BUILDING DRAINAGE AND VENT PIPE

MATERIAL	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic pipe in IPS diameters, including Schedule 40, DR 22 (PS 200) and DR 24 (PS 140); with a solid, cellular core or composite wall	ASTM D2661*; ASTM F628†; ASTM F1488; CSA B181.1*
Cast-iron pipe	ASTM A74; ASTM A888; CISPI 301
Copper or copper-alloy tubing (Type K, L, M or DWV)	ASTM B75; ASTM B88; ASTM B251; ASTM B306
Polyethylene (PE) plastic pipe (SDR-PR)	ASTM F714
Polyolefin pipe	ASTM F714; ASTM F1412; ASTM F3371†; CSA B181.3
Polyvinyl chloride (PVC) plastic pipe in IPS diameters, including Schedule 40, DR 22 (PS 200) and DR 24 (PS 140); with a solid, cellular core or composite wall	ASTM D2665*; ASTM F891*; ASTM F1488; CSA B181.2*
Polyvinyl chloride (PVC) plastic pipe with a 3.25-inch O.D. and a solid, cellular core or composite wall	ASTM D2949; ASTM F1488
Polyvinylidene fluoride (PVDF) plastic pipe	ASTM F1673; CSA B181.3

MATERIAL	STANDARD
Stainless steel drainage systems, Type 316L	ASME A112.3.1

For SI: 1 inch = 25.4 mm.

*These standards, which are referenced in appliance standards ANSI Z21.10.1 • CSA 4.1, ANSI Z21.10.3 • CSA 4.3, ANSI Z21.13 • CSA 4.9, and CSA/ANSI Z21.47 • CSA 2.3, do not specify requirements for venting of combustion gases. UL 1738 specifies requirements for pipe, fittings, and accessories intended for venting of combustion gases.

†These standards do not specify requirements for venting of combustion gases. UL 1738 specifies requirements for pipe, fittings, and accessories intended for venting of combustion gases.

TABLE 702.3 BUILDING SEWER PIPE

MATERIAL	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic pipe in IPS diameters, including Schedule 40, DR 22 (PS 200) and DR 24 (PS 140); with a solid, cellular core or composite wall	ASTM D2661*; ASTM D2680; ASTM F628†; ASTM F1488; CSA B181.1*
Acrylonitrile butadiene styrene (ABS) plastic pipe in sewer and drain diameters, including SDR 42 (PS 20), PS 35, SDR 35 (PS 45), PS 50, PS 100, PS 140, SDR 23.5 (PS 150) and PS 200; with a solid, cellular core or composite wall	ASTM D2751; ASTM F1488
Cast-iron pipe	ASTM A74; ASTM A888; CISPI 301
Concrete pipe	ASTM C14; ASTM C76; CSA A257.1; CSA A257.2
Copper or copper-alloy tubing (Type K or L)	ASTM B75; ASTM B88; ASTM B251
Polyethylene (PE) plastic pipe (corrugated wall)	ASTM F2947/F2947M
Polyethylene (PE) plastic pipe (profile wall)	ASTM F2763
Polyethylene (PE) plastic pipe (SDR-PR)	ASTM F714
Polypropylene (PP) plastic pipe	ASTM F2764; CSA B182.13
Polyvinyl chloride (PVC) plastic pipe in IPS diameters, including Schedule 40, DR 22 (PS 200) and DR 24 (PS 140); with a solid, cellular core or composite wall	ASTM D2665*; ASTM F891*; ASTM F1488
Polyvinyl chloride (PVC) plastic pipe in sewer and drain diameters, including PS 25, SDR 41 (PS 28), PS 35, SDR 35 (PS 46), PS 50, PS 100, SDR 26 (PS 115), PS 140 and PS 200; with a solid, cellular core or composite wall	ASTM F891*; ASTM F1488; ASTM D3034; CSA B182.2; CSA B182.4
Polyvinyl chloride (PVC) plastic pipe with a 3.25-inch O.D. and a solid, cellular core or composite wall	ASTM D2949; ASTM F1488
Polyvinylidene fluoride (PVDF) plastic pipe	ASTM F1673; CSA B181.3
Stainless steel drainage systems, Types 304 and 316L	ASME A112.3.1
Vitrified clay pipe	ASTM C4; ASTM C700

For SI: 1 inch = 25.4 mm.

*These standards, which are referenced in appliance standards ANSI Z21.10.1 • CSA 4.1, ANSI Z21.10.3 • CSA 4.3, ANSI Z21.13 • CSA 4.9, and CSA/ANSI Z21.47 • CSA 2.3, do not specify requirements for venting of combustion gases. UL 1738 specifies requirements for pipe, fittings, and accessories intended for venting of combustion gases.

†These standards do not specify requirements for venting of combustion gases. UL 1738 specifies requirements for pipe, fittings, and accessories intended for venting of combustion gases.

TABLE 702.4 PIPE FITTINGS

MATERIAL	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic pipe in IPS diameters	ASME A112.4.4; ASTM D2661*; ASTM F628†; CSA B181.1*
Acrylonitrile butadiene styrene (ABS) plastic pipe in sewer and drain diameters	ASTM D2751
Cast iron	ASME B16.4; ASME B16.12; ASTM A74; ASTM A888; CISPI 301
Copper or copper alloy	ASME B16.15; ASME B16.18; ASME B16.22; ASME B16.23; ASME B16.26; ASME B16.29
Glass	ASTM C1053
Gray iron and ductile iron	AWWA C110/A21.10
Polyethylene	ASTM D2683
Polyolefin	ASTM F1412; ASTM F3371†; CSA B181.3
Polyvinyl chloride (PVC) plastic in IPS diameters	ASME A112.4.4; ASTM D2665*; ASTM F1866
Polyvinyl chloride (PVC) plastic pipe in sewer and drain diameters	ASTM D3034
Polyvinyl chloride (PVC) plastic pipe with a 3.25-inch O.D.	ASTM D2949
Polyvinylidene fluoride (PVDF) plastic pipe	ASTM F1673; CSA B181.3
Stainless steel drainage systems, Types 304 and 316L	ASME A112.3.1
Steel	ASME B16.9; ASME B16.11; ASME B16.28
Vitrified clay	ASTM C700

For SI: 1 inch = 25.4 mm.

*These standards, which are referenced in appliance standards ANSI Z21.10.1 • CSA 4.1, ANSI Z21.10.3 • CSA 4.3, ANSI Z21.13 • CSA 4.9, and CSA/ANSI Z21.47 • CSA 2.3, do not specify requirements for venting of combustion gases. UL 1738 specifies requirements for pipe, fittings, and accessories intended for venting of combustion gases.

†These standards do not specify requirements for venting of combustion gases. UL 1738 specifies requirements for pipe, fittings, and accessories intended for venting of combustion gases.

TABLE 702.6 CHEMICAL WASTE DRAINAGE SYSTEM PIPE AND FITTINGS

MATERIAL	STANDARD
Chlorinated polyvinyl chloride (CPVC)	ASTM F2618†
Borosilicate glass	ASTM C1053
High silicon iron	ASTM A518/A518M
Polyolefin	ASTM F1412, CSA B181.3
Polyvinylidene fluoride (PVDF)	ASTM F1673, CSA B181.3

†ASTM F2618 does not specify requirements for venting of combustion gases. UL 1738 specifies requirements for pipe, fittings, and accessories intended for venting of combustion gases.

Staff Analysis: The proposed change is not within the scope of the IPC.

Reason: The purpose of the proposed notes to the tables is to make users of the IPC, including tradespersons, aware that those ASTM and CSA plastic piping standards expressly indicate that they do **not** contain specific provisions for venting of combustion gases.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposal only adds statements for clarity.

P74-24

P75-24

IPC: TABLE 605.5, ASTM Chapter 15 (New), IAPMO Chapter 15 (New)

Proponents: Christopher Adam Smith, Viega, LLC, Codes and Standards Manager for Viega, LLC

2024 International Plumbing Code

Revise as follows:

TABLE 605.5 PIPE FITTINGS

MATERIAL	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic	ASTM D2468
Cast iron	ASME B16.4
Chlorinated polyvinyl chloride (CPVC) plastic	ASSE 1061; ASTM D2846; ASTM F437; ASTM F438; ASTM F439; CSA B137.6
Copper or copper alloy	ASME B16.15; ASME B16.18; ASME B16.22; ASME B16.26; ASME B16.51; ASSE 1061; ASTM F1476; ASTM F1548; ASTM F3226
Cross-linked polyethylene/aluminum/high-density polyethylene (PEX-AL-HDPE)	ASTM F1986
Fittings for cross-linked polyethylene (PEX) plastic tubing	ASSE 1061; ASTM F877; ASTM F1807; ASTM F1960; ASTM F2080; ASTM F2098; ASTM F2159; ASTM F2434; ASTM F2735; ASTM F3347; ASTM F3348; CSA B137.5
Fittings for polyethylene of raised temperature (PE-RT) plastic tubing	ASSE 1061; ASTM D3261; ASTM F1807; ASTM F2098; ASTM F2159; ASTM F2735; ASTM F2769; ASTM F3347; ASTM F3348; CSA B137.18
Gray iron and ductile iron	ASTM F1476; ASTM F1548; AWWA C110/A21.10; AWWA C153/A21.53;
Insert fittings for polyethylene/aluminum/polyethylene (PE-AL-PE) and cross-linked polyethylene/aluminum/cross-linked polyethylene (PEX-AL-PEX)	ASTM F1281; ASTM F1282; ASTM F1974; CSA B137.9; CSA B137.10
Malleable iron	ASME B16.3
Metal (copper alloy) insert fittings for polyethylene/aluminum/polyethylene (PE-AL-PE) and cross-linked polyethylene/aluminum/cross-linked polyethylene (PEX-AL-PEX)	ASTM F1974
Polyethylene (PE) plastic pipe	ASTM D2609; ASTM D2683; ASTM D3261; ASTM F1055; <u>ASTM F3536;</u> CSA B137.1
Polypropylene (PP) plastic pipe or tubing	ASTM F2389; CSA B137.11
Polyvinyl chloride (PVC) plastic	ASTM D2464; ASTM D2466; ASTM D2467; CSA B137.2; CSA B137.3
Stainless steel (Type 304/304L)	ASTM A269; ASTM A312; ASTM A778; ASTM F1476; ASTM F1548; ASTM F3226<u>; IAPMO/ANSI/CAN Z1117</u>
Stainless steel (Type 316/316L)	ASTM A269; ASTM A312; ASTM A778; ASTM F1476; ASTM F1548; ASTM F3226<u>; IAPMO/ANSI/CAN Z1117</u>
Steel	ASME B16.9; ASME B16.11; ASME B16.28; ASTM F1476; ASTM F1548; ASTM F3226<u>; IAPMO/ANSI/CAN Z1117</u>

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428-2959

<u>F3536-22</u> <u>Standard Specification for PE and PP Mechanical Fittings for use on NPS 3 or Smaller Cold-water Service Polyethylene (PE) or Crosslinked Polyethylene (PEX) Pipe or Tubing</u>

IAPMO

IAPMO Group
4755 E. Philadelphia Street
Ontario, CA 91761 USA

<u>IAPMO/ANSI/CAN Z1117</u> <u>Standard for Press Connections</u>

Staff Analysis: A review of the standard proposed for inclusion in the code, ASTM F3536-22 *Standard Specification for PE and PP Mechanical Fittings for use on NPS 3 or Smaller Cold-water Service Polyethylene (PE) or Crosslinked Polyethylene (PEX) Pipe and Tubing* and IAPMO Z1117-2022 *Standard for Press Connections*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: This proposal adds ASTM F3536 "Standard Specification for PE and PP Mechanical Fittings for use on NPS 3 or Smaller Cold-water Service Polyethylene (PE) or Crosslinked Polyethylene (PEX) Pipe or Tubing" as a recognized fitting Standard for PE water service fittings in Table 605.5. The scope of ASTM F3536 covers plastic bodied mechanical fittings for PE or PEX water service pipe. These fittings, commonly produced by Philmac, have a history of successful field use. The ASTM Standard was written to recognize and standardize the performance requirements of this design, and includes sustained pressure, hydrostatic burst, and tensile force requirements. The F3536 Standard was published in 2022 narrowly missing the deadline for addition to the current 2024 edition of IPC, and thus this Proposal seeks to add it to the Code now.

It also seeks to add IAPMO/ANSI/CAN Z1117 "Standard for Press Connections" which is a harmonized standard for press-connect fittings used across North America. It is recognized and enforced in both the United States and Canada and encompasses multiple press-connect materials such as copper, steel, and stainless steel 304 and 316.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The addition of these standards does not increase the cost of construction. The addition of these standards allows for a wider selection of materials but does not make their use mandatory. By including these standards in the code, the options for installers will increase while the cost of construction should stay the same or even decrease.

P75-24

P76-24

IPC: 605.6, CSA Chapter 15 (New)

Proponents: Terry Burger, IAPMO Group, IAPMO Group (terry.burger@asse-plumbing.org)

2024 International Plumbing Code

Revise as follows:

605.6 Flexible water connectors.
Flexible water connectors exposed to continuous pressure shall conform to ASME A112.18.6/CSA B125.6. *Access* shall be provided to all flexible water connectors. Flexible water connectors with excess flow shut-off device shall comply with CSA B125.5/IAPMO Z600

Add new standard(s) as follows:

CSA

CSA Group
8501 East Pleasant Valley Road
Cleveland, OH 44131-5516

CSA B125.5/IAPMO Z600-2022 Flexible Water Connectors with Excess Flow Shut-off Devices.pdf

Staff Analysis: A review of the standard proposed for inclusion in the code, CSA B125.5/IAPMO Z600-2022 *Flexible water Connectors with Excess Flow Shut-off Devices*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: Flexible connects that have integral excess flow devices are not certified to the ASME A112.18.6/CSA B125.6 but rather to CSA B125.5/IAPMO Z600

Bibliography: CSA B125.5/IAPMO Z600

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Products are currently being listed to the CSA B125.5/IAPMO Z600 standard

P76-24

P77-24

IPC: TABLE 605.7

Proponents: Michael Cudahy, PPFA Plastic Pipe and Fittings Association, PPFA Plastic Pipe and Fittings Association (mikec@cmservices.com)

2024 International Plumbing Code

Revise as follows:

TABLE 605.7 VALVES

PIPING MATERIAL	STANDARD
Chlorinated polyvinyl chloride (CPVC) plastic	ASME A112.4.14/CSA B125.14; ASME A112.18.1/CSA B125.1; ASTM F1970; CSA B125.3; IAPMO Z1157; MSS SP-122
Copper or copper alloy	ASME A112.4.14/CSA B125.14; ASME A112.18.1/CSA B125.1; ASME B16.34; CSA B125.3; IAPMO Z1157; MSS SP-67; MSS SP-80; MSS SP-110; MSS SP-139
Cross-linked polyethylene (PEX) plastic	ASME A112.4.14/CSA B125.14; ASME A112.18.1/CSA B125.1; CSA B125.3; IAPMO Z1157; NSF 359
Gray iron and ductile iron	AWWA C500; AWWA C504; AWWA C507; IAPMO Z1157; MSS SP-67; MSS SP-70; MSS SP-71; MSS SP-72; MSS SP-78
Polyethylene of Raised Temperature (PERT)	ASME A112.4.14/CSA B125.14; ASME A112.18.1/CSA B125.1; IAPMO Z1157
Polypropylene (PP) plastic	ASME A112.4.14/CSA B125.14; ASTM F2389; IAPMO Z1157
Polyvinyl chloride (PVC) plastic	ASME A112.4.14/CSA B125.14; ASTM F1970; IAPMO Z1157; MSS SP-122
Stainless steel (Type 304/304L)	ASME A112.4.14/CSA B125.14; IAPMO Z1157
Stainless steel (Type 316/316L)	ASME A112.4.14/CSA B125.14; IAPMO Z1157

Staff Analysis: Standards ASME A112.4.14/CSA B125.14, ASME A112,18.1/CSA B125.1 and IAPMO Z1157 are in the current code.

Reason: This proposal adds a row for PERT valves to match PERT piping.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal adds an optional valve material for use with PERT piping. As this is an option, it is not mandated to be used and therefore there is no impact to the cost of construction.

P77-24

P78-24 Part I

IPC: 605.15, 605.15.2

Proponents: Michael Cudahy, PPFA Plastic Pipe and Fittings Association, PPFA Plastic Pipe and Fittings Association (mikec@cmservices.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

605.15 Chlorinated polyvinyl chloride/aluminum/chlorinated polyvinyl chloride (CPVC/AL/CPVC) pipe and tubing.
Joints between CPVC/AL/CPVC plastic pipe or CPVC fittings shall comply with Sections 605.15.1 and 605.15.2.

Revise as follows:

605.15.2 Solvent cementing.
Joint surfaces shall be clean and free from moisture, and an *approved* primer shall be applied. Solvent cement, orange in color and conforming to ASTM F493, shall be applied to joint surfaces. The joint shall be made while the cement is wet, and in accordance with ASTM D2855. Solvent cement joints shall be permitted above or below ground.

Exception: A primer is not required where all of the following conditions apply:

1. The solvent cement used is *third-party certified* as conforming to ASTM F493.
2. The solvent cement used is yellow <u>or green</u> in color.
3. The solvent cement is used only for joining $^{1}/_{2}$-inch (12.7 mm) through 2-inch-diameter (51 mm) CPVC/AL/CPVC pipe and CPVC fittings.
4. The CPVC fittings are manufactured in accordance with ASTM D2846.
5. The joint is made in accordance with ASTM F3328.

Reason: Green cement was previously added to the CPVC tubing section and should also appear in the composite CPVC tubing section as an option.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Allows for an additional color for cement and would not change costs.

P78-24 Part I

P78-24 Part II

IRC: P2906.9.1.3

Proponents: Michael Cudahy, PPFA Plastic Pipe and Fittings Association, PPFA Plastic Pipe and Fittings Association (mikec@cmservices.com)

2024 International Residential Code

Revise as follows:

P2906.9.1.3 CPVC/AL/CPVC pipe.
Joint surfaces shall be clean and free from moisture, and an *approved* primer shall be applied. Solvent cement, orange in color and conforming to ASTM F493, shall be applied to all joint surfaces. The joint shall be made while the cement is wet, and in accordance with ASTM D2846 or ASTM F493. Solvent-cemented joints shall be installed above or below ground.

Exception: A primer shall not be required where all of the following conditions apply:

1. The solvent cement used is third-party certified as conforming to ASTM F493.
2. The solvent cement used is yellow <u>or green</u> in color.
3. The solvent cement is used only for joining $^1/_2$-inch (12.7 mm) through 1-inch (25 mm) diameter CPVC/AL/CPVC pipe and CPVC fittings.
4. The CPVC fittings are manufactured in accordance with ASTM D2846.

Reason: Green cement was previously added to the CPVC tubing section and should also appear in the composite CPVC tubing section as an option.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Adding a permitted color is not expected to change costs of construction.

P78-24 Part II

P79-24

IPC: 607.2.2.2

Proponents: Ronald George, Plumb-Tech Design & Consulting Services LLC, Self (ron@plumb-techllc.com)

2024 International Plumbing Code

Delete without substitution:

~~**607.2.2.2 Demand recirculation controls for distribution systems.**~~
~~A water distribution system having one or more recirculation pumps that pump water from a heated water supply pipe back to the heated water source through a cold water supply pipe shall be a demand recirculation water system. Pumps shall have controls that comply with both of the following:~~

1. ~~The control shall start the pump upon receiving a signal from the action of a user of a fixture or appliance, sensing the presence of a user of a fixture, or sensing the flow of hot or *tempered water* to a fixture fitting or appliance.~~
2. ~~The control shall limit the temperature of the water entering the cold water piping to 104°F (40°C).~~

Reason: The Plumbing Code has the following Language: *IPC 604.2 System Interconnection*

At the points of interconnection between the hot and cold water supply piping systems and the individual fixtures, appliances or devices, provisions shall be made to prevent flow between such piping systems.

Comment: The above language clearly requires the separation of hot and cold-water systems, and that "provisions shall be made to prevent flow between such piping systems." These provisions typically include check valves and integral check valves in faucets and fixture fittings, which prevent hot water from crossing over into the cold water piping system or cold water crossing over into the hot water piping system. When crossover occurs, hot or warm water can be flushing fixtures, scalding can occur, bacteria, amoeba and pathogens can grow in cold water pipes, and in larger apartment buildings, you could be brushing your teeth with hot or warm water because another tenant decided to install an on-demand cross-connection pump device that is designed to pump hot water into your cold water pipes. Also, the mixing of hot and cold water can create areas of the piping system where temperatures are ideal for Legionella bacteria growth. When Pressure reducing valves or check valves are installed in systems this concept will not work.

Small, demand recirculation pumps were developed to intentionally created a cross-connection, where the device pumps previously heated hot water through the cold water pipes back to the water heater instead of installing a dedicated hot water return pipe. The plumbing code should not be promoting intentional cross-connections and Jerry-rigged plumbing systems. A dedicated return piping system is already required. I support this concept for single family homes where the homeowner lives with the consequences of installing this system. However in a commercial office building or condo building installing one of these systems could force hot water into other tenants cold water piping.

The on-demand recirculation systems, were only successful in the codes because it was popular, not because of safety, because it is not safe! This code provision is not safe and violates the basic principles of plumbing, in addition to being a direct violation of the code section on prohibition of system interconnections stated in code section, 604.2. This code provision creates a conflict in the code and a health and safety issue that could be a liability when an outbreak occurs. I spoke with a few backflow prevention industry people, and they were shocked that the plumbing code would allow such a device. Most of them were not aware of the new section 607.2.2.2 Demand Recirculation Controls for Distribution Systems.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

Approximately $1,850 per on-demand circulator pump

Estimated Immediate Cost Impact Justification (methodology and variables):

Recirculation Systems are already required in the plumbing system when the developed length exceeds 50 feet. The code section proposed for deletion is in conflict with other code sections which prohibit cross connections between hot and cold water systems. Hot or warm water circulated back toward the water heater in the cold water piping system, as the stricken is code section allows, the previously heated hot water will rarely reach the water heater in large cold water distribution systems because the cold water flow rate is many times higher than the circulated water flow rate, so the recirculated flow will be swept away in the cold water distribution to other fixtures. The reason given for using these devices was to save water that was previously heated from being dumped down the drain, but the previously heated hot water that is pumped into the cold water pipes will simply be swept away with the cold water current in the cold water mains and flushed out other fixtures where warm water from the water heater with dissolved metals from the water heater anode rod and bacteria growing in the warm piping system will make the cold water unsuitable for uses like brushing teeth or cooking. When the warm water is flushed from cold water fixtures, it perpetually wastes energy for the life of the building. This cost can be estimated based on the number of times a person enters a bathroom in a given day. and cycles of the circulating pump. in addition to the initial cost of multiple pumps in a building vs one central pump.
Example of excessive costs: In a conventional multi-unit apartment building or similar structure with a central domestic hot water distribution system design there will typically be one, fractional horsepower hot water return circulating pump serving the entire building. With the demand circulator pumps located in every bathroom, and kitchen of an apartment building the following is a summary of the first cost for a circulation system relying on demand circulators within the system.

If the code language proposed to be stricken remains, a building can be constructed with no central hot water circulating pump. and a reliance on demand circulators at each apartment would then be required.

Given a 10-story apartment building, with 24 apartments on every floor where each apartment has two bathrooms and a kitchen sink with a demand circulator, there would be 10 floors x 24 apartments x 3 circulators per apartment unit = 720 On-demand circulating pumps. The cost of each on-demand circulator with proximity sensors is: $450 each materials; + $190 plumbing labor; + $450 electrical power materials. + 4 hours @ 190/hr = 760 electrical labor for dedicated wiring to panel with ground-fault circuit breaker = $1,850 per on-demand circulator pump x750 pumps = $1,387,500.00 initial cost.

The cost of a dedicated recirculation line would be a fraction of the cost of everyone installing an on-demand circulator.

This is a waste of materials and energy when a single circulating pump with balancing can provide adequate circulation for a whole building.

Estimated Life Cycle Cost Impact:

Example of excessive costs: In a conventional multi-unit apartment building or similar structure with a central domestic hot water distribution system design there will typically be one, fractional horsepower hot water return circulating pump serving the entire building.

With the demand circulator pumps located in every bathroom, and kitchen of an apartment building the following is a summary of the first cost for a circulation system relying on demand circulators within the system.

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The cost of a dedicated recirculation line would be a fraction of the cost of everyone installing an on-demand circulator.

This is a waste of materials and energy when a single circulating pump with balancing can provide adequate circulation for a whole building.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

In the United States the US Census bureau statistics say there are approximately 3 people per household. In a multifamily apartment or condominium building, if each person enters the bathroom 4 times a day, there will be approximately 12 circulator pump cycles per day per bathroom plus approximately 4 additional pump cycles for people walking by the proximity sensors triggering a pump cycle. If an apartment building with 720 circulating pumps run for 15 minutes every time a proximity sensor is triggered, then 750 circulating pumps would run for twenty four (24), 15-minute cycles per day vs a single pump running 12 or 24 hours a day.

The energy wasted by pre-heated water being flushed from other fixtures and the running of the circulator pumps would be massive in this 240 unit apartment building example, not to mention the long term dissatisfaction from tenants not getting clean, safe, cold water. The existing language is not safe and this method of circulation should be eliminated.

P79-24

P80-24

IPC: 607.2.3, 607.2.4 (New)

Proponents: Ronald George, Plumb-Tech Design & Consulting Services LLC, Self (ron@plumb-techllc.com)

2024 International Plumbing Code

607.2.3 Piping for recirculation systems having temperature-actuated mixing valves.
Where a temperature-actuated mixing valve is used in a system with a hot water recirculating pump, the *hot water* or *tempered water* return line shall be routed to the cold water inlet pipe of the water heater and the cold water inlet pipe or the hot water return connection of the temperature-actuated mixing valve.

Add new text as follows:

607.2.4 Temperature Gauge at end of Hot Water Return Pipe. A temperature gauge shall be located within 10 feet before the hot water return pipe connection to the water heater.

Reason: ASHRAE 188 and ASHRAE Guideline 12 dealing with control of Legionella in Building water systems recommends having a water management program and maintaining the hot water distribution system above the maximum Legionella bacteria growth temperature of 122 F. This proposal calls for a temperature gauge at the lowest temperature location in the circulated hot water system which is the end of the hot water return pipe, just before the connection the the cold water makeup and the water heater or storage tank. Generally a minimum temperature of 122 to 124 F would need to be maintained at this location to assure that Legionella bacteria will not grow in the hot water system. This code change is intended to allow a building owner to adjust temperature controls with an ASSE 1017 valve to monitor and maintain about 124 F at a temperature gauge at the lowest temperature location in the hot water system. (The end of the Hot water recirculation system).

Effects of Temperature on Legionella Bacteria

Temperature[1]	Result
Below 68F (20C)	Legionella survives, but will not grow/multiply
68 F (20C)	Legionella will double its population in 8 days
77 F (25C)	Legionella will double its population in 3 days
68 to 122 F (20-50C)	Legionella bacteria growth temperature range[3]
95 to 115 F (35-46C)	Ideal Legionella bacteria growth temperature range
Abv 122F & Bel. 131 F	Legionella bacteria survives, will not grow/multiply[2,3]
131 F (55C)	Legionella bacteria dies in 5 to 6 hours[2]
140 F (60C)	Legionella bacteria dies in 32 minutes[2]
151 F (66C)	Legionella bacteria dies in 2 minutes[2]
158 F + (70C+)	Legionella bacteria dies instantly (Disinfection temp.)[2]

Notes:

1. These temperatures are based on laboratory tests. Field conditions may vary due to differences in water quality, insulating properties of host amoeba, biofilm,

   scale and sediment.

2. Verify that the water heater is capable of heating to non-growth or disinfection temperatures.
3. The coolest point in the hot water system (Hot water return pipe) should be a couple of degrees above the highest growth temperature as a safety factor.

   (122F + 2F = 124F, many temperature gauges have a + or – 2F accuracy Locate a temperature gauge just before HW Return connects to Water Heater/Mixing

Valve return tee.)

Cost Impact: Increase

Estimated Immediate Cost Impact:

This will cost about $10-$15 for a temperature gauge in the piping system to allow a building operator to monitor condition in the piping that are conducive to bacterial growth. This will significantly improve the safety of the building and potentially save lives.

Estimated Immediate Cost Impact Justification (methodology and variables):

The cost of a temperature gauge in minimal in order for a building operator to know what is happening in the piping system.

Estimated Life Cycle Cost Impact:

Every time there is a positive test for legionella bacteria it can disrupt building operations. When there is a reported case and an outbreak, the costs can get into the hundreds of thousands of dollars in lost revenue, legal and professional fees, disinfection costs. If there are serious illnesses or deaths associated with an outbrek, the costs can rapidly get into the millions of dollars. The cost of a single temperature gauge at the lowest temperature location in the hot water system is minimal compared to what can happen it the temperature is not monitored and bacteria is allowed to growth and cause disease.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

The cost of not installing a temperature gauge can quickly get into the millions if bacteria causes an outbreak of Legionnaires disease.

P80-24

P81-24 Part I

IPC: 607.3

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

Revise as follows:

607.3 Thermal expansion control.
Where a storage water heater is supplied with cold water that passes through a check valve, pressure reducing valve or backflow preventer, a thermal expansion control device shall be connected to the water heater cold water supply pipe at a point that is downstream of all check valves, pressure reducing valves and backflow preventers. Thermal expansion tanks shall be sized in accordance with the tank manufacturer's instructions and shall be sized such that the pressure in the water distribution system shall not exceed that required by Section 604.8.<u>Thermal expansion tanks shall be supported to the structure with a support rated for the weight of the tank and water in the tank, or shall be floor mounted tanks.</u>

P81-24 Part I

P81-24 Part II

IRC: P2903.4.2

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov)

2024 International Residential Code

Revise as follows:

P2903.4.2 Backflow prevention device or check valve. Where a backflow prevention device, check valve or other device is installed on a water supply system using storage water heating equipment such that thermal expansion causes an increase in pressure, a device for controlling pressure shall be installed.<u>Where a thermal expansion tank is installed, the thermal expansion tank shall be supported to the structure with a support rated for the weight of the tank and water in the tank, or shall be floor mounted tanks.</u>

Reason: In many instances installers are relying on the water heater or storage tank or the water heater or storage tank piping to support the expansion tanks. When replacing the water heater or storage tank becomes necessary, this can be come problematic and/or dangerous for the installer when removing the existing tank. These tanks are not only an extensions of the potable water distribution systems, but they are also classified as appurtenances and should be supported in the same fashion as piping systems but independent of the piping systems.

Bibliography: See reason statement.

Cost Impact: Increase

Estimated Immediate Cost Impact:

Between $70 - $200

Estimated Immediate Cost Impact Justification (methodology and variables):

Between $19 - $30 for a bracket designed to support the expansion tank and depending on the labor market, between $51 - $170 for the installation labor.

P81-24 Part II

P82-24

IPC: 607.3, IAPMO Chapter 15 (New)

Proponents: Terry Burger, IAPMO Group, IAPMO Group (terry.burger@asse-plumbing.org)

2024 International Plumbing Code

Revise as follows:

607.3 Thermal expansion control. Where a storage water heater is supplied with cold water that passes through a check valve, pressure reducing valve or backflow preventer, a thermal expansion control device shall be connected to the water heater cold water supply pipe at a point that is downstream of all check valves, pressure reducing valves and backflow preventers. Thermal expansion tanks shall be sized in accordance with the tank manufacturer's instructions and shall be sized such that the pressure in the water distribution system shall not exceed that required by Section 604.8. <u>Pre-pressurized water expansion tanks shall comply with IAPMO Z1088.</u>

Add new standard(s) as follows:

IAPMO

IAPMO Group
4755 E. Philadelphia Street
Ontario, CA 91761 USA

<u>IAPMO Z1088-19e1</u> <u>Pre-pressurized Water Expansion Tanks</u>

Staff Analysis: A review of the standard proposed for inclusion in the code, IAPMO Z1088-19e1 *Pre-pressurized Water Expansion Tanks*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: This standard provides the minimum safety and performance requirements for pre-pressurized expansion tanks.

Bibliography: IAPMO Z1088-19e1 Pre-pressurized Water Expansion Tanks

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Products are currently listed to this standard.

P82-24

P83-24

IPC: TABLE 608.1, 608.17.1.2, ASSE Chapter 15 (New)

Proponents: George Istefan, Watts Water Technologies (george.istefan@wattswater.com)

2024 International Plumbing Code

Revise as follows:

TABLE 608.1 APPLICATION OF BACKFLOW PREVENTERS

Portions of table not shown remain unchanged.

DEVICE	DEGREE OF HAZARD[a]	APPLICATION[b]	APPLICABLE STANDARDS
Backflow preventer plumbing devices:			
Antisiphon-type fill valves for gravity water closet flush tanks	High hazard	Backsiphonage only	ASSE 1002/ASME A112.1002/CSA B125.12; CSA B125.3
Backflow preventer for carbonated beverage machines	Low hazard	Backpressure or backsiphonage Sizes $^1/_4$″– $^1/_2$″	ASSE 1022
Backflow preventer for carbonated and non-carbonated beverage machines.	Low Hazard	Backpressure or backsiphonage Sizes 1/4″–1/2″	ASSE 1032
Backflow preventer with intermediate atmospheric vents	Low hazard	Backpressure or backsiphonage Sizes $^1/_4$″–$^3/_4$″	ASSE 1012; CSA B64.3
Backflow preventer with intermediate atmospheric vent and pressure-reducing valve.	Low hazard	Backpressure or backsiphonage Sizes $^1/_2$″–$^3/_4$″	ASSE 1081
Dual-check-valve-type backflow preventer	Low hazard	Backpressure or backsiphonage Sizes $^1/_4$″–2″	ASSE 1024; CSA B64.6
Hose connection backflow preventer	High or low hazard	Low head backpressure, rated working pressure, backpressure or backsiphonage Sizes $^1/_2$″–1″	ASME A112.21.3; ASSE 1052; CSA B64.2.1.1
Hose connection vacuum breaker	High or low hazard	Low head backpressure or backsiphonage Sizes $^1/_2$″, $^3/_4$″, 1″	ASME A112.21.3; ASSE 1011; CSA B64.2; CSA B64.2.1
Laboratory faucet backflow preventer	High or low hazard	Low head backpressure and backsiphonage	ASSE 1035; CSA B64.7
Pipe-applied atmospheric-type vacuum breaker	High or low hazard	Backsiphonage only Sizes $^1/_8$″–8″	ASSE 1001; CSA B64.1.1
Vacuum breaker wall hydrants, frost-resistant, automatic-draining-type	High or low hazard	Low head backpressure or backsiphonage Sizes $^3/_4$″, 1″	ASME A112.21.3; ASSE 1019; CSA B64.2.2

For SI: 1 inch = 25.4 mm.

a. Low hazard—See Pollution (Section 202).

High hazard—See Contamination (Section 202).

b. See Backpressure, low head (Section 202, Backflow).

See Backsiphonage (Section 202, Backflow).

608.17.1.2 Coffee machines and noncarbonated drink dispensers.
The water supply connection to each coffee machine and each noncarbonated beverage dispenser shall be protected against backflow by a backflow preventer conforming to ASSE 1022 or ASSE 1024, ASSE 1032, or protected by an *air gap*.

Add new standard(s) as follows:

ASSE

ASSE International
18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448

ASSE/ANSI 1032-23	Dual Check Valve Type Backflow Preventers for Carbonated Beverage Dispensers, Post Mix Type, and Non-Carbonated Beverage Dispensers

Staff Analysis: A review of the standard proposed for inclusion in the code, ASSE 1032-23 *Dual Check Valve Type Backflow Preventers for Carbonated Beverage Dispensers, Post Mix Type, and Non-Carbonated Beverage Dispensers* , with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: ASSE/ANSI 1032-2023 *“Dual Check Valve Type Backflow Preventers for Carbonated Beverage Dispensers, Post Mix Type, and Non-Carbonated Beverage Dispensers”* has been published and the title was updated to include the approval for applications that are carbonated and non-carbonated. The previous version of the standard did not include non-carbonated and was the basis for rejection in the last code cycle. ASSE technical committees reviewed the design and materials of the ASSE 1032 backflow preventors and verified that they exceed the requirements for non-carbonated applications. This title change will provide increased design flexibility and inclusion in the IPC will allow acceptance by AHJs.

Bibliography: Links date: 11-29-2023

Zurn 1022

https://www.grainger.com/product/454N98?gucid=N:N:PS:Paid:GGL:CSM-2295:4P7A1P:20501231&gad_source=1&gclid=EAIaIQobChMI6d_p9Z37ggMVRmJHAR1O-gkwEAQYASABEgLT8fD_BwE&gclsrc=aw.ds

Zurn 1032

https://www.grainger.com/product/454N98?gucid=N:N:PS:Paid:GGL:CSM-2295:4P7A1P:20501231&gad_source=1&gclid=EAIaIQobChMI6d_p9Z37ggMVRmJHAR1O-gkwEAQYASABEgLT8fD_BwE&gclsrc=aw.ds

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The approval of this proposal will allow designers the flexibility to specify, and AHJs to approve check valves specifically intended for use in potable water systems. Costs for the original purchase, installation and life cycle of the proposed additional valve are very similar to the currently approved check valve. These valves are small and are generally replaced versus being field repaired.

P83-24

P84-24 Part I

IPC: 608.9

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

Revise as follows:

608.9 Identification of nonpotable water systems.
Where nonpotable water distribution systems are installed, the piping conveying the nonpotable water shall be identified either by color marking, metal tags or tape in accordance with Sections 608.9.1 through 608.9.2.3.

P84-24 Part I

P84-24 Part II

IRC: P2901.2

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Residential Code

Revise as follows:

P2901.2 Identification of nonpotable water systems.
Where *nonpotable* water distribution systems are installed, the piping conveying the nonpotable water shall be identified either by color marking, metal tags or tape in accordance with Sections P2901.2.1 through P2901.2.2.3.

Reason: This section has been misinterpreted to mean that all nonpotable water system piping needed to be labeled. For example, the collection piping for greywater. This section only applies to nonpotable water distribution systems.

This proposal is submitted by the ICC Plumbing Mechanical Gas Code Action Committee (PMGCAC)

PMGCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 PMGCAC has held 26 virtual meetings open to any interested party. In addition, there were several virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the PMGCAC website at PMGCAC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal only clarifies which water systems need identified so that labeling is not applied where no labeling was intended.

P84-24 Part II

P85-24

IPC: 608.12, 608.12.1 (New), ASSE Chapter 15 (New)

Proponents: Erin Coffman, Water Systems Council, Water Systems Council

2024 International Plumbing Code

608.12 Potable water tanks.
Where in contact with potable water intended for drinking water, water tanks, coatings for the inside of tanks and liners for water tanks shall conform to NSF 61. The interior surface of a potable water tank shall not be lined, painted or repaired with any material that changes the taste, odor, color or potability of the water supply when the tank is placed in, or returned to, service.

Add new text as follows:

608.12.1 Pressurized potable water tanks. Pressurized potable water tanks for well water systems shall comply with ASSE 1099/WSC-PST.

Add new standard(s) as follows:

ASSE

ASSE International
18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448

1099-2022/WSC-PST-2000/2022 Performance Requirements for Pressurized Water Storage Tanks

Staff Analysis: A review of the standard proposed for inclusion in the code, ASSE #1093-2019 (R2023) WSC Standard PAS-97(2019) (R2023) *Performance Requirements for Pitless Adapters, Pitless Units, and Well Caps* , with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: Currently, pressurized water storage tanks for water well systems are not stringently regulated; countries and municipalities may elect to implore oversight, or they may ignore the need to qualify pressure vessels within residences. In general, pressurized water tanks are not included within the scope of in-home inspections and see very little oversight in the majority of communities. As of now, some manufacturers elect to certify their production to ASSE-1099-2022/WSC-PST-2000/2022, but it is not mandatory from a plumbing code level. It is the contention of The Water Systems Council that all pressurized water storage vessels sold to the consumer market should be qualified through certification to ASSE-1099-2022/WSC-PST-2000/2022.

ASSE-1099-2022/WSC-PST-2000/2022effectively qualifies the structural integrity of pressurized water storage vessels through the prescription of construction materials, methods of manufacture, water quality extraction testing, labeling requirements, proof testing schedules and ultimate yield strength requirements. The tanks covered under this standard are up to 120 gallons in volume and designed for a maximum working pressure up to 150 PSI. These guidelines impress upon the industry the requirements for a safe and reliable product for the consumer market.

The consumer market for these products is predominantly residential dwellings in areas without municipal water service. The vessel is installed within the home as part of the plumbed domestic well water system. Water and air are stored within the pressure bearing components of the vessel for the duration of the product lifecycle; it is imperative to the safety of the residents that the integrity of pressure containment vessel is not compromised leading to the release of stored energy. This standard lays out simple and effective guidelines to ensure the continued integrity of the vessel over years of service under all expected conditions.

It would be in the best interest of the municipalities, contractors, and consumers for the structural integrity of these vessels to be covered by the International Plumbing Code through the adoption of ASSE-1099-2022/WSC-PST-2000/2022.

Bibliography: ASSE-1099-2022/WSC-PST-2000/2022

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Existing standard, products in the marketplace currently listed to the standard. Reference the product listing: https://www.watersystemscouncil.org/resources/well-standards/ansiwsc-pst/

P85-24

P86-24 Part I

IPC: 608.15, 608.15.1 (New), 608.15.1.1 (New)

Proponents: Dennis Hart, Fairfax County, Virginia, Virginia Plumbing and Mechanical Inspectors Association (VPMIA) and Virginia Building and Code Officials Association (VBCOA) (dennis.hart@fairfaxcounty.gov)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

Revise as follows:

608.15 Location of backflow preventers.
Access shall be provided to backflow preventers ~~as specified by the manufacturer's instructions~~.

Add new text as follows:

608.15.1 Backflow Prevention Assemblies. Backflow prevention assemblies indicated in Table 608.1 shall be installed between 12 inches (305 mm) and 60 inches (1525 mm) above grade, floor level or service platform.

608.15.1.1 Backflow prevention devices. Access shall be provided to backflow prevention devices.

P86-24 Part I

P86-24 Part II

IRC: P2902.6, P2902.6.1 (New), P2902.6.1.2 (New)

Proponents: Dennis Hart, Fairfax County, Virginia, Virginia Plumbing and Mechanical Inspectors Association (VPMIA) and Virginia Building and Code Officials Association (VBCOA) (dennis.hart@fairfaxcounty.gov)

2024 International Residential Code

Revise as follows:

P2902.6 Location of backflow preventers.
Access shall be provided to backflow preventers as ~~specified by the manufacturer's installation instructions~~.

Add new text as follows:

P2902.6.1 **Backflow Prevention Assemblies.** Backflow prevention assemblies indicated in Table 608.1 shall be installed between 12 inches (305 mm) and 60 inches (1525 mm) above grade, floor level or service platform.

P2902.6.1.2 **Backflow prevention devices.** Access shall be provided to backflow prevention devices.

Reason: Per the definition found in Chapter 2, "backflow preventers" include both backflow prevention assemblies, which require annual testing, and backflow prevention devices which typically do not. The current code specifies that access shall be provided to backflow prevention assemblies per the manufacturer's installation instructions, but there are some manufacturers of backflow prevention assemblies that do not provide specific requirements for access. Since the current code requires backflow prevention assemblies be installed per the manufacturer's installation instructions, and some manufacturers do not provide guidance, often there is inadequate access to inspect, test, service, repair or replace the backflow prevention assembly. This proposal provides minimum requirements to follow if the manufacturer does not provide adequate requirements for access to a backflow prevention assembly. This proposal also separates backflow prevention assemblies and backflow prevention devices and clarifies that access is required to backflow prevention devices either by the definition in Chapter 2, or by the manufacturers requirements if they are more restrictive. While a backflow prevention device may not be required to be tested annually and require less maintenance than a backflow prevention assembly, these devices still need to be accessible for repair and replacement.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Access is already required for backflow preventers. This change simply provides more details to these access requirements that should not increase the cost of construction.

P86-24 Part II

P87-24

IPC: 608.17.1.1, ASSE Chapter 15 (New)

Proponents: George Istefan, Watts Water Technologies (george.istefan@wattswater.com)

2024 International Plumbing Code

Revise as follows:

608.17.1.1 Carbonated beverage dispensers.
The water supply connection to each carbonated beverage dispenser shall be protected against backflow by a backflow preventer conforming to ASSE 1022, ASSE 1032, or by an *air gap*. The portion of the backflow preventer device downstream from the second check valve of the device and the piping downstream therefrom shall not be affected by carbon dioxide gas.

Add new standard(s) as follows:

ASSE

ASSE International
18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448

ASSE/ANSI 1032-23	Dual Check Valve Type Backflow Preventers for Carbonated Beverage Dispensers, Post Mix Type, and Non-Carbonated Beverage Dispensers

Staff Analysis: A review of the standard proposed for inclusion in the code, ASSE/ANSI 1032-23 *Dual Check Valve Type Backflow Preventers for Carbonated Beverage Dispensers, Post Mix Type, and Non-Carbonated Beverage Dispensers*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: ASSE/ANSI 1032-2023 *"Dual Check Valve Type Backflow Preventers for Carbonated Beverage Dispensers, Post Mix Type, and Non-Carbonated Beverage Dispensers"* has been published and the title was updated to include the approval for applications that are carbonated and non-carbonated. The previous version of the standard did not include non-carbonated and was the basis for rejection in the last code cycle. ASSE technical committees reviewed the design and materials of the ASSE 1032 backflow preventors and verified that they exceed the requirements for non-carbonated applications. This title change will provide increased design flexibility and inclusion in the IPC will allow acceptance by AHJs.

Bibliography: Links date: 11-29-2023

Zurn 1022

https://www.grainger.com/product/454N98?gucid=N:N:PS:Paid:GGL:CSM-2295:4P7A1P:20501231&gad_source=1&gclid=EAIaIQobChMI6d_p9Z37ggMVRmJHAR1O-gkwEAQYASABEgLT8fD_BwE&gclsrc=aw.ds

Zurn 1032

https://www.grainger.com/product/454N98?gucid=N:N:PS:Paid:GGL:CSM-2295:4P7A1P:20501231&gad_source=1&gclid=EAIaIQobChMI6d_p9Z37ggMVRmJHAR1O-gkwEAQYASABEgLT8fD_BwE&gclsrc=aw.ds

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The approval of this proposal will allow designers the flexibility to specify, and AHJs to approve check valves specifically intended for use in potable water systems. Costs for the original purchase, installation and life cycle of the proposed additional valve are very similar to the currently approved check valve. These valves are small and are generally replaced versus being field repaired.

P87-24

P88-24

IPC: 608.17.1.1

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Plumbing Code

Revise as follows:

608.17.1.1 Carbonated beverage dispensers.
The water supply connection to each carbonated beverage dispenser shall be protected against backflow by a backflow preventer conforming to ASSE 1013, ASSE 1022 or by an *air gap*. The portion of the backflow preventer device downstream from the second check valve of the device and the piping downstream therefrom shall not be affected by carbon dioxide gas.

Staff Analysis: The proposed standard is in the current edition of the code.

Reason: Some designers could prefer to use an RPP because of their reliability over a long period of time and its testability to ensure that the device is still functioning as intended.

This proposal is submitted by the ICC Plumbing Mechanical Gas Code Action Committee (PMGCAC)

PMGCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 PMGCAC has held 26 virtual meetings open to any interested party. In addition, there were several virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the PMGCAC website at PMGCAC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The addition to the code text provides for more choices for the designer. The code does not mandate the device selection.

P88-24

P89-24

IPC: 608.17.4.1

Proponents: Jason Shank, ASSE International, ASSE International (jshank@plumbers55.com)

2024 International Plumbing Code

Revise as follows:

608.17.4.1 Additives or nonpotable source.
Where systems under continuous pressure contain chemical additives or antifreeze, or where systems are connected to a nonpotable secondary water supply, the potable water supply shall be protected against backflow by a reduced pressure principle backflow prevention assembly or a reduced pressure principle fire protection backflow prevention assembly conforming to ASSE 1013 or ASSE 1047. Where chemical additives or antifreeze are added to only a portion of an automatic sprinkler system or standpipe system, the reduced pressure principle backflow prevention assembly or the reduced pressure principle fire protection backflow prevention assembly shall be permitted to be located so as to isolate that portion of the system. Where systems are not under continuous pressure, the potable water supply shall be protected against backflow by an *air gap* or an atmospheric vacuum breaker conforming to ASSE 1001 or CSA B64.1.1.

Staff Analysis: The proposed standards are in the current edition of the code.

Reason: Adding the ASSE Standards Numbers to be included along with the titles of the standards will allow reference either to the name or the number of the standards.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is not adding any requirements to the current code section.

P89-24

P90-24

IPC: TABLE 608.1, 608.17.11 (New), ASSE Chapter 15 (New)

Proponents: Jason Shank, ASSE International, ASSE International (jshank@plumbers55.com)

2024 International Plumbing Code

Revise as follows:

TABLE 608.1 APPLICATION OF BACKFLOW PREVENTERS

Portions of table not shown remain unchanged.

DEVICE	DEGREE OF HAZARD[a]	APPLICATION[b]	APPLICABLE STANDARDS
Other means or methods:			
Air gap	High or low hazard	Backsiphonage or backpressure	ASME A112.1.2
Air gap fittings for use with plumbing fixtures, appliances and appurtenances	High or low hazard	Backsiphonage or backpressure	ASME A112.1.3
Barometric loop	High or low hazard	Backsiphonage only	(See Section 608.14.4)
<u>Dual check backflow preventer wall hydrants, freeze resistant</u>	<u>High or low hazard</u>	<u>Backsiphonage or Backpressure</u>	<u>ASSE 1053</u>

For SI: 1 inch = 25.4 mm.

a. Low hazard—See Pollution (Section 202).

High hazard—See Contamination (Section 202).

b. See Backpressure, low head (Section 202, Backflow).

See Backsiphonage (Section 202, Backflow).

Add new text as follows:

<u>**608.17.11**</u> <u>**Dual Check Backflow Preventer Wall Hydrants-Freeze Resistant Type**</u>**.** <u>Dual check backflow preventer wall hydrants, freeze resistant type, shall conform to ASSE 1053.Such hydrants shall not be exposed to continuous pressure conditions.</u>

-

Add new standard(s) as follows:

ASSE

ASSE International
18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448

<u>1053-2019(R2023)</u> <u>Performance Requirements for Dual Check Backflow Preventer Wall Hydrants-Freeze Resistant Type</u>

Staff Analysis: A review of the standard proposed for inclusion in the code, ASSE 1053-2019(R2023) *Performance Requirements for Dual Check Backflow Preventer Wall Hydrants-Freeze Resistant Type*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: Dual Check Backflow Preventer Wall Hydrants – Freeze Resistant Type. Dual Check Backflow Preventer Wall Hydrants – Freeze Resistant Type shall confirm to ASSE 1053. The device provides protection of the potable water supply from contamination due to backsiphonage or backpressure without damage to the device due to freezing. The device shall only be used on systems where there is low-head backpressure that does not exceed that generated by an elevated hose equal to or less than 10.0 ft (3.0 m) in height. The device shall not be subjected to more than 12 hours of continuous water pressure. The device consists of two independent checks, force-loaded or biased to a closed position, with an atmospheric vent located between the two check valves, which is force-loaded or biased to an open position, and a means for attaching a hose. They shall be installed in accordance with the manufacturer's instructions.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Giving another option for the protection of the system.

P91-24

IPC: TABLE 608.1, 608.17.11 (New), ASSE Chapter 15 (New)

Proponents: Jason Shank, ASSE International, ASSE International (jshank@plumbers55.com)

2024 International Plumbing Code

Revise as follows:

TABLE 608.1 APPLICATION OF BACKFLOW PREVENTERS

Portions of table not shown remain unchanged.

DEVICE	DEGREE OF HAZARD[a]	APPLICATION[b]	APPLICABLE STANDARDS
Other means or methods:			
Air gap	High or low hazard	Backsiphonage or backpressure	ASME A112.1.2
Air gap fittings for use with plumbing fixtures, appliances and appurtenances	High or low hazard	Backsiphonage or backpressure	ASME A112.1.3
Barometric loop	High or low hazard	Backsiphonage only	(See Section 608.14.4)
Freeze resistant sanitary yard hydrants	High or low hazard	Backsiphonage only	ASSE 1057

For SI: 1 inch = 25.4 mm.

a. Low hazard—See Pollution (Section 202).

   High hazard—See Contamination (Section 202).

b. See Backpressure, low head (Section 202, Backflow).

   See Backsiphonage (Section 202, Backflow).

Add new text as follows:

608.17.11 Freeze resistant sanitary yard hydrants. Freeze resistant sanitary yard hydrants shall conform to ASSE 1057. Such hydrants shall not be exposed to continuous pressure conditions.

Add new standard(s) as follows:

ASSE

ASSE International
18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448

1057-2012 Performance Requirements for Freeze Resistant Sanitary Yard Hydrants with Backflow Protection

Staff Analysis: A review of the standard proposed for inclusion in the code, ASSE 1057-2012 *Freeze Resistant Sanitary Yard Hydrant with Backflow Protection* , with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: Freeze Resistant Sanitary Yard Hydrants with Backflow Protection. Freeze resistant sanitary yard hydrants with backflow prevention shall conform to ASSE 1057. Freeze Resistant Sanitary Yard Hydrants protect the potable water supply from backflow contamination and ground water contamination. Hydrants that comply with ASSE 1057 do not contain a stop and waste or weep hole feature. The standard lists five types of yard hydrants. Type 1, which provides protection with two check valves and an atmospheric vent and does not require removal of the hose to provide freeze protection; Type 2, which provides protection with two check valves and an atmospheric vent and requires removal of the hose to provide freeze protection; Type 3, which provides protection with one check valve and an atmospheric vent and does not require removal of the hose to provide freeze protection; Type 4, which provides protection with one check valve and an atmospheric vent and requires removal of the hose to provide freeze protection; and Type 5, which has an air gap or removable backflow protection device and requires removal of the backflow protection device and hose to provide freeze protection. They shall be installed in accordance with the manufacturer's instructions.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Adds to options for something already required.

P91-24

P92-24

IPC: 608.18.9 (New), SECTION 202 (New), ASSE Chapter 15 (New)

Proponents: Erin Coffman, Water Systems Council, Water Systems Council

2024 International Plumbing Code

Add new text as follows:

608.18.9 Pitless adapters, pitless units, and sanitary well caps. Pitless adapters, pitless units, and sanitary well caps shall comply with ASSE 1093/WSC PAS-97.

Add new definition as follows:

Pitless Adapter.
A device designed to attach to one or more openings through a well casing. to provide access to water system parts within the well.

Pitless Unit. An assembly that extends the upper end of the well casing from below the frostline to above grade. Its purpose is to prevent the entrance of contaminants or pollutants into the well water supply, to conduct water from the well, to protect the water from freezing or extremes of temperature, and to provide full access to the well and to water system parts within the well.

Sanitary Well Cap.
A device that covers and encloses the upper termination of a pitless unit or the well casing to provides protection to the top, exposed portion of the well casing.

Add new standard(s) as follows:

ASSE

ASSE International
18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448

#1093-2019 (R2023) WSC Standard PAS-97(2019)(R2023)	Performance Requirements for Pitless Adapters, Pitless Units, and Well Caps

Staff Analysis: A review of the standard proposed for inclusion in the code, ASSE #1093-2019 (R2023) WSC Standard PAS-97(2019) (R2023) *Performance Requirements for Pitless Adapters, Pitless Units, and Well Caps* , with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: A common system for supplying potable water is a private water well. There are approximately 47 million people that are using private wells for water supply in the United States (US Geological Survey).

Well pits are potentially unsanitary method of providing access to lateral pipe connections below ground level on individual water systems. There is a health and safety concern for some unregulated systems because pits will cause unsanitary conditions when not properly built and are commonly contaminated from near surface sources that can drain into the pit and well.

Pitless adapter wells are common replacements for above ground well houses and well pits, improving sanitation, convenience, frost protection, and vandalism security. The ASSE 1093/WSC PAS-97 is an ANSI designated standard which guides the end user with pitless well construction and sharply eliminates the possibility of contaminated water entering the well and system, allowing these systems to be more resilient to the surroundings.

While some products for well construction such as casing are covered in the UPC/IPC codes, there is a need to also include pitless adapters, pitless units, and sanitary well caps that provide the connection to the well casing. The pitless and the well cap are the connection of the water supply to the home from the well and protect the well from contamination. These well components are also often not covered by health departments or home inspections, as inspection requirements vary by state and local jurisdiction. Many state health departments do not have jurisdiction or require water well inspections. The source of water connection to the well and casing needs to be included in the plumbing code for the millions of homes with water wells.

The standard covers pitless adapters, pitless units, and sanitary well caps that are part of a pitless well system. These components are critical to well water supply systems as they protect the system's parts and potable water supply. The addition of the provision in the proposed Section 605.17 (Connections to Private Wells) will give the end user and local jurisdictions minimum necessary requirements for safety aspects and dependable performance standards. Additionally, Section 602.4 (Approved by Authority) is needed to guide the end user to Section 605.17 for private wells where permitted).

Bibliography: ASSE 1093-2019(R2023), WSC PAS-97 (2019) (R2023)

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Existing standard, products in the marketplace are listed to the standard. Reference for product listings: https://www.watersystemscouncil.org/pas-97-listing-of-products-meeting-the-standard/

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P93-24

IPC: SECTION 609, 609.1, 609.3 (New), 609.3.1 (New), 609.3

Proponents: Jeff O'Neil, Chair, Committee on Healthcare (ahc@iccsafe.org)

2024 International Plumbing Code

SECTION 609
HEALTH CARE PLUMBING

609.1 Scope.
This section shall govern those aspects of health care plumbing systems that differ from plumbing systems in other structures. Health care plumbing systems shall conform to the requirements of this section in addition to the other requirements of this code. The provisions of this section shall apply to the special devices and equipment installed and maintained in the following *occupancies* : Group I-1, Group I-2, ambulatory care facilities, medical offices, research and testing laboratories, and Group F facilities manufacturing pharmaceutical drugs and medicines.

Add new text as follows:

609.3 Water. Water shall be provided in health care facilities in accordance with Section 609.3.1 and 609.3.2.

609.3.1 Hand-washing water. Hand-washing water shall be provided to all dedicated handwashing stations. Water with a temperature not less than 45 degrees F (13 C) and not greater than 85 F degrees (32 C) or not less than 105 degrees F (40 C) to 120 degrees F (49 C), shall be delivered from dedicated hand-washing stations. Water shall be delivered through an approved water-temperature limiting device that conforms to ASSE 1070/ASME A112.1070/CSA B125.70.

Revise as follows:

~~609.3~~ 609.3.2 Hot water.
Other than at dedicated hand washing stations, *hot* ~~*Hot*~~ *water* shall be provided to supply all of the hospital fixture, kitchen and laundry requirements. Special fixtures and equipment shall have hot water supplied at a temperature specified by the manufacturer. The hot water system shall be installed in accordance with Section 607.

Staff Analysis: The proposed standard is in the current edition of the code.

Reason: The purpose of this change is to allow for maximum amount of handwashing options in a hospital setting, while considering optimal operating performance of systems. In addition to the proven effectiveness of handwashing against COVID-19, other pathogens such as Legionella are a primary concern for healthcare facilities. Water systems are constantly being optimized to In addition, use of higher water temperature increases energy consumption, and therefore having alternate options for handwashing would be beneficial from an environmental standpoint. Even if ABHR is used, it is not recommended for use when hands are heavily soiled or greasy, also per the CDC (Show Me the Science – When & How to Use Hand Sanitizer in Community Settings | Handwashing | CDC). From that article, the “CDC recommends washing hands with soap and water whenever possible because handwashing reduces the amounts of all types of germs and chemicals on hands.”

Hospital water systems do not directly reflect outside weather conditions in terms of temperature. Systems generally receive water from municipal mains at about 45 degrees minimum. To combat pathogens such as Legionella, CDC recommendations are to maintain cold water temperature at approximately 68 degrees, based on standard ASHRAE 12-2020. This is achieved by simple circulation of the water through the interior system of the hospital, where indoor air temperatures are maintained. Systems heat water, and also chilled water, to operational temperatures, but water from the cold water tap is not extreme in temperature. This dispels the notion of the “Minnesota Effect,” which was a concern in the debate and discussion during the Committee Action Hearings on this code change.

Also, during proper handwashing, use of soap accounts for most of the 20 seconds recommended for hand scrubbing. Hands are only under the water briefly at the beginning, to rinse hands, and then at the end to rinse off the soap. Based on CDC observations, found at

Frequent Questions About Hand Hygiene | Handwashing | CDC the effectiveness of the soap is not related to water temperature. Per the CDC, on the topic of use of warm water or cold water for handwashing, “[u]se your preferred water temperature – cold or warm – to wash your hands. Warm and cold water remove the same number of germs from your hands. The water helps create soap lather that removes germs from your skin when you wash your hands. Water itself does not usually kill germs; to kill germs, water would need to be hot enough to scald your hands.” Other studies suggest that cold water handwashing is actually more effective than warm water handwashing, including elimination of a number of pathogens as noted in Quantifying the Effects of Water Temperature, Soap Volume, Lather Time, and Antimicrobial Soap as Variables in the Removal of Escherichia coli ATCC 11229 from Hands (https://meridian.allenpress.com/jfp/article/80/6/1022/200017/Quantifying-the-Effects-of-Water-Temperature-Soap). In brief, “the results of this study indicate that water temperature is not a critical factor for the removal of transient microorganisms from hands.”

Regarding data surrounding Legionella testing, ASHRAE 188-2017 requires a testing program to determine growth of Legionella at cooling towers and domestic water systems. The purpose for testing is to treat the water before the pathogen grows to lethal levels. In 2017, as noted in Legionellosis Report 2017 (pa.gov), the top jurisdictions had a total of 7,458 cases of Legionella. The monumental Legionnaires Disease outbreak of 1976 at the Bellevue Stratford Hotel in Philadelphia had 182 reported cases with 29 deaths, for a 15.9% death rate. There have been more recent outbreaks in 2017 at Lenox Hill Hospital in New York, and in relation to the Flint, MI water crisis in 2019. Water testing programs are instituted throughout the united states to avoid such a catastrophic result, so systems can be properly cleaned before they reach an outbreak level.The complexities of encouraging handwashing, while mitigating pathogens such as Legionella and COVID-19, are a balance that hospitals face regularly. This change to allow cold handwashing affords another tool to successfully create the safest environment possible.

This proposal is submitted by the ICC Committee for Healthcare (CHC).
The Committee on Healthcare (CHC) was established by the ICC Board of Directors in 2011 to pursue opportunities to study and develop effective and efficient provisions for Hospital, Nursing Homes, Assisted Living and Ambulatory Care Facilities. This committee was formed in cooperation with the American Society for Healthcare Engineering (ASHE). In July of 2017, the ICC Board made CHC a standing committee. In 2023 the CHC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the CHC website at CHC webpage.

Bibliography: 1. Carrico AR, Spoden M, Wallston KA, Vandenbergh MP. The Environmental Cost of Misinformation: Why the Recommendation to Use Elevated Temperatures for Handwashing is Problematic. Int J Consum Stud. 2013;37(4):433-441. doi:10.1111/ijcs.12012

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is an option for hospitals for water temperature and will not change the requirements for construction of the dedicated handwashing stations or the piping.

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IPC: 610.1

Proponents: Ronald George, Plumb-Tech Design & Consulting Services LLC, Self (ron@plumb-techllc.com)

2024 International Plumbing Code

Revise as follows:

610.1 General.

New potable water systems and systems or portions of systems that have been shut down for renovations shall be purged of deleterious matter and disinfected prior to utilization. The method followed shall be documented and contain, at a minimum, the factors set forth below. ~~That prescribed by the health authority or water purveyor having jurisdiction or, in the absence of a prescribed method, the procedure described in either AWWA C651 or AWWA C652, or as described in this section.~~ This requirement shall apply to all domestic water distribution systems before they are put into service. ~~“on-site” or “in-plant” fabrication of a system or to a modular portion of a system.~~

1. Remove all strainers, filters, and equipment connections. ~~The pipe system shall be flushed with clean, potable water until dirty water does not appear at the points of outlet.~~

2. Flush the piping distribution system and branches with potable water at a flow velocity of at least three (3) feet per second for a minimum of three (3) seconds. For a building with greater than 100 feet of developed length of pipe from the building water entrance to the farthest fixture, flush three minutes for each 100 feet of developed length of pipe.

~~2.~~ 3. The system or part thereof shall be filled with a water/chlorine solution containing a minimum of 10 parts per million of chlorine and not exceeding 20 parts per million of chlorine for a minimum of 10 hours and a maximum of 24 hours. Verify the maximum ppm chlorine level and contact time with the manufacturer for each pipe material on the project prior to the disinfection process. ~~The system or part thereof shall be filled with a water/chlorine solution containing not less than 50 parts per million (50 mg/L) of chlorine, and the system or part thereof shall be valved off and allowed to stand for 24 hours; or the system or part thereof shall be filled with a water/chlorine solution containing not less than 200 parts per million (200 mg/L) of chlorine and allowed to stand for 3 hours.~~

~~3.~~ 4. Following the required minimum contact ~~standing~~ time, the system shall be flushed with clean potable water until the chlorine is purged from the system.

~~4~~ 5. The procedure shall be repeated where shown by a bacteriological examination that contamination remains present in the system.

6. Document the method used in a: "Flushing, Disinfection, and Purge" report, which shall be provided to the code official and the building owner upon completion. The report shall include, at a minimum, the start and end times and the flushing time at each fixture; the ppm level; the start time of fill and the start time of post-disinfection flush; the ppm levels, contact times, and post purge time; and chlorine level post purge.

Reason: AWWA C651 and AWWA C652 standards for Disinfection of Water mains are not applicable and not easily converted for use in building piping systems. For example the smallest pipe size listed in the AWWA C651 Standard is 4-inch diameter pipe. The vast majority of plumbing pipes within buildings is of different pipe materials than identified in the water main standard. For pipes smaller than 4-inches, there is no direction for flow velocities for flushing. The chemicals and disinfection methods used in public water mains through fire hydrants are not applicable for plumbing pipes in buildings. There is no chemical compatibility information for the pipe materials used inside buildings.

Many new plumbing systems have been destroyed because the current disinfection method has a minimum chlorine level, but no maximum chlorine level. Excessive disinfection chemical concentrations and extended contact times without post disinfection purging have led to failed piping systems within a very short time after construction.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Flushing and disinfection is already required; this change just seeks to ensure that it is done correctly.

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P95-24

IPC: 611.1, Table 611.1 (New), ASSE Chapter 15 (New), NSF Chapter 15 (New)

Proponents: Jason Shank, ASSE International, ASSE International (jshank@plumbers55.com)

2024 International Plumbing Code

Revise as follows:

611.1 Design.
Point-of-use reverse osmosis drinking water treatment units shall comply with CSA B483.1 or NSF 58. Drinking water treatment units shall meet the requirements of CSA B483.1, NSF 42, NSF 44, NSF 53 or NSF 62. Commercial and food service water treatment equipment shall comply with ASSE 1087. Table 611.1 shall be used to determine the applicable standards for the applications and uses for the requirements of this section.

Add new text as follows:

Table 611.1 Drinking Water Treatment Units

Application	Point of Use	Point of Entry
Aesthetic Contaminant Reduction Filters	NSF/ANSI 42 or CSA B483.1	NSF/ANSI 42 or CSA B483.1
Distillation Systems	NSF/ANSI 62 or CSA B483.1	NSF/ANSI 62 or CSA B483.1
Health Related Contaminant Reduction Filters	NSF/ANSI 53 or CSA B483.1	NSF/ANSI 53 or CSA B483.1
Reverse Osmosis	NSF/ANSI 58 or CSA B483.1	-
Ultraviolet Water Treatment	NSF/ANSI 55 or CSA B483.1	NSF/ANSI 55 or CSA B483.1
Water Softeners	-	Up to 1.25 in. inlet: NSF/ANSI 44, or CSA B483.1
		greater than 1.25 in, inlet : ASSE 1087

Add new standard(s) as follows:

ASSE

ASSE International
18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448

1087 - 2022 Performance Requirements for Commercial and Food Service Water Treatment Equipment Utilizing Drinking Water

NSF

NSF International
789 N. Dixboro Road P.O. Box 130140
Ann Arbor, MI 48105

55 - 2022 Ultraviolet Microbiological Water Treatment Systems

Staff Analysis: A review of the standard proposed for inclusion in the code, NSF 55-2022 *Ultraviolet (UV) Water Treatment Systems* and ASSE 1087-2022 *Commercial and Food Service Water Treatment Equipment Utilizing Drinking Water*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: The proposal to add this language and chart is to define what ASSE 1087 standard covers in regards to the other standards listed currently in this section and what they cover in the Code. The table also includes the applications, point of use and point of entry for each standard listed in this section.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

These are optional items in a building and are not required. It is up to the Owner of the building to decide if they wish these or not.

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P96-24 Part I

IPC: TABLE 702.1, TABLE 702.3, 702.3, TABLE 702.2, 702.2, 702.1, ASTM Chapter 15 (New)

Proponents: Michael Cudahy, PPFA Plastic Pipe and Fittings Association, PPFA Plastic Pipe and Fittings Association (mikec@cmservices.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

Revise as follows:

TABLE 702.1 ABOVE-GROUND DRAINAGE AND VENT PIPE

MATERIAL	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic pipe in IPS diameters, including Schedule 40, DR 22 (PS 200) and DR 24 (PS 140); with a solid, cellular core or composite wall	ASTM D2661; ASTM F628; ASTM F1488; CSA B181.1
Cast-iron pipe	ASTM A74; ASTM A888; CISPI 301
Copper or copper-alloy pipe	ASTM B42; ASTM B43; ASTM B302
Copper or copper-alloy tubing (Type K, L, M or DWV)	ASTM B75; ASTM B88; ASTM B251; ASTM B306
Galvanized steel pipe	ASTM A53
Glass pipe	ASTM C1053
Polyolefin pipe	ASTM F1412; ASTM F3371; CSA B181.3
Polyvinyl chloride (PVC) plastic pipe in IPS diameters, including Schedule 40, DR 22 (PS 200), and DR 24 (PS 140); with a solid, cellular core or composite wall	ASTM D2665; ASTM F891; ASTM F1488; ASTM F1760; CSA B181.2
Polyvinyl chloride (PVC) plastic pipe with a 3.25-inch O.D. and a solid, cellular core or composite wall	ASTM D2949; ASTM F1488
Polyvinylidene fluoride (PVDF) plastic pipe	ASTM F1673; CSA B181.3
Stainless steel drainage systems, Types 304 and 316L	ASME A112.3.1

TABLE 702.3 BUILDING SEWER PIPE

MATERIAL	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic pipe in IPS diameters, including Schedule 40, DR 22 (PS 200) and DR 24 (PS 140); with a solid, cellular core or composite wall	ASTM D2661; ASTM D2680; ASTM F628; ASTM F1488; CSA B181.1
Acrylonitrile butadiene styrene (ABS) plastic pipe in sewer and drain diameters, including SDR 42 (PS 20), PS 35, SDR 35 (PS 45), PS 50, PS 100, PS 140, SDR 23.5 (PS 150) and PS 200; with a solid, cellular core or composite wall	ASTM D2751; ASTM F1488
Cast-iron pipe	ASTM A74; ASTM A888; CISPI 301
Concrete pipe	ASTM C14; ASTM C76; CSA A257.1; CSA A257.2
Copper or copper-alloy tubing (Type K or L)	ASTM B75; ASTM B88; ASTM B251
Polyethylene (PE) plastic pipe (corrugated wall)	ASTM F2947/F2947M
Polyethylene (PE) plastic pipe (profile wall)	ASTM F2763
Polyethylene (PE) plastic pipe (SDR-PR)	ASTM F714
Polypropylene (PP) plastic pipe	ASTM F2764; CSA B182.13
Polyvinyl chloride (PVC) plastic pipe in IPS diameters, including Schedule 40, DR 22 (PS 200) and DR 24 (PS 140); with a solid, cellular core or composite wall	ASTM D2665; ASTM F891; ASTM F1488; ASTM F1760
Polyvinyl chloride (PVC) plastic pipe in sewer and drain diameters, including PS 25, SDR 41 (PS 28), PS 35, SDR 35 (PS 46), PS 50, PS 100, SDR 26 (PS 115), PS 140 and PS 200; with a solid, cellular core or composite wall	ASTM F891; ASTM F1488; ASTM D3034; CSA B182.2; CSA B182.4
Polyvinyl chloride (PVC) plastic pipe with a 3.25-inch O.D. and a solid, cellular core or composite wall	ASTM D2949; ASTM F1488
Polyvinylidene fluoride (PVDF) plastic pipe	ASTM F1673; CSA B181.3
Stainless steel drainage systems, Types 304 and 316L	ASME A112.3.1
Vitrified clay pipe	ASTM C4; ASTM C700

For SI: 1 inch = 25.4 mm.

702.3 Building sewer pipe.
Building sewer pipe shall conform to one of the standards listed in Table 702.3.

Revise as follows:

TABLE 702.2 UNDERGROUND BUILDING DRAINAGE AND VENT PIPE

MATERIAL	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic pipe in IPS diameters, including Schedule 40, DR 22 (PS 200) and DR 24 (PS 140); with a solid, cellular core or composite wall	ASTM D2661; ASTM F628; ASTM F1488; CSA B181.1

MATERIAL	STANDARD
Cast-iron pipe	ASTM A74; ASTM A888; CISPI 301
Copper or copper-alloy tubing (Type K, L, M or DWV)	ASTM B75; ASTM B88; ASTM B251; ASTM B306
Polyethylene (PE) plastic pipe (SDR-PR)	ASTM F714
Polyolefin pipe	ASTM F714; ASTM F1412; ASTM F3371; CSA B181.3
Polyvinyl chloride (PVC) plastic pipe in IPS diameters, including Schedule 40, DR 22 (PS 200) and DR 24 (PS 140); with a solid, cellular core or composite wall	ASTM D2665; ASTM F891; ASTM F1488; ASTM F1760; CSA B181.2
Polyvinyl chloride (PVC) plastic pipe with a 3.25-inch O.D. and a solid, cellular core or composite wall	ASTM D2949; ASTM F1488
Polyvinylidene fluoride (PVDF) plastic pipe	ASTM F1673; CSA B181.3
Stainless steel drainage systems, Type 316L	ASME A112.3.1

For SI: 1 inch = 25.4 mm.

702.2 Underground building sanitary drainage and vent pipe.
Underground building sanitary drainage and vent pipe shall conform to one of the standards listed in Table 702.2.

702.1 Above-ground sanitary drainage and vent pipe.
Above-ground soil, waste and vent pipe shall conform to one of the standards listed in Table 702.1.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428-2959

ASTM F1760-16(2020) Standard Specification for Coextruded Poly(Vinyl Chloride) (PVC) Non-Pressure Plastic Pipe Having Reprocessed-Recycled Content

Staff Analysis: A review of the standard proposed for inclusion in the code, ASTM F1760-16(2020) *Standard Specification for Coextruded Poly(Vinyl Chloride) (PVC) Non-Pressure Plastic Pipe Having Reprocessed-Recycled Content*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: ASTM F1760 is ***Standard Specification for Coextruded Poly(Vinyl Chloride) (PVC) Non-Pressure Plastic Pipe Having Reprocessed-Recycled Content***, last updated in 2020. It is a piping material included in APPENDIX AG, as well as the UPC and NSPC codes.

Bibliography: ASTM F1760, ***Standard Specification for Coextruded Poly(Vinyl Chloride) (PVC) Non-Pressure Plastic Pipe Having Reprocessed-Recycled Content***

Cost Impact: Decrease

Estimated Immediate Cost Impact:

Adding the standard ASTM F1760 ***Standard Specification for Coextruded Poly(Vinyl Chloride) (PVC) Non-Pressure Plastic Pipe Having Reprocessed-Recycled Content*** is not expected to alter costs of construction, it only offers another optional material which could offer minor reductions in costs depending on market pricing vs. current options ($0-$100).

Estimated Immediate Cost Impact Justification (methodology and variables):

Adding the standard ASTM F1760 ***Standard Specification for Coextruded Poly(Vinyl Chloride) (PVC) Non-Pressure Plastic Pipe Having Reprocessed-Recycled Content*** is not expected to alter costs of construction, it only offers another optional material which could offer minor reductions in costs depending on market pricing vs. current options ($0-$100).

Estimated Life Cycle Cost Impact:

Adding the standard ASTM F1760 ***Standard Specification for Coextruded Poly(Vinyl Chloride) (PVC) Non-Pressure Plastic Pipe Having Reprocessed-Recycled Content*** is not expected to alter costs of project life cycle.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

Adding the standard ASTM F1760 ***Standard Specification for Coextruded Poly(Vinyl Chloride) (PVC) Non-Pressure Plastic Pipe Having Reprocessed-Recycled Content*** is not expected to alter costs post-construction.

P96-24 Part I

P96-24 Part II

IRC: P3002.1, TABLE P3002.1(1), TABLE P3002.1(2), TABLE P3002.2, ASTM Chapter 44 (New)

Proponents: Michael Cudahy, PPFA Plastic Pipe and Fittings Association, PPFA Plastic Pipe and Fittings Association (mikec@cmservices.com)

2024 International Residential Code

P3002.1 Piping within buildings.
Drain, waste and vent (DWV) piping in *buildings* shall be as indicated in Tables P3002.1(1) and P3002.1(2) except that galvanized wrought-iron or galvanized steel pipe shall not be used underground and shall be maintained not less than 6 inches (152 mm) above ground. Allowance shall be made for the thermal expansion and contraction of plastic piping.

Revise as follows:

TABLE P3002.1(1) ABOVE-GROUND DRAINAGE AND VENT PIPE

MATERIAL	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic pipe in IPS diameters, including Schedule 40, DR 22 (PS 200) and DR 24 (PS 140); with a solid, cellular core or composite wall	ASTM D2661; ASTM D2680; ASTM F628; ASTM F1488; CSA B181.1
Cast-iron pipe	ASTM A74; ASTM A888; CISPI 301
Copper or copper-alloy pipe	ASTM B42; ASTM B43; ASTM B302
Copper or copper-alloy tubing (Type K, L, M or DWV)	ASTM B75/B75M; ASTM B88; ASTM B251/B251M; ASTM B306
Galvanized steel pipe	ASTM A53/A53M
Polyolefin pipe	ASTM F3371; CSA B181.3
Polyvinyl chloride (PVC) plastic pipe in IPS diameters, including Schedule 40, DR 22 (PS 200) and DR 24 (PS 140); with a solid, cellular core or composite wall	ASTM D2665; ASTM F891; ASTM F1488; ASTM F1760; CSA B181.2
Polyvinyl chloride (PVC) plastic pipe with a 3.25-inch O.D. and a solid, cellular core or composite wall	ASTM D2949; ASTM F1488
Stainless steel drainage systems, Types 304 and 316L	ASME A112.3.1

For SI: 1 inch = 25.4 mm.

TABLE P3002.1(2) UNDERGROUND BUILDING DRAINAGE AND VENT PIPE

PIPE	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic pipe in IPS diameters, including Schedule 40, DR 22 (PS 200) and DR 24 (PS 140); with a solid, cellular core or composite wall	ASTM D2661; ASTM F628; ASTM F1488; CSA B181.1
Cast-iron pipe	ASTM A74; ASTM A888; CISPI 301
Copper or copper-alloy tubing (Type K, L, M or DWV)	ASTM B75/B75M; ASTM B88; ASTM B251; ASTM B306
Polyethylene (PE) plastic pipe (SDR-PR)	ASTM F714
Polyolefin pipe	ASTM F714; ASTM F1412; ASTM F3371; CSA B181.3
Polyvinyl chloride (PVC) plastic pipe in IPS diameters, including Schedule 40, DR 22 (PS 200) and DR 24 (PS 140); with a solid, cellular core or composite wall	ASTM D2665; ASTM F891; ASTM F1488; ASTM F1760; CSA B181.2
Polyvinyl chloride (PVC) plastic pipe with a 3.25-inch O.D. and a solid, cellular core or composite wall	ASTM D2949; ASTM F1488
Stainless steel drainage systems, Type 316L	ASME A112.3.1

For SI: 1 inch = 25.4 mm.

TABLE P3002.2 BUILDING SEWER PIPE

MATERIAL	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic pipe in IPS diameters, including Schedule 40, DR 22 (PS 200) and DR 24 (PS 140); with a solid, cellular core or composite wall	ASTM D2661; ASTM F628; ASTM F1488
Acrylonitrile butadiene styrene (ABS) plastic pipe in sewer and drain diameters, including SDR 42 (PS 20), PS35, SDR 35 (PS 45), PS50, PS100, PS140, SDR 23.5 (PS 150) and PS200; with a solid, cellular core or composite wall	ASTM D2751; ASTM F1488
Polyvinyl chloride (PVC) plastic pipe in sewer and drain diameters, including PS 25, SDR 41 (PS 28), PS 35, SDR 35 (PS 46), PS 50, PS 100, SDR 26 (PS 115), PS140 and PS 200; with a solid, cellular core or composite wall	ASTM D3034; ASTM F891; ASTM F1488; CSA B182.2; CSA B182.4
Cast-iron pipe	ASTM A74; ASTM A888; CISPI 301
Concrete pipe	ASTM C14; ASTM C76; CSA A257.1; CSA A257.2
Copper or copper-alloy tubing (Type K or L)	ASTM B75/B75M; ASTM B88; ASTM B251/B251M
Polyethylene (PE) plastic pipe (SDR-PR)	ASTM F714
Polyolefin pipe	ASTM F1412; ASTM F3371; CSA B181.3
Polyvinyl chloride (PVC) plastic pipe in IPS diameters, including Schedule 40, DR 22 (PS 200) and DR 24 (PS 140); with solid, cellular core or composite wall	ASTM D2665; ASTM D2949; ASTM D3034; ASTM F1412; ASTM F1760; CSA B182.2; CSA B182.4

MATERIAL	STANDARD
Polyvinyl chloride (PVC) plastic pipe with a 3.25-inch O.D. and a solid, cellular core or composite wall	ASTM D2949, ASTM F1488
Stainless steel drainage systems, Types 304 and 316L	ASME A112.3.1
Vitrified clay pipe	ASTM C425; ASTM C700

For SI: 1 inch = 25.4 mm.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

F1760-16(2020) *Standard Specification for Coextruded Poly(Vinyl Chloride) (PVC) Non-Pressure Plastic Pipe Having Reprocessed-Recycled Content*

Staff Analysis: A review of the standard proposed for inclusion in the code, ASTM F1760-16(2020) *Standard Specification for Coextruded Poly(Vinyl Chloride) (PVC) Non-Pressure Plastic Pipe Having Reprocessed-Recycled Content*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: ASTM F1760 is ***Standard Specification for Coextruded Poly(Vinyl Chloride) (PVC) Non-Pressure Plastic Pipe Having Reprocessed-Recycled Content***, last updated in 2020. It is a piping material included in IPC APPENDIX AG, as well as the UPC and NSPC codes.

Bibliography: ASTM F1760***, Standard Specification for Coextruded Poly(Vinyl Chloride) (PVC) Non-Pressure Plastic Pipe Having Reprocessed-Recycled Content***

Cost Impact: Decrease

Estimated Immediate Cost Impact:

Adding the standard ASTM F1760 ***Standard Specification for Coextruded Poly(Vinyl Chloride) (PVC) Non-Pressure Plastic Pipe Having Reprocessed-Recycled Content*** is not expected to alter costs of construction, it only offers another optional material which could offer minor reductions in costs depending on market pricing vs. current options ($0-$100).

Estimated Immediate Cost Impact Justification (methodology and variables):

Adding the standard ASTM F1760 ***Standard Specification for Coextruded Poly(Vinyl Chloride) (PVC) Non-Pressure Plastic Pipe Having Reprocessed-Recycled Content*** is not expected to alter costs of construction, it only offers another optional material which could offer minor reductions in costs depending on market pricing vs. current options ($0-$100).

Estimated Life Cycle Cost Impact:

Adding the standard ASTM F1760 ***Standard Specification for Coextruded Poly(Vinyl Chloride) (PVC) Non-Pressure Plastic Pipe Having Reprocessed-Recycled Content*** is not expected to alter costs post construction ($0-$1).

Estimated Life Cycle Cost Impact Justification (methodology and variables):

Adding the standard ASTM F1760 ***Standard Specification for Coextruded Poly(Vinyl Chloride) (PVC) Non-Pressure Plastic Pipe Having Reprocessed-Recycled Content*** is not expected to alter costs post-construction ($0-$1).

P96-24 Part II

P97-24

IPC: TABLE 702.1, TABLE 702.2, TABLE 702.4

Proponents: Abraham MURRA, Abraham Murra Consulting, Georg Fischer

2024 International Plumbing Code

Revise as follows:

TABLE 702.1 ABOVE-GROUND DRAINAGE AND VENT PIPE

MATERIAL	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic pipe in IPS diameters, including Schedule 40, DR 22 (PS 200) and DR 24 (PS 140); with a solid, cellular core or composite wall	ASTM D2661; ASTM F628; ASTM F1488; CSA B181.1
Cast-iron pipe	ASTM A74; ASTM A888; CISPI 301
Copper or copper-alloy pipe	ASTM B42; ASTM B43; ASTM B302
Copper or copper-alloy tubing (Type K, L, M or DWV)	ASTM B75; ASTM B88; ASTM B251; ASTM B306
<u>Chlorinated polyvinylchloride (CPVC) plastic pipe, Schedule 80</u>	<u>ASTM F441/F441M, CSA B181.2</u>
Galvanized steel pipe	ASTM A53
Glass pipe	ASTM C1053
Polyolefin pipe	ASTM F1412; ASTM F3371; CSA B181.3
Polyvinyl chloride (PVC) plastic pipe in IPS diameters, including Schedule 40, DR 22 (PS 200), and DR 24 (PS 140); with a solid, cellular core or composite wall	ASTM D2665; ASTM F891; ASTM F1488; CSA B181.2
Polyvinyl chloride (PVC) plastic pipe with a 3.25-inch O.D. and a solid, cellular core or composite wall	ASTM D2949; ASTM F1488
Polyvinylidene fluoride (PVDF) plastic pipe	ASTM F1673; CSA B181.3
Stainless steel drainage systems, Types 304 and 316L	ASME A112.3.1

TABLE 702.2 UNDERGROUND BUILDING DRAINAGE AND VENT PIPE

MATERIAL	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic pipe in IPS diameters, including Schedule 40, DR 22 (PS 200) and DR 24 (PS 140); with a solid, cellular core or composite wall	ASTM D2661; ASTM F628; ASTM F1488; CSA B181.1
Cast-iron pipe	ASTM A74; ASTM A888; CISPI 301
Copper or copper-alloy tubing (Type K, L, M or DWV)	ASTM B75; ASTM B88; ASTM B251; ASTM B306
<u>Chlorinated polyvinylchloride (CPVC) plastic pipe, Schedule 80</u>	<u>ASTM F441/F441M, CSA B181.2</u>
Polyethylene (PE) plastic pipe (SDR-PR)	ASTM F714
Polyolefin pipe	ASTM F714; ASTM F1412; ASTM F3371; CSA B181.3
Polyvinyl chloride (PVC) plastic pipe in IPS diameters, including Schedule 40, DR 22 (PS 200) and DR 24 (PS 140); with a solid, cellular core or composite wall	ASTM D2665; ASTM F891; ASTM F1488; CSA B181.2
Polyvinyl chloride (PVC) plastic pipe with a 3.25-inch O.D. and a solid, cellular core or composite wall	ASTM D2949; ASTM F1488
Polyvinylidene fluoride (PVDF) plastic pipe	ASTM F1673; CSA B181.3
Stainless steel drainage systems, Type 316L	ASME A112.3.1

For SI: 1 inch = 25.4 mm.

TABLE 702.4 PIPE FITTINGS

MATERIAL	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic pipe in IPS diameters	ASME A112.4.4; ASTM D2661; ASTM F628; CSA B181.1
Acrylonitrile butadiene styrene (ABS) plastic pipe in sewer and drain diameters	ASTM D2751
Cast iron	ASME B16.4; ASME B16.12; ASTM A74; ASTM A888; CISPI 301
Copper or copper alloy	ASME B16.15; ASME B16.18; ASME B16.22; ASME B16.23; ASME B16.26; ASME B16.29
<u>Chlorinated polyvinylchloride (CPVC), Schedule 80</u>	<u>ASTM F439, CSA B181.2</u>
Glass	ASTM C1053
Gray iron and ductile iron	AWWA C110/A21.10
Polyethylene	ASTM D2683
Polyolefin	ASTM F1412; ASTM F3371; CSA B181.3
Polyvinyl chloride (PVC) plastic in IPS diameters	ASME A112.4.4; ASTM D2665; ASTM F1866
Polyvinyl chloride (PVC) plastic pipe in sewer and drain diameters	ASTM D3034
Polyvinyl chloride (PVC) plastic pipe with a 3.25-inch O.D.	ASTM D2949
Polyvinylidene fluoride (PVDF) plastic pipe	ASTM F1673; CSA B181.3
Stainless steel drainage systems, Types 304 and 316L	ASME A112.3.1
Steel	ASME B16.9; ASME B16.11; ASME B16.28
Vitrified clay	ASTM C700

For SI: 1 inch = 25.4 mm.

Staff Analysis: The proposed standards are in the current edition of the code.

Reason: CPVC is a widely used and accepted piping material and adding it to Tables 702.1, 702.2, and 702.3 will give users of the IPC a broader choice of materials.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposal adds a piping material, thus giving users more options to choose from, without any cost impact because of the new alternative.

P97-24

P98-24

IPC: TABLE 702.1, TABLE 702.2, TABLE 702.4

Proponents: Abraham MURRA, Abraham Murra Consulting, Georg Fischer

2024 International Plumbing Code

Revise as follows:

TABLE 702.1 ABOVE-GROUND DRAINAGE AND VENT PIPE

MATERIAL	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic pipe in IPS diameters, including Schedule 40, DR 22 (PS 200) and DR 24 (PS 140); with a solid, cellular core or composite wall	ASTM D2661; ASTM F628; ASTM F1488; CSA B181.1
Cast-iron pipe	ASTM A74; ASTM A888; CISPI 301
Copper or copper-alloy pipe	ASTM B42; ASTM B43; ASTM B302
Copper or copper-alloy tubing (Type K, L, M or DWV)	ASTM B75; ASTM B88; ASTM B251; ASTM B306
Galvanized steel pipe	ASTM A53
Glass pipe	ASTM C1053
Polyolefin pipe	ASTM F1412; ASTM F3371; CSA B181.3
Polypropylene (PP) plastic pipe	ASTM F1412; ASTM F3371; CSA B182.13
Polyvinyl chloride (PVC) plastic pipe in IPS diameters, including Schedule 40, DR 22 (PS 200), and DR 24 (PS 140); with a solid, cellular core or composite wall	ASTM D2665; ASTM F891; ASTM F1488; CSA B181.2
Polyvinyl chloride (PVC) plastic pipe with a 3.25-inch O.D. and a solid, cellular core or composite wall	ASTM D2949; ASTM F1488
Polyvinylidene fluoride (PVDF) plastic pipe	ASTM F1673; CSA B181.3
Stainless steel drainage systems, Types 304 and 316L	ASME A112.3.1

TABLE 702.2 UNDERGROUND BUILDING DRAINAGE AND VENT PIPE

MATERIAL	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic pipe in IPS diameters, including Schedule 40, DR 22 (PS 200) and DR 24 (PS 140); with a solid, cellular core or composite wall	ASTM D2661; ASTM F628; ASTM F1488; CSA B181.1
Cast-iron pipe	ASTM A74; ASTM A888; CISPI 301
Copper or copper-alloy tubing (Type K, L, M or DWV)	ASTM B75; ASTM B88; ASTM B251; ASTM B306
Polyethylene (PE) plastic pipe (SDR-PR)	ASTM F714
Polyolefin pipe	ASTM F714; ASTM F1412; ASTM F3371; CSA B181.3
Polypropylene (PP) plastic pipe	ASTM F1412; ASTM F3371; CSA B182.13
Polyvinyl chloride (PVC) plastic pipe in IPS diameters, including Schedule 40, DR 22 (PS 200) and DR 24 (PS 140); with a solid, cellular core or composite wall	ASTM D2665; ASTM F891; ASTM F1488; CSA B181.2
Polyvinyl chloride (PVC) plastic pipe with a 3.25-inch O.D. and a solid, cellular core or composite wall	ASTM D2949; ASTM F1488
Polyvinylidene fluoride (PVDF) plastic pipe	ASTM F1673; CSA B181.3
Stainless steel drainage systems, Type 316L	ASME A112.3.1

For SI: 1 inch = 25.4 mm.

TABLE 702.4 PIPE FITTINGS

MATERIAL	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic pipe in IPS diameters	ASME A112.4.4; ASTM D2661; ASTM F628; CSA B181.1
Acrylonitrile butadiene styrene (ABS) plastic pipe in sewer and drain diameters	ASTM D2751
Cast iron	ASME B16.4; ASME B16.12; ASTM A74; ASTM A888; CISPI 301
Copper or copper alloy	ASME B16.15; ASME B16.18; ASME B16.22; ASME B16.23; ASME B16.26; ASME B16.29
Glass	ASTM C1053
Gray iron and ductile iron	AWWA C110/A21.10
Polyethylene	ASTM D2683
Polyolefin	ASTM F1412; ASTM F3371; CSA B181.3
Polypropylene (PP)	ASTM F1412; ASTM F3371; CSA B182.13
Polyvinyl chloride (PVC) plastic in IPS diameters	ASME A112.4.4; ASTM D2665; ASTM F1866
Polyvinyl chloride (PVC) plastic pipe in sewer and drain diameters	ASTM D3034
Polyvinyl chloride (PVC) plastic pipe with a 3.25-inch O.D.	ASTM D2949
Polyvinylidene fluoride (PVDF) plastic pipe	ASTM F1673; CSA B181.3
Stainless steel drainage systems, Types 304 and 316L	ASME A112.3.1
Steel	ASME B16.9; ASME B16.11; ASME B16.28
Vitrified clay	ASTM C700

For SI: 1 inch = 25.4 mm.

Staff Analysis: The proposed standards are in the current edition of the code.

Reason: PP is a widely used and accepted piping material and adding it to Tables 702.1, 702.2, and 702.3 will give users of the IPC a broader choice of materials.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposal adds a piping material, thus giving users more options to choose from, without any cost impact because of the new alternative.

P98-24

P99-24 Part I

IPC: 702.2, ASTM Chapter 15 (New)

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov); Brian Conner, Charlotte Pipe and Foundry (bconner@charlottepipe.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

Revise as follows:

702.2 Underground building sanitary drainage and vent pipe.
Underground building sanitary drainage and vent pipe shall conform to one of the standards listed in Table 702.2. Thermoplastic pipe and fittings shall be installed in accordance with ASTM D2321.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428-2959

D2321-20	Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications

Staff Analysis: A review of the standard proposed for inclusion in the code, ASTM D2321-20 *Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications*,with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

P99-24 Part I

P99-24 Part II

IRC: P3002.1, P3002.2, ASTM Chapter 44 (New)

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov); Brian Conner, Charlotte Pipe and Foundry (bconner@charlottepipe.com)

2024 International Residential Code

Revise as follows:

P3002.1 Piping within buildings.
Drain, waste and vent (DWV) piping in *buildings* shall be as indicated in Tables P3002.1(1) and P3002.1(2) except that galvanized wrought-iron or galvanized steel pipe shall not be used underground and shall be maintained not less than 6 inches (152 mm) above ground. Allowance shall be made for the thermal expansion and contraction of plastic piping. Thermoplastic pipe and fittings shall be installed in accordance with ASTM D 2321.

P3002.2 Building sewer.
Building sewer piping shall be as indicated in Table P3002.2 Forced main sewer piping shall conform to one of the standards for ABS plastic pipe, copper or copper-alloy tubing, PVC plastic pipe or pressure-rated pipe indicated in Table P3002.2. Thermoplastic pipe and fittings shall be installed in accordance with ASTM D 2321.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

D2321-20	Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications

Staff Analysis: A review of the standard proposed for inclusion in the code, ASTM D2321-20 *Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: Every manufacturer of thermoplastic pipe has in their instruction a reference to the ASTM D 2321 standard for underground installations. The problem is that there is nothing in the code that also references this important standard except section 303.2. Inspectors do not necessarily have the time to read through every manufacturer's installation instructions during an inspection, however, if the installation standard was referenced in the code then the jurisdiction would be responsible for providing access to the standard for verification purposes.

Bibliography: See reason statement.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal will make it easier to ensure installation are in compliance with the manufacturer's requirements and should not technically have any impact on the cost of construction if the installers were following these requirements as they should have been.

P99-24 Part II

P100-24 Part I

IPC: TABLE 308.5, 308.5, 702.7, 705.9, 705.9.1, 705.9.2, 705.16.5

Proponents: Michael Cudahy, PPFA Plastic Pipe and Fittings Association, PPFA Plastic Pipe and Fittings Association (mikec@cmservices.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

Revise as follows:

TABLE 308.5 HANGER SPACING

PIPING MATERIAL	MAXIMUM HORIZONTAL SPACING (feet)	MAXIMUM VERTICAL SPACING (feet)
Acrylonitrile butadiene styrene (ABS) pipe	4	10[b]
Aluminum tubing	10	15
Cast-iron pipe	5[a]	15
Chlorinated polyvinyl chloride (CPVC) pipe and tubing, 1 inch and smaller	3	10[b]
Chlorinated polyvinyl chloride (CPVC) pipe and tubing, 1 $^1/_4$ inches and larger	4	10[b]
Copper or copper-alloy pipe	12	10
Copper or copper-alloy tubing, 1 $^1/_4$-inch diameter and smaller	6	10
Copper or copper-alloy tubing, 1 $^1/_2$-inch diameter and larger	10	10
Cross-linked polyethylene (PEX) pipe, 1 inch and smaller	2.67 (32 inches)	10[b]
Cross-linked polyethylene (PEX) pipe, 1 $^1/_4$ inches and larger	4	10[b]
Cross-linked polyethylene/aluminum/cross-linked polyethylene (PEX-AL-PEX) pipe	2.67 (32 inches)	4
~~Lead pipe~~	~~Continuous~~	~~4~~
Polyethylene/aluminum/polyethylene (PE-AL-PE) pipe	2.67 (32 inches)	4
Polyethylene of raised temperature (PE-RT) pipe, 1 inch and smaller	2.67 (32 inches)	10[b]
Polyethylene of raised temperature (PE-RT) pipe, 1 $^1/_4$ inches and larger	4	10[b]
Polypropylene (PP) pipe or tubing, 1 inch and smaller	2.67 (32 inches)	10[b]
Polypropylene (PP) pipe or tubing, 1 $^1/_4$ inches and larger	4	10[b]
Polyvinyl chloride (PVC) pipe	4	10[b]
Stainless steel drainage systems	10	10[b]
Steel pipe	12	15

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

a. The maximum horizontal spacing of cast-iron pipe hangers shall be increased to 10 feet where 10-foot lengths of pipe are installed.

b. For sizes 2 inches and smaller, a guide shall be installed midway between required vertical supports. Such guides shall prevent pipe movement in a direction perpendicular to the axis of the pipe.

308.5 Interval of support.
Pipe shall be supported in accordance with Table 308.5.

Exception: The interval of support for piping systems designed to provide for expansion/contraction shall conform to the engineered design in accordance with Section 316.1.

Delete without substitution:

~~**702.7 Lead bends and traps.**~~
~~The wall thickness of lead bends and traps shall be not less than $^1/_8$ inch (3.2 mm).~~

~~**705.9 Lead.**~~
~~Joints between lead pipe or fittings shall comply with Sections 705.9.1 and 705.9.2.~~

~~**705.9.1 Burned.**~~

~~Burned joints shall be uniformly fused together into one continuous piece. The thickness of the joint shall be not less than the thickness of the lead being joined. The filler metal shall be of the same material as the pipe.~~

~~**705.9.2 Wiped.**~~

~~Joints shall be fully wiped, with an exposed surface on each side of the joint not less than $^3/_4$ inch (19.1 mm). The joint shall be not less than $^3/_8$ inch (9.5 mm) thick at the thickest point.~~

~~**705.16.5 Lead pipe to other piping material.**~~

~~Joints between lead pipe and other piping material shall be made by a wiped joint to a caulking ferrule, soldering nipple or bushing or shall be made with an *approved* adapter fitting.~~

Reason: If we are finally removing lead pipe from use in old service lines, it should be also be removed from the plumbing code, as it does not serve the code to continue suggesting it's usage. It's just historical lingering text at this point.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

Not using a material no one is using seems cost neutral.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

Proposal removes a rarely used material from the support table, so no cost impact or minor decrease because other materials would be cheaper than lead pipe ($0-$10) is estimated. I don't think we could install lead pipe anymore.

Estimated Immediate Cost Impact Justification (methodology and variables):

Proposal removes a rarely used material from the support table, so no cost impact or minor decrease because other materials would be cheaper than lead pipe ($0-$10) is estimated. I don't think we could install lead pipe anymore.

Estimated Life Cycle Cost Impact:

Not expected to have a cost impact over life of building or project ($0-$1).

Estimated Life Cycle Cost Impact Justification (methodology and variables):

Not expected to have a cost impact over life of building or project ($0-$1).

P100-24 Part I

P100-24 Part II

IRC: P3003.8, P3003.8.1, P3003.8.2, P3003.13.5

Proponents: Michael Cudahy, PPFA Plastic Pipe and Fittings Association, PPFA Plastic Pipe and Fittings Association (mikec@cmservices.com)

2024 International Residential Code

Delete without substitution:

~~P3003.8 Lead~~.
~~Joints between lead pipe or fittings shall comply with Sections P3003.8.1 and P3003.8.2.~~

~~P3003.8.1 Burned.~~ ~~Burned joints shall be uniformly fused together into one continuous piece. The thickness of the joint shall be not less than the thickness of the lead being joined. The filler metal shall be of the same material as the pipe.~~

~~P3003.8.2 Wiped.~~ ~~Joints shall be fully wiped, with an exposed surface on each side of the joint not less than $^3/_4$ inch (19 mm). The joint shall be not less than $^3/_8$ inch (9.5 mm) thick at the thickest point.~~

~~P3003.13.5 Lead pipe to other piping material.~~ ~~Joints between lead pipe and other piping material shall be made by a wiped joint to a caulking ferrule, soldering nipple, or bushing or shall be made with an *approved* adapter fitting.~~

Reason: It's time to remove lead piping not just from service lines, but the residential code as well.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

Proposal removes a rarely used material from the support table, so no cost impact or minor decrease because other materials would be cheaper than lead pipe ($0-$10) is estimated. I don't think we could install lead pipe anymore.

Estimated Immediate Cost Impact Justification (methodology and variables):

Proposal removes a rarely used material from the support table, so no cost impact or minor decrease because other materials would be cheaper than lead pipe ($0-$10) is estimated. I don't think we could install lead pipe anymore.

Estimated Life Cycle Cost Impact:

None expected over the life of the building or project ($0-$1)

Estimated Life Cycle Cost Impact Justification (methodology and variables):

None expected over the life of the building or project ($0-$1)

P100-24 Part II

P100-24 Part III

IMC®: TABLE 305.4

Proponents: Michael Cudahy, PPFA Plastic Pipe and Fittings Association, PPFA Plastic Pipe and Fittings Association (mikec@cmservices.com)

2024 International Mechanical Code

Revise as follows:

TABLE 305.4 PIPING SUPPORT SPACING[a]

PIPING MATERIAL	MAXIMUM HORIZONTAL SPACING (feet)	MAXIMUM VERTICAL SPACING (feet)
ABS pipe	4	10[c]
Aluminum pipe and tubing	10	15
Cast-iron pipe[b]	5	15
Copper or copper-alloy pipe	12	10
Copper or copper-alloy tubing	8	10
CPVC pipe or tubing, 1 inch and smaller	3	10[c]
CPVC pipe or tubing, $1^1/_4$-inches and larger	4	10[c]
~~Lead pipe~~	~~Continuous~~	~~4~~
PE-RT 1 inch and smaller	$2^2/_3$ (32 inches)	10[c]
PE-RT $1^1/_4$ inches and larger	4	10[c]
PEX tubing 1 inch and smaller	$2^2/_3$ (32 inches)	10[c]
PEX tubing $1^1/_4$ inches and larger	4	10[c]
Polypropylene (PP) pipe or tubing, 1 inch and smaller	$2^2/_3$ (32 inches)	10[c]
Polypropylene (PP) pipe or tubing, $1^1/_4$ inches and larger	4	10[c]
PVC pipe	4	10[c]
Steel pipe	12	15
Steel tubing	8	10

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

a. See Section 301.18.

b. The maximum horizontal spacing of cast-iron pipe hangers shall be increased to 10 feet where 10-foot lengths of pipe are installed.

c. Mid-story guide.

Reason: This proposal would remove lead pipe from the Mechanical code piping support table. It is rarely used and we are removing it from other applications.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

Proposal removes a rarely used material from the support table, so no cost impact or minor decrease because other materials would be cheaper than lead pipe ($0-$10) is estimated, as no increase in cost seems probably.

Estimated Immediate Cost Impact Justification (methodology and variables):

Proposal removes a rarely used material from the support table, so no cost impact or minor decrease because other materials would be cheaper than lead pipe ($0-$10) is estimated.

Estimated Life Cycle Cost Impact:

Proposal removes a rarely used material from the support table, so no cost impact ($0-$10) during life of building.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

Proposal removes a rarely used material from the support table, so no cost impact ($0-$10) during life of building

P101-24 Part I

IPC: 708.1.11.2, ASME Chapter 15, ASME Chapter 15 (New)

Proponents: Justin Cassamassino, ASME, A112 Main Committee (cassamassinoj@asme.org)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

Revise as follows:

708.1.11.2 Floor cleanout assemblies.
Where it is necessary to protect a cleanout plug from the loads of vehicular traffic, cleanout assemblies in accordance with ASME ~~A112.36.2M~~ ASME A112.36.2/CSA B79.2 shall be installed.

ASME

ASME
ASME
Two Park Avenue
New York, NY 10016-5990

~~A112.36.2M—1991 (R2022)~~ ~~Cleanouts~~

Add new standard(s) as follows:

ASME

American Society of Mechanical Engineers
Two Park Avenue
New York, NY 10016-5990

A112.36.2/CSA B79.2-2022 Cleanouts

Staff Analysis: A review of the standard proposed for inclusion in the code, ASME A112.36.2/CSA B79.2-2022 *Cleanouts*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

P101-24 Part I

P101-24 Part II

IRC: P3005.2.10.3, ASME Chapter 44, ASME Chapter 44 (New)

Proponents: Justin Cassamassino, ASME, A112 Main Committee (cassamassinoj@asme.org)

2024 International Residential Code

Revise as follows:

P3005.2.10.3 Floor cleanout assemblies.
Where it is necessary to protect a cleanout plug from the loads of vehicular traffic, cleanout assemblies in accordance with ~~ASME A112.36.2M~~ ASME A112.36.2/CSA B79.2 shall be installed.

ASME

ASME
ASME
Two Park Avenue
New York, NY 10016-5990

~~A112.36.2M—1991 (R2022)~~ ~~Cleanouts~~

Add new standard(s) as follows:

ASME

American Society of Mechanical Engineers
Two Park Avenue
New York, NY 10016-5990

A112.36.2/CSA B79.2 Cleanouts

Staff Analysis: A review of the standard proposed for inclusion in the code, ASME A112.36.2/CSA B79.2-2022 *Cleanouts*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: The ASME A112.36.2 was harmonized with CSA B79. The intent of this proposal is to replace the current standard with the new standard.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The ASME standard was harmonized with the CSA standard, no additional requirements were added, clarification change.

P101-24 Part II

P102-24

IPC: TABLE 709.1

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov)

2024 International Plumbing Code

Revise as follows:

TABLE 709.1 DRAINAGE FIXTURE UNITS FOR FIXTURES AND GROUPS

FIXTURE TYPE	DRAINAGE FIXTURE UNIT VALUE AS LOAD FACTORS	MINIMUM SIZE OF TRAP (inches)
Automatic clothes washers, commercial[a, g]	3	2
Automatic clothes washers, residential[g]	2	2
Bathroom group as defined in Section 202 (1.6 gpf water closet)[f]	5	—
Bathroom group as defined in Section 202 (water closet flushing greater than 1.6 gpf)[f]	6	—
Bathtub[b] (with or without overhead shower or whirlpool attachments)	2	1 1/2
Bidet	1	1 1/4
Combination sink and tray	2	1 1/2
Dental lavatory	1	1 1/4
Dental unit or cuspidor	1	1 1/4
Dishwashing machine[c], domestic	2	1 1/2
Drinking fountain	~~1/2~~ 0	1 1/4
Emergency floor drain	0	2
Floor drains[h]	2[h]	2
Floor sinks	Note h	2
Kitchen sink, domestic	2	1 1/2
Kitchen sink, domestic with food waste disposer, dishwasher or both	2	1 1/2
Laundry tray (1 or 2 compartments)	2	1 1/2
Lavatory	1	1 1/4
Shower (based on the total flow rate through showerheads and body sprays)Flow rate:5.7 gpm or lessGreater than 5.7 gpm to 12.3 gpmGreater than 12.3 gpm to 25.8 gpmGreater than 25.8 gpm to 55.6 gpm	2 3 5 6	1 1/2 2 3 4
Service sink	2	1 1/2
Sink	2	1 1/2
Urinal	4	Note d
Urinal, 1 gallon per flush or less	2[e]	Note d
Urinal, nonwater supplied	1/2	Note d
Wash sink (circular or multiple) each set of faucets	2	1 1/2
Water closet, flushometer tank, public or private	4[e]	Note d
Water closet, private (1.6 gpf)	3[e]	Note d
Water closet, private (flushing greater than 1.6 gpf)	4[e]	Note d
Water closet, public (1.6 gpf)	4[e]	Note d
Water closet, public (flushing greater than 1.6 gpf)	6[e]	Note d

For SI: 1 inch = 25.4 mm, 1 gallon = 3.785 L, gpf = gallon per flushing cycle, 1 gallon per minute (gpm) = 3.785 L/m.

a. For traps larger than 3 inches, use Table 709.2.

b. A showerhead over a bathtub or whirlpool bathtub attachment does not increase the drainage fixture unit value.

c. See Sections 709.2 through 709.4.1 for methods of computing unit value of fixtures not listed in this table or for rating of devices with intermittent flows.

d. Trap size shall be consistent with the fixture outlet size.

e. For the purpose of computing loads on building drains and sewers, water closets and urinals shall not be rated at a lower drainage fixture unit unless the lower values are confirmed by testing.

f. For fixtures added to a bathroom group, add the dfu value of those additional fixtures to the bathroom group fixture count.

g. See Section 406.2 for sizing requirements for fixture drain, branch drain and drainage stack for an automatic clothes washer standpipe.

h. See Sections 709.4 and 709.4.1.

Reason: A DFU value is not necessary for a drinking fountain. Approximately 90% of the water discharged at a drinking fountain leaves with the user and is not discharged down the drain. Any residual amount of water that does make it down the drain can easily be accommodated by any drainage system.

Bibliography: See reason statement.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposal would result in no additional materials or labor as the proposal only clarifies a drainage value in the table.

P102-24

P103-24

IPC: TABLE 710.1(2), 710.1

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov)

2024 International Plumbing Code

Revise as follows:

TABLE 710.1(2) ~~HORIZONTAL FIXTURE BRANCHES AND~~ STACKSAND CONNECTIONS TO STACKS[a]

DIAMETER OF PIPE (inches)	MAXIMUM NUMBER OF DRAINAGE FIXTURE UNITS (dfu)			
	Total for ~~horizontal~~fixture drain or fixture branch connection	Stacks[b]		
		Total discharge into one branch interval	Total for stack of three branch intervals or less	Total for stack greater than three branch intervals
1 1/2	3	2	4	8
2	6	6	10	24
2 1/2	12	9	20	42
3	20	20	48	72
4	160	90	240	500
5	360	200	540	1,100
6	620	350	960	1,900
8	1,400	600	2,200	3,600
10	2,500	1,000	3,800	5,600
12	3,900	1,500	6,000	8,400
15	7,000	Note c	Note c	Note c

For SI: 1 inch = 25.4 mm.

a. Does not include branches of the building drain. Refer to Table 710.1(1).

b. Stacks shall be sized based on the total accumulated connected load at each story or branch interval. As the total accumulated connected load decreases, stacks are permitted to be reduced in size. Stack diameters shall not be reduced to less than one-half of the diameter of the largest stack size required.

c. Sizing load based on design criteria.

710.1 Maximum fixture unit load.
The maximum number of *drainage fixture units* ~~connected~~ discharging to a given size of *building sewer*, *building drain* or horizontal *branch* of the *building drain* shall be determined using Table 710.1(1). The maximum number of *drainage fixture units* ~~connected~~ discharging to a given size of ~~horizontal~~ fixture drain or fixture *branch connection* ~~or~~ to a vertical soil or waste *stack* shall be determined using Table 710.1(2).

Reason: The current code language is often confusing to users. The first charging statement in 710.1 refers people to table 710.1 for sizing horizontal branches of building drains. The second sentence refers the user to 710.1(2) for sizing "horizontal branches or vertical soil or waste stacks". Since the column in table 710.1(2) is labeled " Total for horizontal branch", users are often confusing this to mean all horizontal branches when in fact the intent is for sizing connections to the stack. In order to eliminate further confusion, it is also being suggested to change the phrases "connected to a given size of" to " discharging to a given size of", reserving connected for the connections to stacks.

Bibliography: See reason statement.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

There would be absolutely no cost impact as this proposal is just for clarification purposes. The reason statement explains.

P103-24

P104-24 Part I

IPC: 714.3, 714.1

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

Revise as follows:

714.3 ~~Location~~ Installation.
Backwater valves shall be installed so that *access* is provided to the working parts.

714.1 Sewage backflow. Where plumbing fixtures are installed on a floor with a finished floor elevation below the elevation of the manhole cover of the next upstream manhole in the public *sewer,* such fixtures shall be protected by a backwater valve installed in the *building drain*, or horizontal *branch* serving such fixtures. ~~Plumbing fixtures installed on a floor with a finished floor elevation above the elevation of the manhole cover of the next upstream manhole in the public *sewer* shall not discharge through a backwater valve.~~The backwater valve shall be of the normally open type.

~~**Exception:** In existing buildings, fixtures above the elevation of the manhole cover of the next upstream manhole in the public *sewer* shall not be prohibited from discharging through a backwater valve.~~**Exception:** Normally closed backwater valve installations for *existing buildings* shall not be prohibited.Normally closed backwater valves shall be provided with a venting method in accordance with one of the methods in Chapter 9 upstream of the backwater valve.

P104-24 Part I

P104-24 Part II

IRC: P3008.2

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov)

2024 International Residential Code

Revise as follows:

P3008.2 Allowable installations. Where plumbing fixtures are installed on a floor with a finished floor elevation above the elevation of the manhole cover of the next upstream manhole in the public sewer~~, and~~ a backwater valve ~~is~~ shall be installed in the *building drain* or *horizontal branch* serving such fixtures. ~~, the~~ The backwater valve shall be of the normally open type.

> **Exception:** Normally closed backwater valve installations for *existing buildings* shall not be prohibited.Normally closed backwater valves shall be provided with a venting method in accordance with one of the methods in Chapter 9 upstream of the backwater valve.

Reason: The title of the section was improper to begin with, "Location", the entire section was referencing installation requirements. The remainder of the proposal is focused on the fact that most floor drains are installed as part of a combination waste and vent system, however, since most backwater valves are manufactured as normally closed backwater valves, this interrupts the pathway for venting in a combination waste and vent system. Additionally, a normally closed backwater valve poses a resistance to flow until a certain amount of flow is present to force the valve open. This results in slowing the flow below the desired flow rate and impedes the ability of the waste flow to scour the pipe as it flows. A normally open backwater valve will avoid both of these associated complications from backwater valves. Additionally, allowing normally closed backwater valves to be installed to serve an entire existing building results in restricting the ability of the sewer systems to use building DWV system to assist in providing a venting pathway to atmosphere. This results in less pathways and increased positive and/or negative pressures within the sewer network and ultimately can negatively impact the DWV system of surrounding buildings.

Bibliography: See reason statement.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal doesn't create any additional requirements and should technically result in lower overall maintenance costs.

P104-24 Part II

P105-24

IPC: 715.2, CSA Chapter 15 (New)

Proponents: Abraham MURRA, Abraham Murra Consulting, Jets Vacuum AS, Norway

2024 International Plumbing Code

Revise as follows:

715.2 System design.
Vacuum drainage systems shall be designed in accordance with the vacuum drainage system manufacturer's instructions. The system layout, including piping layout, tank assemblies, vacuum pump assembly and other components necessary for proper function of the system shall be in accordance with <u>CSA B45.13/IAPMO Z1700 and with </u>the manufacturer's instructions. Plans, specifications and other data for such systems shall be submitted to the code official for review and approval prior to installation.

Add new standard(s) as follows:

CSA

CSA Group
8501 East Pleasant Valley Road
Cleveland, OH 44131-5516

<u>CSA B45.13:19/IAPMO Z1700-2019</u>	<u>Vacuum waste-collection systems</u>

Staff Analysis: A review of the standard proposed for inclusion in the code, CSA B45.13:19/IAPMO Z1700-2019 *Vacuum waste-collection systems*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: Adding a reference to CSA B45.13/IAPMO Z1700 —a consensus standard that specifies requirements for materials, construction, performance testing, and markings— in the system design section of the IPC will standardize vacuum waste-collection systems. Mandating that such systems comply only with the manufacturer's instructions allows installation of substandard systems that do not benefit users or regulators.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Adding CSA B45.13/IAPMO Z1700 as a referenced standard to the IPC should not have a cost impact as major manufacturers of vacuum waste-collection systems are already listed to the standard.

P105-24

P106-24

IPC: 717.1, ASSE Chapter 15 (New)

Proponents: Sidney Lee Cavanaugh, Cavanaugh Consulting, WRT (sidneycavanaugh@yahoo.com)

2024 International Plumbing Code

Revise as follows:

717.1 General.
This section shall govern the relining of existing *building sewers* and building drainage piping. Required Inspections shall be conducted by a ANSI/ASSE/IAPMO Series 28000 qualified inspector.

Add new standard(s) as follows:

ASSE

ASSE International
18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448

ANSI/ASSE/IAPMO Series 28000-Standard 28001-xx	Professional Qualifications Standard for Inspectors of CIPP (Cured-in-Place-Pipe) Rehabilitation of Building Sewer and Drain, Waste and Vent Piping Systems (DRAFT)

Reason: The new ANSI/ASSE/IAPMO Series 2800 standard assures that the inspector and inspection of piping using CIPP is done appropriately. Unfortunately, many inspectors are not knowledgeable concerning CIPP rehabilitation, and the necessary requirements demanded for proper installation and inspection. This requirement is necessary and needed in the code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Proper inspection is not only a cost built into the code but necessary to protect it's users ultimate health and safety.

P106-24

P107-24

IPC: 717.1

Proponents: Sidney Lee Cavanaugh, Cavanaugh Consulting, WRT (sidneycavanaugh@yahoo.com)

2024 International Plumbing Code

Revise as follows:

717.1 General.
This section shall govern the relining of existing *building sewers* and building drainage system piping.

Reason: The title and scope of both Secton 717 and 718 are for Building sewers and Building drains. Building drains can include sanitary and storm water. A more inclusive and proper scope for both 717 and 718 would be to use Drainage System piping instead of drainage piping which are both defined in Section 3 of the code. This would eliminate confusion and recognize all piping covered under the requirements of these Sections.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Just as my reason states: This code change simply clarifies current requirements in the code and would add no additional cost to installation and technology currently used in Section 717.

P107-24

P108-24

IPC: 717.2

Proponents: Luther Grant Whittle, Nu Flow Technologies, "self" (gwhittle@nuflow.com)

2024 International Plumbing Code

Revise as follows:

717.2 Applicability.

The relining of existing *building sewers* and building drainage piping shall be limited to gravity drainage piping 2"~~4~~ inches (~~102~~50 mm) in diameter and larger. The relined piping shall be of the same nominal size as the existing piping.

Attached Files

- **TECH BRIEF - NuDrain Flow Analysis - 20201117 Rev Lvl 1.1.pdf**
  https://www.cdpaccess.com/proposal/10434/30667/files/download/4388/

Reason: CIPP in building drains is routinely used in sizes down to 2". The scope of ASTM F1216-22 governs the usage of CIPP down to 2".

Documentation is provided that shows the ability to routinely preserve flow capacity while increasing scouring velocities in sizes down to 2", with typical CIPP thicknesses. It is recognized that the DFU design capacity requires preservation. The nominal pipe size is not altered.

The provided flow analysis chart does not take into consideration the inherent conservatism of DFU design being based upon data from cast iron pipe collected in the 1930s. As far as actually maintaining the original design DFUs, all CIPP relined pipes should be compared to iron pipe flows as the basis of their original DFU design capacity. What is apparent, is that CIPP does not negatively alter nominal sizing nor DFU capacity at typical installed thicknesses. Scouring velocity also greatly improves, further helping to correct for minor flow issues in the existing piping.

Bibliography: ASTM F1216-22 Scope

"1.1 This practice describes the procedures for the reconstruction of pipelines and conduits (**2 in.** to 108 in. diameter) by the installation of a resin-impregnated, flexible tube which is inverted into the existing conduit by use of a hydrostatic head or air pressure."

NuFlow Flow Analysis Chart to be attached.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal merely expands the applicable size range down to 2" with the same comparative cost impacts as are typical of relining / rehabilitation for repair or replacement with Cured-in-Place Pipe (CIPP) versus exhume and replace with other piping materials, as already otherwise approved for use within Sections 717 and 718 of the Code.

This proposal to expand the size range down to 2” creates no significant cost impact alteration as compared to the considerations behind the existing code inclusion of CIPP.

P108-24

P109-24

IPC: 717.4

Proponents: Luther Grant Whittle, Nu Flow Technologies, "self" (gwhittle@nuflow.com)

2024 International Plumbing Code

Revise as follows:

717.4 Permitting.
<u>For replacement work, a reviewed permit shall be required. Prior to permit issuance, t</u>he code official shall review and evaluate the preinstallation recorded video camera survey to determine if the piping system is able to be relined in accordance with the proposed lining system manufacturer's installation requirements, and applicable referenced standards. <u>Replacement work shall include applications where the pipe is broken or missing and where the cured-in-place-pipe is replacing the structural function of the existing pipe. For repair work, review and evaluation of the preinstallation recorded video camera survey shall not be required prior to permit issuance. Repair work does not require removal or replacement of the piping systems and shall include relining to stop joint leakage, restoration of design flow, or to protect from internal corrosion of the existing, otherwise code compliant piping. Prior to permit issuance, the code official shall review and approve construction documents as per Section 105.5.1.</u>

Reason: Current language effectively requires pre-installation review & evaluation to issue permits for all Cured-in-Place Pipe (CIPP) projects, whereas Section 105.2 currently exempts "plumbing" work unless "it becomes necessary to remove and replace with new material." Many "repair" applications with CIPP would otherwise be deemed exempt from permitting by the language of Section 105.2, as CIPP is widely used to "repair" leaks and to more permanently clear stoppages in conjunction with cleaning of scaling and tuberculation.

We do concur with the value of routine permitting with CIPP work. We propose, however, that AHJs have the option of not having to conduct a mandatory "review and evaluation" of pre-CCTV video prior to issuing permits for basic "repair" work, so as to ease the burden on local AHJs when dealing with lower risk "repair" applications of CIPP. We propose that a distinction be made for mandatory "review and evaluation" prior to issuing permits for plumbing "replacement" applications of CIPP, where the CIPP is intended to function as the new structural "replacement" pipe.

This proposal strikes a closer balance to the general permitting practices for other plumbing pipe materials within the IPC as governed by Section 105.2. The local AHJ can then use discretion with their preferred permitting process for CIPP according to their experience and comfort level.

The applications of concern necessitating mandatory preinstallation "review and evaluation" of pre-CCTV video for code officials to ensure that the code requirements will continue to be met, all pertain to "replacement" applications of CIPP. The "repair" applications as defined within this proposal are inherently less likely to alter the code approved design compliance of the completed CIPP "repair." Regardless, post-installation inspection and review for permit closing will verify the as-built code compliance of the CIPP.

We feel that this proposal will significantly reduce the burden on AHJ staff while still providing proper code compliance oversight with the usage of CIPP.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

As proposed, permits will still be required for CIPP projects, so there is no permitting cost difference to the cost of construction.

However, the time cost to AHJ staff will be significantly reduced versus mandatory review of pre-installation CCTV video prior to permitting for all (even lower risk "repair") CIPP applications.

AHJs will still have the local authority to require a "reviewed" permit should they so desire. The proposed language simply permits AHJs to issue non-reviewed permits and verify compliance at permit closing for applications where CIPP is being used for a "repair" [that would otherwise be completely non-permitted as per the requirements of IPC Section 105.2] with the option to place trust in the professionalism of the licensed plumber while still verifying code compliance with review and inspection during permit closure. This brings section 717.4 more in line with the permitting practices for all other code approved plumbing pipe products, while still providing for greater oversight through "required" permitting even for "repair" work that does not involve "removal and replacement."

P110-24

IPC: 717.5

Proponents: Luther Grant Whittle, Nu Flow Technologies, "self" (gwhittle@nuflow.com)

2024 International Plumbing Code

Revise as follows:

717.5 Prohibited applications.
Where review of the preinstallation recorded video camera survey reveals that piping systems are not installed correctly or defects exist , that will not be corrected by relining, then relining shall not be permitted without correction of such defects prior to cured-in place-pipe relining. ~~The defective portions of piping shall be exposed and repaired with pipe and fittings in accordance with this code. Defects include, but are not limited to, backgrade or insufficient slope, complete pipe wall deterioration or complete separations such as from tree root invasion or improper support.~~

Reason: The deleted language is erroneous regarding the capabilities and limitations of CIPP and confusingly complicated. The revised opening language more appropriately covers the guidance required by AHJs to make informed decisions on when to prohibit the use of CIPP.

There seems to be the erroneous assumption that CIPP is only ever a "repair" option and not capable of being a "replacement" option. The industry consensus standards and their design equations (as found in the design appendix of ASTM F1216) provide for the use of CIPP as a structural replacement as well as a performance repair system.

The installation of CIPP as a "repair" in conjunction with the preparation of the existing pipe for relining can readily correct defects such as flow disruption by scaling or tuberculation (which can be mistaken for backgrade or insufficient slope) prior to cleaning. Although CIPP cannot correct significant line and grade issues, the improved flow characteristics (including the increased scouring velocity) frequently rectifies any sedimentation issues associated with minor bellies in piping. Properly designed in compliance with the IPC, CIPP does NOT reduce the nominal sizing, the original design flow capacity, or the original design DFU count.

CIPP can also reliably eliminate leakage and root penetration from failed joint seals and even function as "replacement" piping for missing sections of buried piping. CIPP can structurally "replace" pipe sections with "channel rot" and can also structurally "replace" pipes with missing pipe sections; there are also reliable methods to fill voids around the pipe wall while restoring the proper flow line for code compliance. Soil voiding in such smaller diameter CIPP applications is expected to fully reconsolidate within 2 to 3 years to restore proper soil support, with the CIPP structurally spanning the void in the interim.

Where existing pipe defects are capable of being corrected through pipe "replacement" with CIPP, there should be no reason to disallow a reviewed permit installation of certified and listed CIPP systems by a responsible, licensed contractor. The 2024 code language is unnecessarily restrictive.

Bibliography: The ASTM F1216 design appendix provides an industry consensus design approach for use of CIPP as a structural replacement for piping.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The clarifications are in regard to proper applicability for use as either "repair" or "replacement."

P110-24

P111-24

IPC: 717.6, ASTM Chapter 15 (New)

Proponents: Luther Grant Whittle, Nu Flow Technologies, "self" (gwhittle@nuflow.com)

2024 International Plumbing Code

Revise as follows:

717.6 Relining materials.
The relining materials shall be manufactured in compliance with applicable standards and certified as required in Section 303. Cured-in-place-pipe reline materials shall comply with ASTM F1216, ASTM F1743, ASTM F2561, ASTM F2599 or ASTM F3541. Fold-and-form pipe reline materials shall be manufactured in compliance with ASTM F1504 or ASTM F1871.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428-2959

F1216-22	Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube
F1743-22	Standard Practice for Rehabilitation of Existing Pipelines and Conduits by Pulled-in-Place Installation of Cured-in-Place Thermosetting Resin Pipe (CIPP)
F2599-22	Standard Practice for Sectional Repair of Damaged Pipe By Means of an Inverted Cured-In-Place Liner
F3541-22	Standard Practice for Sectional Repair of Existing Gravity Flow, Non-Pressure Pipelines and Conduits by Pushed or Pulled-In-Place Installation of Cured-In-Place Thermosetting Resin Pipe (CIPP)

Staff Analysis: A review of the standards proposed for inclusion in the code, ASTM F1216-22 *Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube*, ASTM F1743-22 *Standard Practice for Rehabilitation of Existing Pipelines and Conduits by Pulled-in-Place Installation of Cured-in-Place Thermosetting Resin Pipe (CIPP)* and ASTM F2599-22 *Standard Practice for Sectional Repair of Damaged Pipe By Means of an Inverted Cured-In-Place Liner1,* ASTM F3541-22 *Standard Practice for Sectional Repair of Existing Gravity Flow, Non-Pressure Pipelines and Conduits by Pushed or Pulled-In-Place Installation of Cured-In-Place Thermosetting Resin Pipe (CIPP)1,* with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

The proposed standard ASTM F2561 is in the current edition of the code.

Attached Files

- **Value Engineering Considerations.pdf**
  https://www.cdpaccess.com/proposal/10453/30661/files/download/4716/
- **Example Project Cost Analysis Documentation (2).docx**
  https://www.cdpaccess.com/proposal/10453/30661/files/download/4715/

Reason: The scope of Section 717 with its detailed guidance is clearly intended to include usage with Cured-in-Place Pipe (CIPP) reline materials. The Fold & Form PVC reline materials standards (ASTM F1871 & ASTM F1504) have never had a product certified and listed by ICC-ES and have exceptionally minimal usage in Building Sewer applications only.

This section needs to include the ASTM standards to which ICC-ES is actively certifying and listing CIPP systems to provide more thorough guidance to AHJs; currently, products are certified and listed to ASTM F1216-22 (with ICC required mandatory language) for inversion and ASTM F1743-22 (expected mandatory language revision in 2024 -- currently balloting) for pull-in-place CIPP.

We also propose that the recently passed standard of ASTM F3541-22 be included within this section. ASTM F3541 is for segmental relining by CIPP and closely reflects the actual installation practices utilized within Building Sewer and Building Drain applications. ASTM F3541 includes by reference the same performance property requirements of ASTM F1743 to which ICC-ES currently certifies CIPP systems.

We are also recommending the inclusion of ASTM F2599 (segmental CIPP lining by inversion with patented gaskets) and ASTM F2561 (utility sewer lateral to utility main connection CIPP lining with patented gaskets) that are currently included in the otherwise redundant (same title scope) Section 718. Note that no CIPP systems has ever been certified and listed for use to these standards. Any products applicable to ASTM F2599 or ASTM F2561 will also comply with the same performance property requirements of ASTM F1216 to which ICC-ES already certifies CIPP systems. As such, the inclusion of these proprietary standards is a bit redundant.

Bibliography: F1216-22 Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube

ASTM F1743-24 (expected) [F1743-22] Standard Practice for Rehabilitation of Existing Pipelines and Conduits by Pulled-in-Place Installation of Cured-in-Place Thermosetting Resin Pipe (CIPP)

ASTM F2561-20 Standard Practice for Rehabilitation of a Sewer Service Lateral and Its Connection to the Main Using a One Piece Main and Lateral Cured-in-Place Liner

ASTM F2599-22 Standard Practice for Sectional Repair of Damaged Pipe By Means of an Inverted Cured-In-Place Liner

ASTM F3541-22 Standard Practice for Sectional Repair of Existing Gravity Flow, Non-Pressure Pipelines and Conduits by Pushed or Pulled-In-Place Installation of Cured-In-Place Thermosetting Resin Pipe (CIPP)

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposal only requests referencing standards of materials already otherwise governed by this Code section (thereby is editorial in nature or a clarification), and as such there is no new cost impact.

The addition of existing and newly referenced standards into Section 717 provides no significant cost impact alteration as compared to the existing costs impacts behind the existing code inclusion.

For those interested, we will further expound upon the comparative cost impacts between relining / rehabilitation with Cured-in-Place Pipe (CIPP) versus exhumation and replacement with other piping materials.

The unit costs of CIPP "materials" are typically about the same as other code approved piping alternatives. But depending upon the project scope and site conditions, the unit costs of CIPP "as constructed" are HIGHLY variable as compared to the alternative of exhuming existing piping and replacing with other code approved piping alternatives (refer to the attached project cost analysis documentation).

CIPP "project costs" are significantly driven by the site conditions (and the ancillary "costs" of facility operational disruption tend to also weigh into choosing relining / rehabilitation versus exhumation & replacement) rather than the piping materials cost differences. Hence, a more direct cost comparison to other piping materials' costs is not truly relevant or particularly useful.

So, we will explore how site conditions and operational disruptions create relevant “cost impacts” deserving of thoughtful consideration.

SITE CONDITIONS: Where surface structure restoration costs are exceptionally high, avoidance of such site restoration costs through the remote installation of CIPP (with limited site disruption) can provide significant project cost savings as compared to exhuming the existing piping and replacing with alternative code approved piping materials. The "ancillary" surface structure restoration costs associated with piping exhumation, removal, and replacement is frequently the primary driver of project cost differentials.

Exhumation and replacement can often negatively impact load bearing components of a structure resulting in exceptionally high restoration costs that can be avoided by pipe relining / rehabilitation with CIPP.

Relining / rehabilitation with CIPP can also greatly reduce site safety risks associated with exhumation and prospectively confined space entry. Exhumation and replacement can have environmental and health impacts such as disruption of encapsulated asbestos, lead paint or other hazardous materials, requiring high remediation and disposal costs, as well as subjecting workers and facility occupants to unnecessary risks. Relining / rehabilitation with CIPP can be leveraged to avoid such risks and costs.

Where surface structure restoration and/or remediation costs and risks are high, the higher materials, specialty labor, and equipment costs associated with CIPP installation are generally absorbed and frequently exceeded, resulting in the potential for significant cost savings with CIPP.

OPERATIONAL DISRUPTION & BROADER SOCIAL COSTS: In addition to direct construction costs and risks, the indirect costs and risks of operational disruption often weigh into any project "cost" comparison between a relining / rehabilitation installation with CIPP versus exhumation and replacement with other piping materials.

With facilities such as hospitals, jails, court houses, schools, etc. (even the Pentagon & White House on multiple occasions), the "social costs" of operational disruption from exhumation and replacement are frequently deemed to be entirely unacceptable. Relining / rehabilitation with CIPP can reduce the "social costs" to a more acceptable level.

Schools with emergency piping issues do not have the facility capacity and cannot afford the “social costs” to the community that would be caused by unscheduled shutting down of classrooms for extensive exhumation and replacement of piping during the school year. Jails and other government facilities often have security and operational concerns that are alleviated through remote pipe relining / rehabilitation with CIPP versus direct secure zone entry and disruption that is required for exhumation and replacement.

P111-24

P112-24

IPC: 717.6

Proponents: Luther Grant Whittle, Nu Flow Technologies, "self" (gwhittle@nuflow.com)

2024 International Plumbing Code

Revise as follows:

717.6 Relining materials.
The relining materials shall be manufactured in compliance with applicable standards and certified as required in Section 303. ~~Fold and form pipe reline materials shall be manufactured in compliance with ASTM F1504 or ASTM F1871.~~

Reason: No products have ever been certified and listed by ICC-ES to ASTM F1504 or ASTM F1871. There has been very limited to practically no usage of such Fold & Form PVC products for Building Sewer relining and without Section 303 compliance they should not be used.

Removing Fold & Form PVC standards from Section 717 clarifies the intent of Section 717 as having primary applicability to the widely used Cured-in-Place Pipe (CIPP) systems.

If and when Fold & Form PVC products seek Section 303 compliance through certification & listing, it can be proposed for a new section more relevant to Fold & Form capabilities and limitations.

Bibliography: ASTM F1504-21e1 Standard Specification for Folded Poly(Vinyl Chloride) (PVC) Pipe for Existing Sewer and Conduit Rehabilitation

ASTM F1871-20
Standard Specification for Folded/Formed Poly (Vinyl Chloride) Pipe Type A for Existing Sewer and Conduit Rehabilitation

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

There is no increase or decrease in cost impact as no products compliant with the standards proposed to be removed have ever been certified and listed for use, and therefore, are not code compliant for usage anyway.

The products compliant with ASTM F1504 and ASTM F1871 (Fold & Form PVC pipe) require "direct" access through an access chamber or excavation at both ends of the existing piping, whereas the more commonly used CIPP relining methods only require "remote" access at one end of the existing piping; as a result, the Fold & Form PVC relining methods tend to be significantly higher cost than the CIPP relining methods, contributing to the exceedingly rare (almost non-existent) usage of Fold & Form PVC relining in building sewer applications. This is further attested to by the complete lack of products ever ICC-ES certified to either ASTM F1504 or ASTM F1871 for proper code compliant permitted usage.

P112-24

P113-24

IPC: 717.6, 717.7 (New), 717.8 (New), ASTM Chapter 15 (New)

Proponents: Sidney Lee Cavanaugh, Cavanaugh Consulting, WRT (sidneycavanaugh@yahoo.com)

2024 International Plumbing Code

Revise as follows:

717.6 Relining materials.
The relining materials shall be manufactured in compliance with applicable standards and certified as required in Section 303.~~Fold-and-form pipe reline materials shall be manufactured in compliance with ASTM F1504 or ASTM F1871.~~

Add new text as follows:

717.7 Fold in form. Sectional repair using fold-and-form pipe reline materials shall be manufactured in compliance with ASTM F1504 or ASTM F1871.

717.8 Cured-in-Place-Pipe. Sectional repair using push or pull in place cure-in-place pipe (CIPP) shall be in compliance with ASTM F3541 using gaskets in accordance with ASTM F3240 to ensure water tightness and elimination of ground water penetration. Sectional repair using inversion cure-in-place pipe (CIPP)shall be in compliance with ASTMF1216 or ASTM F2599 using gaskets in accordance with ASTM F3240 to ensure water tightness and elimination of ground water penetration. Main and lateral cured-in-place rehabilitation of building sewer and sewer service lateral pipe and their connections to the main sewer pipe shall be in accordance with ASTM F2561 using gaskets in accordance with ASTM F3240 to ensure water tightness and elimination of ground water penetration.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428-2959

F1216-22	Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube
F3541-22	Standard Practice for Sectional Repair of Existing Gravity Fow, Non-Pressure Pipelines and Conduits by Pushed or Pulled-in-Place Installation of Cured-In-Place Thermosetting Resin Pipe (CIPP)

Staff Analysis: A review of the standard proposed for inclusion in the code, ASTM F1216-22 *Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube1,2* and ASTM F3541-22 *Standard Practice for Sectional Repair of Existing Gravity Flow, Non-Pressure Pipelines and Conduits by Pushed or Pulled-In-Place Installation of Cured-In-Place Thermosetting Resin Pipe (CIPP)1,* with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: ASTM F3541 is the preferred method of rehabilitation using CIPP technology inside the building parameter and ASTM F1216 is referenced for requirements in all other CIPP standards in Section 718. adding more clarification regarding Hydrophilic gaskets and rings is consistent with the requirements in Section 718 currently and is an health and safety issue.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

there is no material cost added to this code as the standards referenced are currently referenced in the code and the standards reference each other in most cases such as ASTM F1216 and ASTM F3541. ASTM F3240, and the required use of hydrophilic gaskets, is in Section 718 where the minimal cost is already recognized by the code.

P113-24

P114-24

IPC: 717.6, 717.7 (New)

Proponents: Sidney Lee Cavanaugh, Cavanaugh Consulting, WRT (sidneycavanaugh@yahoo.com)

2024 International Plumbing Code

717.6 Relining materials.
The relining materials shall be manufactured in compliance with applicable standards and certified as required in Section 303. Fold-and-form pipe reline materials shall be manufactured in compliance with ASTM F1504 or ASTM F1871.

Add new text as follows:

717.7 Cured-in-place-pipe. Sectional cured-in-place pipe rehabilitation of building sewer piping and sewer service lateral piping shall be in accordance with ASTM F2599. Main and lateral cure-in-place pipe rehabilitation of building sewer and sewer service lateral pipe and their connections to the main sewer pipe shall be in accordance with ASTM F2561. Hydrophilic rings or gaskets in cure-in-place rehabilitation of building sewer piping and sewer service laterals shall be in accordance with ASTM F3240 to ensure water tightness and elimination of ground water penetration.

Staff Analysis: The proposed standards are in the current edition of the code.

Reason: This code change simply moves Section 718 into Section 717. Both Sections cover the rehabilitation of building sewers and building drains.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal simply moves existing requirements in Section 718 into Section 717 and thus cost allowance is already in code.

P114-24

P115-24

IPC: 717.10 (New), 717.10

Proponents: Sidney Lee Cavanaugh, Cavanaugh Consulting, WRT (sidneycavanaugh@yahoo.com)

2024 International Plumbing Code

Add new text as follows:

717.10 Pressure Testing. The rehabilitated piping system shall be tested in accordance with Section 312.

Revise as follows:

~~717.10~~ 717.11 Approval.
Upon verification of compliance with the requirements of Sections 717.1 through ~~717.9~~ 717.10, the code official shall approve the installation.

Reason: All sanitary drainage systems must be pressure tested in accordance with Section 312 as is noted in Section 701.6 and 716.8 in Chapter 7. It also needs to be clarified in Section 717 and 718 that this is necessary.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Pressure testing is required in multiple Sections of the code currently and the cost allowance is already recognized.

P115-24

P116-24

IPC: SECTION 202 (New), 718.1, ASTM Chapter 15 (New)

Proponents: Joanne Carroll, Subtegic Group Inc., Subtegic Group Inc (jcarroll@subtegic.com)

2024 International Plumbing Code

Add new definition as follows:

CURED-IN-PLACE PIPE (CIPP). A system consisting of a flexible textile tube saturated with a thermosetting resin used to rehabilitate existing pipe in-place by insertion and cure within an existing pipe.

Revise as follows:

718.1 Cured-in-place pipe (CIPP).
The cured-in-place pipe (CIPP) materials shall be manufactured in compliance with applicable standards and certified as required in Section 303. ~~Sectional cure-in-place~~ CIPP rehabilitation of building drain and *building sewer* piping ~~and *sewer* service lateral piping~~ shall be installed in accordance with ASTM F1216, ASTM F3541, or F2599. ~~Main and lateral cure-in-place~~ CIPP rehabilitation of a *building sewer* ~~and *sewer* service lateral pipe~~ and ~~their~~ its connection~~s~~ to the main *sewer* pipe shall be installed in accordance with ASTM F2561. Seamless molded ~~H~~ hydrophilic ~~rings or~~ gaskets in ~~cure-in-place~~ CIPP rehabilitation of ~~*building sewer* piping and *sewer* service~~ lateral~~s~~ pipelines shall be installed in accordance with ASTM F3240 ~~to ensure water tightness and elimination of ground water penetration~~.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428-2959

F1216 - 2022	Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube
F3541 - 2022	Standard Practice for Sectional Repair of Existing Gravity Flow, Non-Pressure Pipelines and Conduits by Pushed or Pulled-In-Place Installation of Cured-In-Place Thermosetting Resin Pipe (CIPP)

Staff Analysis: A review of the standard proposed for inclusion in the code, ASTM F1216-2022 *Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube* and ASTM F3541-2022 *Standard Practice for Sectional Repair of Existing Gravity Flow, Non-Pressure Pipelines and Conduits by Pushed or Pulled-In-Place Installation of Cured-In-Place Thermosetting Resin Pipe (CIPP)*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: As is the case with all plumbing-related pipe, materials, fittings and fixtures, in order to ensure quality and appropriateness for the intended use, CIPP lining materials must be manufactured in accordance with an industry standard.

The addition of CIPP installation standards ASTM F1216 and ASTM F3541 cover the requirements for the installation of CIPP when using the inversion or pushed or pulled-in place installation methods.

Reference to ASTM F2561 is made to clearly describe the scope of F2561 as appropriate for the reference to installation of CIPP for the rehabilitation of a building sewer and its connection to the main. Reference to ASTM F3240 is clarified to the scope of ASTM F3240 that is specific to covering the requirements for the installation of seamless molded hydrophilic gaskets in the CIPP rehabilitation of main and lateral pipelines.

Bibliography: Scope from ASTM F2561 - "*1.1 This practice covers requirements and test methods for the reconstruction of a sewer service lateral pipe having an inner diameter of 3 to 12 in. (7.6 to 30.5 cm) and its connection to the main pipe having an inner diameter of 6 to 24 in. (15.2 to 61.0 cm) and up the lateral a maximum of 150 ft (46 m) without excavation.*"

Scope from ASTM F3240 - "*1.1 This practice covers the requirements for the installation of seamless molded hydrophilic gaskets (SMHG) in cured-inplace pipe (CIPP) rehabilitation of main and lateral pipelines.*"

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The change proposal adds industry standards and provides clarity for the application of CIPP already included in the code.

P116-24

P117-24 Part I

IPC: 718.1, ASTM Chapter 15 (New)

Proponents: Kevin Duerr-Clark, NYS DOS, NYS DOS (kevin.duerr-clark@dos.ny.gov); Jeanne Rice, NYSDOS (jeanne.rice@dos.ny.gov); China Clarke, New York State Dept of State, Manager Technical Support Unit (china.clarke@dos.ny.gov); Chad Sievers, NYS, NYS DOS (chad.sievers@dos.ny.gov); John R Addario - NYS Department of State, NEW YORK STATE CODES DIVISION, New York State Department of State Division of Building Standards and Codes (john.addario@dos.ny.gov)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

Revise as follows:

718.1 Cure-in-place.
~~Sectional~~ ~~c~~Cure-in-place rehabilitation of *building sewer* piping and *sewer* service lateral piping shall be in accordance with ASTM F1216, ASTM F1743, ASTM F2561, or ASTM F2599. ~~Main and lateral cure-in-place rehabilitation of *building sewer* and *sewer* service lateral pipe and their connections to the main *sewer* pipe shall be in accordance with ASTM F2561.~~ Hydrophilic rings or gaskets in cure-in-place rehabilitation of *building sewer* piping and *sewer* service laterals shall be in accordance with ASTM F3240 to ensure water tightness and elimination of ground water penetration.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428-2959

F1216 - 22	Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube
ASTM F1743 - 22	Standard Practice for Rehabilitation of Existing Pipelines and Conduits by Pulled-in-Place Installation of Cured in-Place Thermosetting Resin Pipe (CIPP)

Staff Analysis: The proposed standard ASTM F2561 is in the current edition of the code.
A review of the standard proposed for inclusion in the code, ASM F1216 - 22 *Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube* and ASTM F1743 - 22 *Standard Practice for Rehabilitation of Existing Pipelines and Conduits by Pulled-in-Place Installation of Cured in-Place Thermosetting Resin Pipe (CIPP)*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: Cure-in-place pipe lining is a commonly used method of rehabilitating existing sewer piping and laterals. The 2021 International Plumbing Code added this new Section 718, but left off several important ASTM reference standards that are necessary to allow different methods of cure-in-place lining to be used properly. This proposal adds two additional reference standards as noted.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This code change is simply adding options for methods of rehabilitating existing sewers and laterals by cured-in-place lining. Owners and designers may chose to rehabilitate sewers via this method, and then chose which standards are most appropriate for their project. Therefore, nothing new is being mandated by this change; the change only provides more options.

P117-24 Part I

P117-24 Part II

IRC: P3012.1 (New), ASTM Chapter 44 (New)

Proponents: Kevin Duerr-Clark, NYS DOS, NYS DOS (kevin.duerr-clark@dos.ny.gov); Brian Tollisen, NYS Department of State, NYS Department of State (brian.tollisen@dos.ny.gov); China Clarke, New York State Dept of State, Manager Technical Support Unit (china.clarke@dos.ny.gov); Chad Sievers, NYS, NYS DOS (chad.sievers@dos.ny.gov); John R Addario - NYS Department of State, NEW YORK STATE CODES DIVISION, New York State Department of State Division of Building Standards and Codes (john.addario@dos.ny.gov); Jeanne Rice, NYSDOS (jeanne.rice@dos.ny.gov)

2024 International Residential Code

Add new text as follows:

P3012.1 Cure-in-place. Cure-in-place rehabilitation of building sewer piping and sewer service lateral piping shall be in accordance with ASTM F1216, ASTM F1743, ASTM F2561, or ASTM F2599. Hydrophilic rings or gaskets in cure-in-place rehabilitation of building sewer piping and sewer service laterals shall be in accordance with ASTM F3240 to ensure water tightness and elimination of ground water penetration.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

F1216 - 22	Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube
F1743 - 22	Standard Practice for Rehabilitation of Existing Pipelines and Conduits by Pulled-in-Place Installation of Cured in-Place Thermosetting Resin Pipe (CIPP)
F2599-22	Standard Practice for Sectional Repair of Damaged Pipe By Means of an Inverted Cured-In-Place Line
F3240-19 (2023)	Standard Practice for Installation of Seamless Molded Hydrophilic Gaskets (SMHG) for Long-Term Watertightness of Cured-in-Place Rehabilitation of Main and Lateral Pipelines

Staff Analysis: The proposed standard ASTM F2561 is in the current edition of the code.

A review of the standards proposed for inclusion in the code,

ASTM F1216 - 22 *Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube*

ASTM F1743 - 22 *Standard Practice for Rehabilitation of Existing Pipelines and Conduits by Pulled-in-Place Installation of Cured in-Place Thermosetting Resin Pipe (CIPP)*

ASTM F2599-22 *Standard Practice for Sectional Repair of Damaged Pipe By Means of an Inverted Cured-In-Place Line*

ASTM F3240-19 (2023) *Standard Practice for Installation of Seamless Molded Hydrophilic Gaskets (SMHG) for Long-Term Watertightness of Cured-in-Place Rehabilitation of Main and Lateral Pipelines Standard Practice for Rehabilitation of a Sewer Service Lateral and Its Connection to the Main Using a One Piece Main and Lateral Cured-in-Place Liner*,with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: Cure-in-place pipe lining is a commonly used method of rehabilitating existing sewer piping and laterals. The 2021 International Plumbing Code added a new Section 718 to the IPC, but nothing was added for the Residential Provisions and 718 left off several important ASTM reference standards that are necessary to allow different methods of cure-in-place lining to be used properly. This proposal pulls in the language from the IPC and adds two additional reference standards as noted.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This code change is simply adding options for methods of rehabilitating existing sewers and laterals by cured-in-place lining. Owners and designers may chose to rehabilitate sewers via this method, and then chose which standards are most appropriate for their project. Therefore, nothing new is being mandated by this change; the change only provides more options.

P117-24 Part II

P118-24

IPC: SECTION 718, 718.1

Proponents: Luther Grant Whittle, Nu Flow Technologies, "self" (gwhittle@nuflow.com)

2024 International Plumbing Code

Delete without substitution:

~~SECTION 718~~
~~REHABILITATION OF BUILDING SEWERS AND BUILDING DRAINS~~

~~**718.1 Cure-in-place.**~~
~~Sectional cure-in-place rehabilitation of *building sewer* piping and *sewer* service lateral piping shall be in accordance with ASTM F2599. Main and lateral cure-in-place rehabilitation of *building sewer* and *sewer* service lateral pipe and their connections to the main *sewer* pipe shall be in accordance with ASTM F2561. Hydrophilic rings or gaskets in cure-in-place rehabilitation of *building sewer* piping and *sewer* service laterals shall be in accordance with ASTM F3240 to ensure water tightness and elimination of ground water penetration.~~

Attached Files

- **Value Engineering Considerations.pdf**
  https://www.cdpaccess.com/proposal/10474/30655/files/download/4714/
- **Example Project Cost Analysis Documentation (2) (2).docx**
  https://www.cdpaccess.com/proposal/10474/30655/files/download/4713/
- **Cast Iron IPC CIPP Example.pdf**
  https://www.cdpaccess.com/proposal/10474/30655/files/download/4712/
- **Lining IPC CIPP Example.pdf**
  https://www.cdpaccess.com/proposal/10474/30655/files/download/4711/

Reason: Section 718 is redundant with Section 717, having the exact same scope. The CIPP standards referenced are suggested to be added to the more comprehensive Section 717 in a separate proposal.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Consolidating the redundant Section 718 with Section 717.

The elimination of the "redundant" section 718 through consolidation with Section 717 (which inappropriately has the exact same scope of application as per their section titles), does not inherently alter the code inclusive availability of any methods or materials and therefore does NOT affect the cost of construction. All IPC compliant, listed and certified Cured-in-Place Pipe (CIPP) materials, including those governed by the ASTM standards currently referenced within Section 718, are also capable of compliance with the "same" scope of application defined more completely within Section 717.

All CIPP systems are currently ICC-ES certified and listed to ASTM F1216 or ASTM F1743; the ASTM standards referenced within Section 718 also rely upon certification to the performance requirements of ASTM F1216, as referenced from within those ASTM standards. No CIPP products have ever been certified and listed to ASTM F2561, ASTM F2599, or ASTM F3240 (a gasket standard, not a CIPP standard).

As the proposal to eliminate Section 718 does not eliminate the availability or code approved usage of any CIPP materials or methods (which ALL still have the ability to comply with Section 717), the proposal is "editorial in nature or a clarification" (removing an inherent redundancy within the Code) and therefore has no impact on the cost of construction. Section 717 has greater depth of guidance to AHJs regarding the proper usage of ALL pipe relining systems, including CIPP, and the CIPP standards listed within Section 718 likewise need to be governed by the same depth of guidance for use as is provided within Section 717. Furthermore, in the separate proposal, 10453, the ASTM CIPP standards (ASTM F2561 and ASTM F2599) found within Section 718 are among the CIPP industry standards proposed for more appropriate inclusion into Section 717, instead of the redundant Section 718 that is proposed for removal.This proposal has no intention to eliminate (nor effect of eliminating) the option of using ANY currently code approved CIPP materials or methods of construction, and therefore has NO cost impact; this proposal merely consolidates redundant sections of the Code.For those interested, we will further expound upon the comparative cost impacts between relining / rehabilitation with Cured-in-Place Pipe (CIPP) versus exhumation and replacement with other piping materials.

The unit costs of CIPP "materials" are typically about the same as other code approved piping alternatives. But depending upon the project scope and site conditions, the unit costs of CIPP "as constructed" are HIGHLY variable as compared to the alternative of exhuming existing piping and replacing with other code approved piping alternatives (refer to the attached project cost analysis documentation).

CIPP "project costs" are significantly driven by the site conditions (and the ancillary "costs" of facility operational disruption tend to also weigh into choosing relining / rehabilitation versus exhumation & replacement) rather than the piping materials cost differences. Hence, a more direct cost comparison to other piping materials' costs is not truly relevant or particularly useful.

So, we will explore how site conditions and operational disruptions create relevant "cost impacts" deserving of thoughtful consideration.

SITE CONDITIONS: Where surface structure restoration costs are exceptionally high, avoidance of such site restoration costs through the remote installation of CIPP (with limited site disruption) can provide significant project cost savings as compared to exhuming the existing piping and replacing with alternative code approved piping materials. The "ancillary" surface structure restoration costs associated with piping exhumation, removal, and replacement is frequently the primary driver of project cost differentials.

Exhumation and replacement can often negatively impact load bearing components of a structure resulting in exceptionally high restoration costs that can be avoided by pipe relining / rehabilitation with CIPP.

Relining / rehabilitation with CIPP can also greatly reduce site safety risks associated with exhumation and prospectively confined space entry. Exhumation and replacement can have environmental and health impacts such as disruption of encapsulated asbestos, lead paint or other hazardous materials, requiring high remediation and disposal costs, as well as subjecting workers and facility occupants to unnecessary risks. Relining / rehabilitation with CIPP can be leveraged to avoid such risks and costs.

Where surface structure restoration and/or remediation costs and risks are high, the higher materials, specialty labor, and equipment costs associated with CIPP installation are generally absorbed and frequently exceeded, resulting in the potential for significant cost savings with CIPP.

OPERATIONAL DISRUPTION & BROADER SOCIAL COSTS: In addition to direct construction costs and risks, the indirect costs and risks of operational disruption often weigh into any project "cost" comparison between a relining / rehabilitation installation with CIPP versus exhumation and replacement with other piping materials.

With facilities such as hospitals, jails, court houses, schools, etc. (even the Pentagon & White House on multiple occasions), the "social costs" of operational disruption from exhumation and replacement are frequently deemed to be entirely unacceptable. Relining / rehabilitation with CIPP can reduce the "social costs" to a more acceptable level.

Schools with emergency piping issues do not have the facility capacity and cannot afford the "social costs" to the community that would be caused by unscheduled shutting down of classrooms for extensive exhumation and replacement of piping during the school year. Jails and other government facilities often have security and operational concerns that are alleviated through remote pipe relining / rehabilitation with CIPP versus direct secure zone entry and disruption that is required for exhumation and replacement.

P118-24

P119-24

IPC: 802.1.5

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov)

2024 International Plumbing Code

Revise as follows:

802.1.5 Nonpotable clear-water waste.
Where devices and equipment such as process tanks, filters, drips, and boilers, plumbing appliances, or other mechanical equipment discharge nonpotable water to the building drainage system, the discharge shall be through an indirect waste pipe by means of an air break or an air gap to an approved waste receptor.

Reason: This section has only referenced process tanks, boilers, filters and drips, condensate is a non-potable clearwater waste that is often generated at mechanical equipment such as furnaces and air conditioners, as well as condensing water heaters and tankless water heaters. This proposal will include a wider range of nonpotable clear water waste and address how to dispose of it.

Bibliography: See reason statement.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is for clarification only and does not impart any additional requirements.

P119-24

P120-24

IPC: SECTION 202 (New), 802.1.9 (New)

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov)

2024 International Plumbing Code

Add new definition as follows:

DUMP SINK

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A sink provided in food service operations for the sole purpose of dumping leftover liquids from drinking containers, these sinks can be stand-alone fixtures or in combination with a 3-compartment sink.

Add new text as follows:

802.1.9 Dump sinks. When dump sinks are required, they shall discharge directly or indirectly through an air gap or air break to the drainage system.

Reason: Public health agencies are requiring these fixtures in an effort to keep food service operation staff from dumping leftover liquids/beverages into food preparation sinks where they could cause a potential contamination issue. This proposal is intended to provide direction for how these fixtures should be viewed and how they will be permitted to discharge to the drainage systems.

Bibliography: See reason statement.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

These sinks are already being required by public health agencies so there would be no additional costs.

P120-24

P121-24

IPC: 802.4, 802.4.3

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov)

2024 International Plumbing Code

Revise as follows:

802.4 Waste receptors.
For other than hub drains that receive only clear-water waste and standpipes, a removable strainer or basket shall cover the outlet of waste receptors. Waste receptors shall not be installed in concealed spaces. Waste receptors shall not be installed in plenums, crawl spaces, attics, interstitial spaces above ceilings and below floors. *Ready access* shall be provided to waste receptors.

Exception: *Access* shall be provided for automatic clothes washer standpipe drains for rodding.

802.4.3 Standpipes.
Standpipes shall be individually trapped. Standpipes shall extend not less than 18 inches (457 mm) but not greater than 42 inches (1067 mm) above the trap weir. ~~*Access* shall be provided to standpipes and drains for rodding.~~

Reason: It is imperative that indirect waste receptors are provided with 'Ready Access" since they receive indirect waste discharge. Without the clear view of the waste receptor, a backup in the drainage system can result in damage due to the concealed location of the waste receptor. The portion of this section which previously indicated standpipes shall be provided with "Access" allows for all standpipes to be concealed in some fashion. Allowing for "Access" to be provided specifically for automatic clothes washer standpipe makes sense due to the fact there is a minimum and maximum height the standpipe is permitted to extend above the trap which results in many of these being concealed by the automatic clothes washers. However, if only providing "Access" is permitted for all types of standpipes, it results in standpipes located under counters behind cabinet doors where they will not be observable to the occupants.

Bibliography: See reason statement.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal does not positively or negatively impact costs, it just clarifies which waste receptors are required to be provided with "Ready Access" and which ones are required to be provided with "Access".

P121-24

P122-24

IPC: 903.1.2

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov)

2024 International Plumbing Code

Revise as follows:

903.1.2 Roof used for recreational or assembly purposes.
Where a roof is to be used as a promenade, restaurant, bar, or sunbathing deck, as an observation deck, or for similar purposes, open vent pipes, including side wall vent terminations, shall terminate not less than 7 feet (2134 mm) above the roof.

Reason: In many cases side wall vent terminals have not been considered in the application of this section. Many code users have improperly assumed this section only applied to thru roof vent terminations. This has led to situations where fumes/vapors from a side wall vent terminal located below an occupiable room area are drawn up or otherwise entering the occupiable roof area. The language should be made more clear that this includes side wall vents as an air contamination source.

Bibliography: See reason statement.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The requirement is already in the code, this proposal just clarifies to users that side wall vent terminations should be included in the implementation of this section.

P122-24

P123-24

IPC: 903.1.2

Proponents: Ken Smithart Jr, IPS Corporation, Studor (ken.smithart@ipscorp.com)

2024 International Plumbing Code

Revise as follows:

903.1.2 Roof used for recreational or assembly purposes. Where a roof is to be used as a promenade, restaurant, bar, or sunbathing deck, as an observation deck, or for similar purposes, open vent pipes shall terminate not less than 7 feet (2134 mm) above the roof. <u>As an alternative, open vent pipes shall terminate to a stack type air admittance valve conforming to ASSE 1050. Such air admittance valves shall be installed in accordance with the manufacturer's instructions and fitted with a with a UV-rated cover.</u>

Staff Analysis: The proposed standards are in the current edition of the code.

Attached Files

- **Studor Engineered Products Manual - 10th Edition (1).pdf**
  https://www.cdpaccess.com/proposal/9704/30403/files/download/4658/
- **Cost Impact Calculations - Rooftop Stack AAV.pdf**
  https://www.cdpaccess.com/proposal/9704/30403/files/download/4657/

Reason: Stack type AAVs have been used for decades for rooftop promenades, restaurants, bars, sunbathing decks, or observation decks to eliminate sewer gas odors on the rooftop environment.

Bibliography: Studor Engineered Products Manual - 10th Edition

Cost Impact: Decrease

Estimated Immediate Cost Impact:

The cost of installing a stack-type air admittance valve to a rooftop application is approximately $450 less than adding at least seven (7) feet of pipe and securing it to the roof with guy wires.

Estimated Immediate Cost Impact Justification (methodology and variables):

See Cost Impact Calculations attachment.

P123-24

P124-24

IPC: 904.2, 904.2.1 (New), 904.2.2 (New)

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov)

2024 International Plumbing Code

Revise as follows:

904.2 ~~Stack vents and vent stacks~~ ~~Vent stack required.~~ ~~A vent *stack* shall be required for every drainage *stack* that has five *branch intervals* or more.~~ Stack vents and vent stacks shall be provided in accordance with section 904.2.1 and 904.2.2, and shall be sized in accordance with Section 906.1.

Exception: Drainage *stacks* installed in accordance with Section 913 and Section 917.

Add new text as follows:

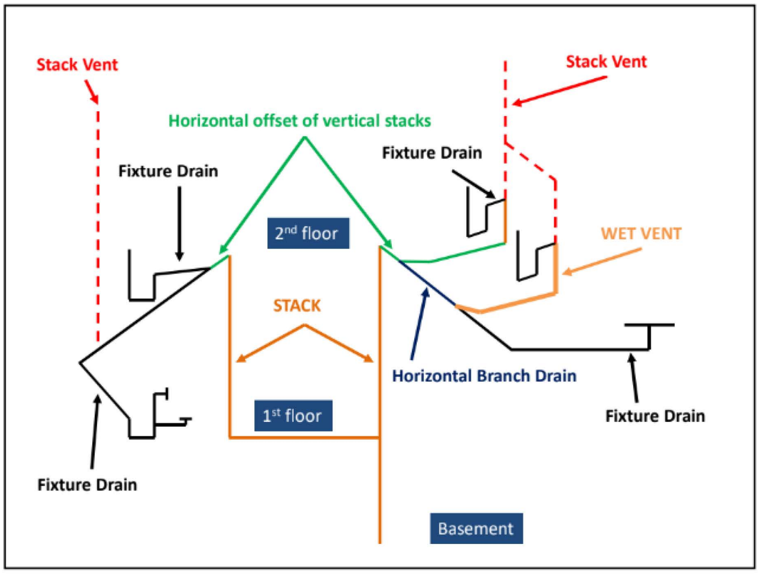
904.2.1 Stack vent required. Each soil or waste stack shall be provided with a stack vent at the interconnection between the stack and the uppermost drainage connection to the stack.

904.2.2 Vent stack required. A vent *stack* shall be required for every drainage *stack* that has five *branch intervals* or more.

Exception: Drainage *stacks* installed in accordance with Section 913.

Reason: Though technically the definition of a stack vent ensures a soil or waste stack has a stack vent, clarification is need as to where it should be applied. Many installation have been installed where the stack is simply terminated to a 90 degree fitting to a horizontal pipe which connects to a bathroom group or other fixtures, however, this wide interpretation can lead to installers providing piping configurations that leave fixture traps unprotected.

Consider a vertical stack that originated in the basement of a 2-story home with a master bath on the second story with a water closet, 2 lavatories, a show and a whirlpool tub. A 2 inch branch is installed below the first floor and extends 12 feet before turning vertically to the 2nd floor where the shower and whirlpool are to be connected. The drain travels through 1 full story which by definition makes it a "stack". The stack connects to a 90 degree fitting and turns horizontally. The shower is connected via a wye fitting and the drain extends another 2 feet where a vertical vent is connected. From there it extends to the whirlpool. Many would look at this and consider it a circuit vent or a version of a wet vent, however, that is just not the case. This configuration did not create a horizontal branch drain because the stack did not have a stack vent applied at the interconnection of the horizontal drain and the stack. The vent connection applied is actually the stack vent which is upstream of the shower drain leaving the trap unprotected. When water is discharge from the 80 gallon whirlpool, the flow of the water blocks the venting pathway for the shower trap and when the waste eater reaches the stack and begin to fall, the negative pressure generated within the piping system results in positive pressure from the atmosphere pushing the shower trap seal around , siphoning the trap, until the positive pressure can enter the system to balance out the negative pressure. See attached isometric.



Bibliography: See reason statement

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal technically should have no impact on cost and is entirely for clarification purposes only, see reason statement.

P124-24

P125-24 Part I

IPC: 905.2

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

Revise as follows:

905.2 Grade. Horizontal ~~Vent~~ vent and *branch vent* pipes shall be installed level, or sloped ~~so graded and connected as~~ to drain back to the drainage pipe by gravity.

P125-24 Part I

P125-24 Part II

IRC: P3104.2

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov)

2024 International Residential Code

Revise as follows:

P3104.2 Grade. Horizontal ~~Vent~~ vent and branch vent pipes shall installed level, or be ~~graded~~ sloped~~, connected and supported to allow moisture and condensate~~ to drain back to the ~~soil or waste~~ drainage pipe by gravity.

Reason: The intent of this section is to ensure vent systems are installed in a manner that does not result in a situation where condensate can collect in sufficient quantities which would result in a blockage of a vent. A vent pipe that is run level could not retain enough water to cause this to occur, at best, a residual amount of water could be left behind on the invert of the pipe due to surface tension. This residual water would never be enough to block or substantially restrict the emission or admission of air for balancing the system.

Bibliography: See reason statement.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal adds no additional requirements for an installation, but rather provides more options for compliance.

P125-24 Part II

P126-24

IPC: 906.2

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov)

2024 International Plumbing Code

Revise as follows:

906.2 Vents other than stack vents or vent stacks. The diameter of individual vents, *branch vents*, circuit vents and relief vents shall be not less than one-half the ~~required diameter of the drain served~~ diameter of the largest rough-in drain to be served**.** The required size of the drain shall be determined in accordance with Table 710.1(2). Vent pipes shall be not less than $1^1/_4$ inches (32 mm) in diameter. Vents exceeding 40 feet (12 192 mm) in *developed length* shall be increased by one nominal pipe size for the entire *developed length* of the vent pipe. Relief vents for soil and waste *stacks* in buildings having more than 10 *branch intervals* shall be sized in accordance with Section 908.2.

Reason: There exists a contradiction in the current code text between section 906.2 and section 905.6. One requires the vent to be sized based on the required size of the drain served while the other requires the vent to be sized based on the rough-in size of the drain served. Leaving section 906.2 as is also can create compliance issue in the future. Jurisdictions typically are only required to keep records for 2 to 4 years for construction documents. If a building was designed with pipe sizes one size larger than "required" in an effort to allow for future expansion, the installed vent will be undersized once the DFU value added reaches the point where the larger size pipe is required. In such a design, the additional DFU load added may not happen within 2 to 4 years, maybe it happens 10 years down the road and no one involved has the records or remembers the vent was sized based on the "required size" of the drain served. A best practice here is to always require the vent to be sized based on the installed size of the drain.

905.6 Vent for future fixtures.

Where the drainage piping has been roughed-in for future fixtures, a rough-in connection for a vent shall be installed. The vent size shall be not less than one-half the diameter of the rough-in drain to be served. The vent rough-in shall connect to the vent system, or shall be vented by other means as provided for in this chapter. The connection shall be identified to indicate that it is a vent.

Bibliography: See reason statement.

Cost Impact: Increase

Estimated Immediate Cost Impact:

The increased cost will be minimal as it will only require the vents to be sized appropriately for the given size of the largest drainage pipe served. Based on retail prices a conservative estimate for the increase is a range of approximately $4 - $20 per 10 foot length of pipe.

Estimated Immediate Cost Impact Justification (methodology and variables):

The increased cost will be minimal as it will only require the vents to be sized appropriately for the given size of the largest drainage pipe served. The overall impact would be determined by the length of the associated vent and the mark -up in material cost by the contractor. As an example, Lowe's lists the price of 10 ft. sections of PVC pipe as follows:

1-1/2 inch - $11.37

2 inch - $15.78

3 inch - $29.47

4 inch - $48.31

P126-24

P127-24

IPC: 907.1, ASSE Chapter 15 (New)

Proponents: Ken Smithart Jr, IPS Corporation, Studor (ken.smithart@ipscorp.com)

2024 International Plumbing Code

Revise as follows:

907.1 Vent for horizontal offset of drainage stack.
Horizontal offsets of drainage *stacks* shall be vented where five or more *branch intervals* are located above the offset. The offset shall be vented by venting the upper section of the drainage *stack* and the lower section of the drainage *stack*, or in single stack drainage systems, a positive pressure reduction device conforming to ASSE 1030 shall be installed in accordance with the manufacturer's instructions.

Add new standard(s) as follows:

ASSE

ASSE International
18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448

1030-2016	Performance Requirements for Positive Pressure Reduction Devices for Sanitary Drainage Systems

Staff Analysis: A review of the standard proposed for inclusion in the code, ASSE 1030-2016 *Performance Requirements for Positive Pressure Reduction Devices for Sanitary Drainage Systems,* with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: The current language does not address single stack drainage systems where positive pressure reduction devices conforming to ASSE 1030 are used to protect the trap seals from positive pressure transients in the drainage system.

Bibliography: ASSE 1030 standard for Performance Requirements for Positive Pressure Reduction Devices for Sanitary Drainage Systems
Studor Engineered Products Manual - 10th Edition

Cost Impact: Decrease

- **PPRD Manual.pdf**
  https://www.cdpaccess.com/proposal/9710/30405/documentation/145586/attachments/download/4540/
- **Cost Impact Calculations - PPRD.pdf**
  https://www.cdpaccess.com/proposal/9710/30405/documentation/145586/attachments/download/4539/
- **Studor Engineered Products Manual - 10th Edition.pdf**
  https://www.cdpaccess.com/proposal/9710/30405/documentation/145586/attachments/download/4236/

Estimated Immediate Cost Impact:

The cost of a single stack pipe system is less than that of an equivalent conventional two-stack pipe system.

Estimated Immediate Cost Impact Justification (methodology and variables):

See Cost Impact Calculations attachment.

P127-24

P128-24

IPC: 907.2, ASSE Chapter 15 (New)

Proponents: Ken Smithart Jr, IPS Corporation, Studor (ken.smithart@ipscorp.com)

2024 International Plumbing Code

Revise as follows:

907.2 Upper section.
The upper section of the drainage *stack* shall be vented as a separate *stack* with a vent *stack* connection installed in accordance with Section 904.4, or in single stack drainage systems, a positive pressure reduction device conforming to ASSE 1030 shall be installed above the offset in the stack in accordance with the manufacturer's instructions. The offset shall be considered to be the base of the *stack*.

Add new standard(s) as follows:

ASSE

ASSE International
18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448

1030-2016	Performance Requirements for Positive Pressure Reduction Devices for Sanitary Drainage Systems

Staff Analysis: A review of the standard proposed for inclusion in the code, ASSE 1030-2016 *Performance Requirements for Positive Pressure Reduction Devices for Sanitary Drainage Systems,* with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: The current language does not address single stack drainage systems with offsets where positive pressure reduction devices (PPRDs) conforming to ASSE 1030 are used to protect the trap seals on branches from positive pressure transients. PPRDs are used to reduce positive pressures at the base of the stack.

Bibliography: ASSE 1030 standard for Performance Requirements for Positive Pressure Reduction Devices for Sanitary Drainage Systems
Studor Engineered Products Manual - 10th Edition

Cost Impact: Decrease

Estimated Immediate Cost Impact:

The cost of a single stack pipe system is less than that of an equivalent conventional two-stack pipe system

Estimated Immediate Cost Impact Justification (methodology and variables):

See Cost Impact Calculations attachment.

Estimated Life Cycle Cost Impact:

P128-24

P129-24

IPC: 907.3, ASSE Chapter 15 (New)

Proponents: Ken Smithart Jr, IPS Corporation, Studor (ken.smithart@ipscorp.com)

2024 International Plumbing Code

Revise as follows:

907.3 Lower section.
The lower section of the drainage *stack* shall be vented by a yoke vent connecting between the offset and the next lower horizontal *branch*. The yoke vent connection shall be permitted to be a vertical extension of the drainage *stack*. The size of the yoke vent and connection shall be not less than the size required for the vent *stack* of the drainage *stack*, or in single stack drainage systems, a positive pressure reduction device conforming to ASSE 1030 shall be installed in accordance with the manufacturer's instructions and stack type air admittance valves shall be installed at the top of offset drainage stacks in accordance with ASSE 1050.

Add new standard(s) as follows:

ASSE

ASSE International
18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448

1030-2016	Performance Requirements for Positive Pressure Reduction Devices for Sanitary Drainage Systems

Staff Analysis: A review of the standard proposed for inclusion in the code, ASSE 1030-2016 *Performance Requirements for Positive Pressure Reduction Devices for Sanitary Drainage Systems,* with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: The current language does not address single stack drainage systems with offsets where positive pressure reduction devices conforming to ASSE 1030 are used to protect the trap seals on branches from positive pressure transients.

Bibliography: ASSE 1030 standard for Performance Requirements for Positive Pressure Reduction Devices for Sanitary Drainage Systems
Studor Engineered Products Manual - 10th Edition

Cost Impact: Decrease

Estimated Immediate Cost Impact:

The cost of a single stack pipe system is less than that of an equivalent conventional two-stack pipe system.

Estimated Immediate Cost Impact Justification (methodology and variables):

See Cost Impact Calculations attachment.

P129-24

P130-24

IPC: 908.1, ASSE Chapter 15 (New)

Proponents: Ken Smithart Jr, IPS Corporation, Studor (ken.smithart@ipscorp.com)

2024 International Plumbing Code

Revise as follows:

908.1 Where required.
Soil and waste *stacks* in buildings having more than 10 *branch intervals* shall be provided with a relief vent at each tenth interval installed, beginning with the top floor.When a single stack drainage system is installed utilizing a combination of air admittance valves and positive pressure reduction devices (PPRDs), a PPRD shall be permitted to serve as a relief vent for the stack when the PPRDs are located no greater than six (6) branch intervals apart, and installed in accordance with the manufacturer's instructions.

Add new standard(s) as follows:

ASSE

ASSE International
18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448

1030-2016	Performance Requirements for Positive Pressure Reduction Devices for Sanitary Drainage Systems

Staff Analysis: A review of the standard proposed for inclusion in the code, ASSE 1030-2016 *Performance Requirements for Positive Pressure Reduction Devices for Sanitary Drainage Systems,* with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: The current code language does not address relief vents for single stack drainage systems. Positive pressure reduction devices conforming to ASSE 1030 installed in accordance with the manufacturer's instructions provide relief from positive pressure transients in waste stacks.

Bibliography: ASSE 1030 standard for Performance Requirements for Positive Pressure Reduction Devices for Sanitary Drainage Systems
Studor Engineered Products Manual - 10th Edition

Cost Impact: Decrease

Estimated Immediate Cost Impact:

The cost of a single stack pipe system is less than that of an equivalent conventional two-stack pipe system.

Estimated Immediate Cost Impact Justification (methodology and variables):

See Cost Impact Calculations attachment.

P130-24

P131-24

IPC: 915.1

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov)

2024 International Plumbing Code

Revise as follows:

915.1 Type of fixtures.
A *combination waste and vent system* shall not serve fixtures other than floor drains,<u>hub drains, </u>sinks, lavatories and drinking fountains. *Combination waste and vent systems* shall not receive the discharge from a clinical sink.

Reason: In most cases, hub drains receive identical waste discharge as what is received by sinks, floor drains, lavatories and drinking fountains. It is reasonable to expect that these traps will be protected as well as the traps associated to the other listed fixtures for this type of venting method if designed and installed in the same manner.

Bibliography: See reason statement.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

Assuming an individual or common venting method was previously chosen to vent the hub drain, under the current code requirement, and as per this proposal it would be permitted to be vented using a combination waste and vent system, the decrease in cost would be dependent on the total distance a vent would be required to be installed otherwise.

Expected immediate saving would range between $172.74 - $246.62 for every 20 feet of vent pipe that would no longer be required to be installed.

Estimated Immediate Cost Impact Justification (methodology and variables):

Allowing for hub drains to be vented as part of a combination waste and vent system would result in lowering the cost of construction compared to some of the other venting options available such as individual vents and common vents.

The overall impact would be determined by the length of the associated vent and the mark -up in material cost by the contractor.

As an example, Lowe's lists the price of 10 ft. sections of PVC pipe as follows:
1-1/2 inch - $11.37
2 inch - $15.78
3 inch - $29.47
4 inch - $48.31
If we assume a labor rate of $150/hr., and 20 feet of pipe with 1 hour of installation time, the overall savings would be as follows per pipe size:

1-1/2 inch - $22.74 - Labor - $150 - Total $172.74
2 inch - $36.51 - Labor - $150 - Total $186.51
3 inch - $58.94 - Labor - $150 - Total $208.94
4 inch - $96.62 - Labor - $150 - Total $246.62

P131-24

P132-24

IPC: 915.2.3

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov)

2024 International Plumbing Code

Revise as follows:

915.2.3 Connection.
The *combination waste and vent system* shall be provided with a dry vent connected at any point within the system or the system shall connect to a horizontal drain that serves vented fixtures located on the same floorlevel that are not isolated by a normally closed backwater valve. *Combination waste and vent systems* connecting to *building drains* receiving only the discharge from one or more *stacks* shall be provided with a dry vent. The vent connection to the combination waste and vent pipe shall extend vertically to a point not less than 6 inches (152 mm) above the *flood level rim* of the highest fixture being vented before offsetting horizontally.

Reason: Fixtures that are vented using the combination waste and vent method can be totally separated from the venting pathway if a normally closed backwater valve has been installed on the fixture drain or fixture branch. placing a dry vent upstream of the normally closed backwater valve, or installing a normally open backwater valve will prevent this condition from occurring.

Bibliography: See reason statement.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Any cost impact would be the responsibility of the design professional designing the project. The code does not dictate how to design a system in order to avoid cost impacts. This proposal just ensures whichever pathway the designer chooses that the fixtures or traps connected will be appropriately protected by a compliant venting method.

P132-24

P133-24

IPC: 915.2.5

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov)

2024 International Plumbing Code

Revise as follows:

915.2.5 Fixture branch or drain.
The *fixture branch* or *fixture drain* shall connect to the combination waste and vent within a distance specified in Table 909.1. The combination waste and vent pipe shall be considered to be the vent for the fixture. <u>Each fixture drain shall connect horizontally to the combination waste and vent system.</u>

Reason: Combination waste and vent systems rely on the upper half of the pipe remaining empty in order to provide a pathway for venting. If fixtures are permitted to connect vertically, the venting pathway can/will be interrupted by the discharge. This problem was addressed in the circuit venting method, however, it has never been addressed in the combination waste and vent method.

Bibliography: See reason statement.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is for clarification only and aimed at keeping venting methodology consistent with methodology in circuit venting.

P133-24

P134-24

IPC: 918.1, ASSE Chapter 15 (New)

Proponents: Ken Smithart Jr, IPS Corporation, Studor (ken.smithart@ipscorp.com); Ronald George, Plumb-Tech Design & Consulting Services LLC, Self (ron@plumb-techllc.com)

2024 International Plumbing Code

Revise as follows:

918.1 General.
Vent systems utilizing air admittance valves shall comply with this section. Stack-type air admittance valves shall conform to ASSE 1050. Individual and branch-type air admittance valves shall conform to ASSE 1051. Positive pressure reduction devices used in systems with air admittance valves shall conform to ASSE 1030.

Add new standard(s) as follows:

ASSE

ASSE International
18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448

1030-2016	Performance Requirements for Positive Pressure Reduction Devices for Sanitary Drainage Systems

Staff Analysis: A review of the standard proposed for inclusion in the code, ASSE 1030-2016 *Performance Requirements for Positive Pressure Reduction Devices for Sanitary Drainage Systems,* with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: This proposed change adds a reference to positive pressure reduction devices and the affiliated standard.

Bibliography: ASSE 1030 standard for Performance Requirements for Positive Pressure Reduction Devices for Sanitary Drainage Systems
Studor Engineered Products Manual - 10th Edition

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

- **Studor Engineered Products Manual - 10th Edition.pdf**
  https://www.cdpaccess.com/proposal/9350/30427/documentation/145718/attachments/download/4294/

Justification for no cost impact:

The proposal is simply adding a statement that the device must meet a standard but does not mandate that the device be installed. There is no requirement for the device and therefore there is no cost impact.

P134-24

P135-24

IPC: 918.3.1, ASSE Chapter 15 (New)

Proponents: Ken Smithart Jr, IPS Corporation, Studor (ken.smithart@ipscorp.com)

2024 International Plumbing Code

Revise as follows:

918.3.1 Horizontal branches.
Individual and branch-type air admittance valves shall vent only fixtures that are on the same floor level and connect to a *horizontal branch drain*. Where the horizontal *branch* is located more than four *branch intervals* from the top of the *stack*, the horizontal *branch* shall be provided with a relief vent that shall connect to a vent *stack*,~~or~~ stack *vent*, ~~or~~ extend outdoors to the open air, or a positive pressure reduction device (PPRD) installed in accordance with the manufacturer's instructions. The relief vent or PPRD shall connect to the *horizontal branch drain* between the *stack* and the most downstream *fixture drain* connected to the *horizontal branch drain*. The relief vent shall be sized in accordance with Section 906.2 and installed in accordance with Section 905. The relief vent shall be permitted to serve as the vent for other fixtures.

Add new standard(s) as follows:

ASSE

ASSE International
18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448

1030-2016	Performance Requirements for Positive Pressure Reduction Devices for Sanitary Drainage Systems

Staff Analysis: A review of the standard proposed for inclusion in the code, ASSE 1030-2016 *Performance Requirements for Positive Pressure Reduction Devices for Sanitary Drainage Systems,* with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Attached Files

- **Cost Impact Calculations - PPRD.pdf**
  https://www.cdpaccess.com/proposal/9716/30434/files/download/4673/

Reason: This code change is to address ASSE 1030 - Performance Requirements for Positive Pressure Reduction Devices for Sanitary Drainage Systems. This new standard for a venting method that relieves positive pressures in the drainage system. These devices are specifically designed to work in concert with air admittance valves in all building types including high rise buildings where positive pressures can develop in drainage systems.

Bibliography: ASSE 1030 standard for Performance Requirements for Positive Pressure Reduction Devices for Sanitary Drainage Systems
Studor Engineered Products Manual - 10th Edition

Cost Impact: Decrease

Estimated Immediate Cost Impact:

The cost of a single stack pipe system is less than that of an equivalent conventional two-stack pipe system.

Estimated Immediate Cost Impact Justification (methodology and variables):

See Cost Impact Calculations attachment.

P135-24

P136-24

IPC: 918.3.2, ASSE Chapter 15 (New)

Proponents: Ken Smithart Jr, IPS Corporation, Studor (ken.smithart@ipscorp.com)

2024 International Plumbing Code

Revise as follows:

918.3.2 Stack.
Stack-type air admittance valves shall be ~~prohibited from serving~~ permitted to serve as the vent terminal for vent *stacks* or *stack vents* ~~that serve drainage *stacks* having more than six *branch intervals*~~where the stack has a positive pressure reduction device that is designed to relieve positive pressures in the stack and conforms to ASSE 1030. Air admittance valves and positive pressure reduction devices shall be installed in accordance with the manufacturer's design and installation manual..

Add new standard(s) as follows:

ASSE

ASSE International
18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448

1030-2016	Performance Requirements for Positive Pressure Reduction Devices for Sanitary Drainage Systems

Staff Analysis: A review of the standard proposed for inclusion in the code, ASSE 1030-2016 *Performance Requirements for Positive Pressure Reduction Devices for Sanitary Drainage Systems*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: With the recent development of a standard for positive pressure reduction devices, there is no reason to limit stack type air admittance valves to a maximum of six branch intervals. This code change addresses this new technology.

Bibliography: ASSE 1030 standard for Performance Requirements for Positive Pressure Reduction Devices for Sanitary Drainage Systems
Studor Engineered Products Manual - 10th Edition

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is just a clarification that stack type AAVs are allowed to be installed in buildings over six stories in height when installed with positive pressure reduction devices.

P136-24

P137-24 Part I

IPC: 918.5

Proponents: Ken Smithart Jr, IPS Corporation, Studor (ken.smithart@ipscorp.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

Revise as follows:

918.5 Access and ventilation.
A ccess shall be provided to all air admittance valves. Such valves shall be installed in a location that allows air to enter the valve <u>and shall be installed in accordance with the manufacturer's instructions</u>.

Reason: This is to add that access to air admittance valves should also be in accordance with the manufacturer's instructions.

Bibliography: Studor Engineered Products Manual - 10th Edition

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is adding that the manufacturer's instructions need to be followed.

P137-24 Part I

P137-24 Part II

IRC: P3114.5

Proponents: Ken Smithart Jr, IPS Corporation, Studor (ken.smithart@ipscorp.com)

2024 International Residential Code

Revise as follows:

P3114.5 Access and ventilation. Access shall be provided to *air admittance valves*. Such valves shall be installed in a location that allows air to enter the valve and shall be in accordance with the manufacturer's instructions
.

Reason: This is to add that access to air admittances valves should also be in accordance with the manufacturer's instructions.

Bibliography: Studor Engineered Products Manual - 10th Edition

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is adding that the manufacturer's installation instructions need to be followed.

P137-24 Part II

P138-24 Part I

IPC: 918.7

Proponents: Ken Smithart Jr, IPS Corporation, Studor (ken.smithart@ipscorp.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

Revise as follows:

918.7 Vent required.
Within each plumbing system, to relieve positive pressure from surcharging public sewers, not less than one stack vent or vent stack shall extend outdoors to the open air.

Reason: This proposed code language clarifies the reason why one stack vent or vent stack is extended outdoors to the open air.

Bibliography: Studor Engineered Products Manual - 10th Edition

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

There is no cost increase or decrease, this language is just to clarify the need for a vent to open air.

P138-24 Part I

P138-24 Part II

IRC: P3114.7

Proponents: Ken Smithart Jr, IPS Corporation, Studor (ken.smithart@ipscorp.com)

2024 International Residential Code

Revise as follows:

P3114.7 Vent required. Within each plumbing system, to relieve positive pressure from surcharging public sewers, not less than one stack vent or a vent stack shall extend outdoors to the open air.

Reason: This proposed code language clarifies the reason why one stack vent or vent stack is extended outdoors to the open air.

Bibliography: Studor Engineered Products Manual - 10th Edition

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

There is no cost increase or decrease, this language is just to clarify the need for a vent to open air.

P138-24 Part II

P139-24 Part I

IPC: 918.8

Proponents: Ken Smithart Jr, IPS Corporation, Studor (ken.smithart@ipscorp.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

Revise as follows:

918.8 Prohibited installations.
Air admittance valves shall not be installed in nonneutralized special waste systems as described in Chapter 8 except where such valves are in compliance with ASSE 1049, are constructed of materials *approved* in accordance with Section 702.5, and are tested for chemical resistance in accordance with ASTM F1412. Air admittance valves shall not be located in spaces utilized as supply or return air plenums. Air admittance valves shall not be used to vent sumps or tanks except where the vent system for the sump or tank has been designed by an engineer, or where the valve is installed in accordance with the manufacturer's engineered instructions. Air admittance valves shall not be installed on outdoor vent terminals for the sole purpose of reducing clearances to gravity air intakes or mechanical air intakes.

Reason: Manufacturers have engineered solutions for sumps or tank installations.

Bibliography: Studor Engineered Products Manual - 10th Edition

Cost Impact: Decrease

Estimated Immediate Cost Impact:

The cost of a venting a sump pump with an AAV in an existing building should be about $600 less than the cost of venting a sump pump conventionally.

Estimated Immediate Cost Impact Justification (methodology and variables):

See Cost Impact Calculations attachment.

P139-24 Part I

P139-24 Part II

IRC: P3114.8

Proponents: Ken Smithart Jr, IPS Corporation, Studor (ken.smithart@ipscorp.com)

2024 International Residential Code

Revise as follows:

P3114.8 Prohibited installations.
Air admittance valves shall not be used to vent sumps or tanks except where the vent system for the sump or tank has been designed by an engineer, or where the valve is installed in accordance with the manufacturer's instructions. *Air admittance valves* shall not be installed on outdoor vent terminals for the sole purpose of reducing clearances to gravity or mechanical air intakes.

Reason: Manufacturers have engineered solutions for sumps or tank installations.

Bibliography: Studor Engineered Products Manual - 10th Edition

Cost Impact: Decrease

- **Cost Impact Calculations - Sump Pump.pdf**
  https://www.cdpaccess.com/proposal/9728/30484/documentation/146060/attachments/download/4546/
- **Studor Engineered Products Manual - 10th Edition.pdf**
  https://www.cdpaccess.com/proposal/9728/30484/documentation/146060/attachments/download/4325/

Estimated Immediate Cost Impact:

The cost of a venting a sump pump with an AAV in an existing building is less than the cost of venting a sump pump conventionally

Estimated Immediate Cost Impact Justification (methodology and variables):

See Cost Impact Calculations attachment.

P139-24 Part II

P140-24 Part I

IPC: 918.8

Proponents: Ken Smithart Jr, IPS Corporation, Studor (ken.smithart@ipscorp.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

Revise as follows:

918.8 Prohibited installations.
Air admittance valves shall not be installed in nonneutralized special waste systems as described in Chapter 8 except where such valves are in compliance with ASSE 1049, are constructed of materials *approved* in accordance with Section 702.5, and are tested for chemical resistance in accordance with ASTM F1412. Air admittance valves shall not be located in spaces utilized as supply or return air plenums. Air admittance valves shall not be used to vent sumps or tanks except where the vent system for the sump or tank has been designed by an engineer. ~~Air admittance valves shall not be installed on outdoor vent terminals for the sole purpose of reducing clearances to gravity air intakes or mechanical air intakes.~~

Reason: This language is restrictive in nature and this topic is already covered in section 903.5 under the location of vent terminals. Designer's or contractor's purpose or intent is not enforceable. Air admittance valves have been used successfully for preventing sewer gas from escaping vent terminals and being drawn into air intakes since stack type air admittance valves were first developed.

Bibliography: Studor Engineered Products Manual - 10th Edition

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

There is no cost increase or decrease, this removes language that was unenforceable with respect to an intended purpose.

P140-24 Part I

P140-24 Part II

IRC: P3114.8

Proponents: Ken Smithart Jr, IPS Corporation, Studor

2024 International Residential Code

Revise as follows:

P3114.8 Prohibited installations.
Air admittance valves shall not be used to vent sumps or tanks except where the vent system for the sump or tank has been designed by an engineer. ~~Air admittance valves shall not be installed on outdoor vent terminals for the sole purpose of reducing clearances to gravity or mechanical air intakes.~~

Reason: This language is restrictive in nature and this topic is already covered in the vent terminal section of the IRC under the location of vent terminals. Designer's or contractor's purpose or intent is not enforceable. Air admittance valves have been used successfully for preventing sewer gas from escaping vent terminals and being drawn into air intakes since stack type air admittance valves were first developed.

Bibliography: Studor Engineered Products Manual - 10th Edition

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

There is no cost increase or decrease, this removes language that was unenforceable with respect to an intended purpose.

P140-24 Part II

P141-24

IPC: 918.9 (New), ASSE Chapter 15 (New)

Proponents: Ken Smithart Jr, IPS Corporation, Studor (ken.smithart@ipscorp.com)

2024 International Plumbing Code

Add new text as follows:

918.9 Positive Pressure Reduction Devices. Vent systems utilizing positive pressure reduction devices shall comply with this section. Positive pressure reduction devices shall conform to ASSE 1030.

Add new standard(s) as follows:

ASSE

ASSE International
18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448

1030-2016	Performance Requirements for Positive Pressure Reduction Devices for Sanitary Drainage Systems

Staff Analysis: A review of the standard proposed for inclusion in the code, ASSE 1030-2016 *Performance Requirements for Positive Pressure Reduction Devices for Sanitary Drainage Systems,* with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Attached Files

- **Cost Impact Calculations - PPRD.pdf**
  https://www.cdpaccess.com/proposal/9724/30473/files/download/4686/

Reason: This is adding language regarding the use of positive pressure reduction devices and a requirement to comply with the new industry standard for these devices.

Bibliography: ASSE 1030 standard for Performance Requirements for Positive Pressure Reduction Devices for Sanitary Drainage Systems
Studor Engineered Products Manual - 10th Edition

Cost Impact: Decrease

Estimated Immediate Cost Impact:

The cost of a single stack pipe system is less than that of an equivalent conventional two-stack pipe system.

Estimated Immediate Cost Impact Justification (methodology and variables):

See Cost Impact Calculations attachment.

P141-24

P142-24

IPC: 1002.4.1, 1002.4.1.6 (New)

Proponents: Jim Williams, JK Plastics, JK Plastics (jimwilliams@jk-plastics.com)

2024 International Plumbing Code

Revise as follows:

1002.4.1 Trap seal protection.
Trap seals of *emergency floor drain* traps, ~~and~~ trap seals subject to evaporation and trap seals subjected to water discharged at high rates of velocity via an ejector type pump shall be protected by one of the methods in Sections 1002.4.1.1 through ~~1002.4.1.5~~ 1002.4.1.6.

Add new text as follows:

1002.4.1.6 Check Valve type trap seal protection device- Automatic clothes washer standpipe trap..
A check valve type trap seal protection device shall protect the automatic clothes washer standpipe trap seal from evaporation or water discharged at high rates of velocity. The protection device shall consist of a one-way valve designed to only allow air to enter the plumbing drainage system (air admittance valve) and an elastomeric sealing gasket to seal the automatic clothes washer's discharge hose. Such protective devices shall conform with Sections 406.2 & 802.4.3. Air admittance valves shall conform to ASSE 1050 or ASSE 1051. The devices shall be installed in accordance with the manufacture's requirements.

Staff Analysis: The proposed standard is in the current edition of the code.

Reason: The trap protecting the standpipe of an automatic clothes washer is the only trap in a dwelling which is not fed by gravity. This is a unique situation where not only is the trap of an automatic clothes washer routinely subjected to evaporation, but also to large volumes of water discharged at high rates of velocity from an ejector pump which forces the protective water seal out of the trap and creates a "dry-trap" allowing dangerous sewer gases to enter the dwelling. While the emergency floor drain trap seal is protected by a barrier-type protection device, there is no protection device for the automatic clothes washer standpipe trap seal. This check-valve type protection device will provide the necessary protection to the automatic clothes washer standpipe trap seal.

Cost Impact: Increase

Estimated Immediate Cost Impact:

The estimated immediate cost impact would be approximately $89.95 completely installed (cost of device $39.95 + labor $50.00).

Estimated Immediate Cost Impact Justification (methodology and variables):

The minimal increase of less than $100 in construction cost would be greatly outweighed by the benefits to public health and safety.

Estimated Life Cycle Cost Impact:

The estimated life cycle cost impact would be $0.00.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

There would be no additional future cost impact. Once the device is installed there would be no maintenance required or need for replacement.

P142-24

P143-24

IPC: SECTION 202 (New), CHAPTER 10, SECTION 1003, 1003.1, 1003.2, 1003.3.8, 1003.9, 1003.3, 1003.3.1, 1003.3.2, 1003.3.3, 1003.3.4, 1003.3.5, 1003.3.5.1, TABLE 1003.3.5.1, 1003.3.5.2, 1003.3.6, 1003.3.7, 1003.3.7 (New), 1003.3.7.1 (New), 1003.3.7.2 (New), 1003.3.7.3 (New), 1003.3.7.4 (New), 1003.3.7.5 (New), 1003.3.7.5.1 (New), 1003.3.7.5.2 (New), 1003.3.7.6 (New), 1003.3.7.7 (New), 1003.3.8 (New), Table 1003.3.8 (New), 1003.3.9 (New), 1003.3.10 (New), 1003.3.10.1 (New), 1003.3.10.2 (New), 1003.3.10.2.1 (New), 1003.3.10.2.1.1. (New), 1003.3.10.2.2 (New), 1003.3.10.2.3 (New), 1003.3.11 (New), 1003.3.11.1 (New), 1003.3.11.2 (New), 1003.3.11.2.1 (New), 1003.3.11.2.2 (New), 1003.10

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov)

2024 International Plumbing Code

Add new definition as follows:

Calculated peak flow rate. Maximum possible grease laden waste discharge into a fats, oils, and grease interceptor expressed in gallons per minute (GPM).

Designed Service Interval. The amount of time the design professional has designated as the maximum time between grease interceptor services for a specific design. This time can be in days, weeks, months, or events, but shall not exceed 90 days between services.

Fast food/quick service restaurant. Any food service operation that serves food primarily with disposable containers and flatware and discharges non-domestic wastewater.

Full service restaurant. Any food service operation that serves food on plates or serving trays that requires washing, with or without flatware that requires washing and discharges non-domestic wastewater.

Nondomestic Wastewater.
Not regular sewage due to volume or character of water. Can contain substances like industrial chemicals, pesticides, rags, paints, excessive oil and grease. Permit and pretreatment may be required before this type of wastewater discharges into the sanitary drainage system.

Peak flow rate. All potential grease laden waste discharge into a fats, oils, and grease interceptor expressed in gallons per minute (GPM).

CHAPTER 10 TRAPS, INTERCEPTORS AND SEPARATORS

SECTION 1003
INTERCEPTORS AND SEPARATORS

Revise as follows:

1003.1 Where required.
Interceptors and separators shall be provided to prevent the discharge of oil, grease, sand and other substances harmful or hazardous to the *public sewer*, the private sewage system or the sewage treatment plant or processes.

> **Exception:** A grease interceptor or an automatic grease removal device shall not be required for individual dwelling units or any *private* living quarters.

1003.2 Approval.
The size, type and location of each interceptor and of each separator shall be designed and installed in accordance with the manufacturer's instructions and the requirements of this section based on the anticipated conditions of use. Wastes that do not require treatment or separation shall not be discharged into any interceptor or separator.

Revise as follows:

~~1003.3.8~~ 1003.2.1 Direct connection.
The discharge piping from ~~a grease~~ interceptors shall be directly connected to the sanitary drainage system.

~~1003.9~~ 1003.2.2 Venting of interceptors and separators.
Interceptors and separators shall be designed so as not to become air bound. Interceptors and separators shall be vented in accordance with one of the methods in Chapter 9.

1003.3 Grease interceptors.
Grease interceptors shall comply with the requirements of Sections 1003.3.1 through 1003.3~~.8~~.11.2.2.

1003.3.1 Grease interceptors and automatic grease removal devices required.
A grease interceptor or automatic grease removal device shall be required to receive the drainage from fixtures and equipment with grease-laden waste located in food preparation areas, such as in restaurants, hotel kitchens, hospitals, school kitchens, bars, factory cafeterias and clubs. Fixtures and equipment shall include pot sinks, prerinse sinks; soup kettles or similar devices; wok stations; floor drains or sinks into which kettles are drained; automatic hood wash units and dishwashers without prerinse sinks. Grease interceptors and automatic grease removal devices shall receive waste only from fixtures and equipment that allow fats, oils or grease to be discharged. Where lack of space or other constraints prevent the installation or replacement of a grease interceptor, one or more grease interceptors shall be permitted to be installed on or above the floor and upstream of an existing grease interceptor.

1003.3.2 Food waste disposers restriction.
A food waste disposer shall not discharge to a grease interceptor.

1003.3.3 Additives to grease interceptors.
Dispensing systems that dispense interceptor performance additives to grease interceptors shall not be installed except where such systems dispense microbes for the enhancement of aerobic bioremediation of grease and other organic material, or for inhibiting growth of pathogenic organisms by anaerobic methods. Such microbial dispensing systems shall be installed only where the grease interceptor manufacturer's instructions allow such systems and the systems conform to ASME A112.14.6. Systems that discharge emulsifiers, chemicals or enzymes to grease interceptors shall be prohibited.

Revise as follows:

~~1003.3.4 Grease interceptors and automatic grease removal devices not required~~.
~~A grease interceptor or an automatic grease removal device shall not be required for individual dwelling units or any *private* living quarters.~~

1003.3.4~~1003.3.5~~ Hydromechanical grease interceptors, fats, oils and greases disposal systems and automatic grease removal devices.
Hydromechanical grease interceptors; fats, oils, and greases disposal systems and automatic grease removal devices shall be sized in accordance with ASME A112.14.3, ASME A112.14.4, ASME A112.14.6, CSA B481.3 or PDI G101. Hydromechanical grease interceptors; fats, oils, and greases disposal systems and automatic grease removal devices shall be designed and tested in accordance with ASME A112.14.3, ASME A112.14.4, CSA B481.1, PDI G101 or PDI G102. Hydromechanical grease interceptors; fats, oils, and greases disposal systems and automatic grease removal devices shall be installed in accordance with the manufacturer's instructions. Where manufacturer's instructions are not provided, hydromechanical grease interceptors; fats, oils, and greases disposal systems and automatic grease removal devices shall be installed in compliance with ASME A112.14.3, ASME A112.14.4, ASME A112.14.6, CSA B481.3 or PDI G101.

~~1003.3.5.1~~ 1003.3.4.1 Hydromechanical ~~Grease~~ grease interceptor and grease removal device retention capacity.
Hydromechanical ~~Grease~~ grease interceptors and automatic grease removal devices shall ~~have~~ be certified for the grease retention capacity indicated in Table ~~1003.3.5.1~~ 1003.3.4.1, or more, for the flow-through rates indicated in Table 1003.3.4.1.

TABLE ~~1003.3.5.1~~ 1003.3.4.1 RETENTION CAPACITY OF HYDROMECHANICAL GREASE INTERCEPTORS[a], AND AUTOMATIC GREASE REMOVAL DEVICES

TOTAL FLOW-THROUGH RATING (gpm)	GREASE RETENTION CAPACITY (pounds)
4	8
6	12
7	14
9	18
10	20
12	24
14	28
15	30
18	36
20	40
25	50
35	70
50	100
75	150
100	200

For SI: 1 gallon per minute = 3.785 L/m, 1 pound = 0.454 kg.

a. For total flow-through ratings greater than 100 (gpm), double the flow-through rating to determine the grease retention capacity (pounds).

~~1003.3.5.2~~ 1003.3.4.2 Rate of flow controls.
Hydromechanical ~~Grease~~ grease interceptors and grease removal devices shall be equipped with devices to control the rate of water flow so that the water flow does not exceed the rated flow. ~~The~~ External flow-control devices shall be vented and terminate not less than 6 inches (152 mm) above the flood rim level or be installed in accordance with the manufacturer's instructions.

~~1003.3.6~~1003.3.5 Automatic grease removal devices.
Where automatic grease removal devices are installed, such devices shall be located downstream of each fixture or multiple fixtures in accordance with the manufacturer's instructions. The automatic grease removal device shall be sized to pretreat the measured or calculated flows for all connected fixtures or equipment. *Ready access* shall be provided for inspection and maintenance.

~~1003.3.7~~ 1003.3.6 Gravity grease interceptors and gravity grease interceptors with fats, oils, and greases disposal systems.
The required capacity of gravity grease interceptors and gravity grease interceptors with fats, oils, and greases disposal systems shall be determined by multiplying the peak drain flow into the interceptor in gallons per minute by a retention time of 30 minutes. Gravity grease interceptors shall be designed and tested in accordance with IAPMO/ANSI Z1001. Gravity grease interceptors with fats, oils, and greases disposal systems shall be designed and tested in accordance with ASME A112.14.6 and IAPMO/ANSI Z1001. Gravity grease interceptors and gravity grease interceptors with fats, oils, and greases disposal systems shall be installed in accordance with manufacturer's instructions. Where manufacturer's instructions are not provided, gravity grease interceptors and gravity grease interceptors with fats, oils, and greases disposal systems shall be installed in compliance with ASME A112.14.6 and IAPMO/ANSI Z1001.

Add new text as follows:

1003.3.7 Meals served per day. Meals served per day shall be calculated based on the occupancy type and service type in accordance with section 1003.3.7.1 through section 1003.3.7.7

1003.3.7.1 Convenience Store. Convenience store meals per day shall be calculated at 1000 meals per day.

1003.3.7.2 Hotel breakfast bars. Hotel breakfast bar meals per day shall be calculated multiplying total guest rooms times 2.

1003.3.7.3 Carryout only pizza shops. Carryout only pizza shop meals per day shall be assumed to be 250 meals per day.

1003.3.7.4 Nursing homes, school cafeterias, adult daycare facilities, child daycare facilities and similar occupancies. Nursing homes, school cafeterias, adult daycare facilities, child daycare facilities and similar occupancy meals per day shall be calculated using total allowable occupancy times the number of meal services per day. Meals services can be any combination of the following, breakfast, lunch, or dinner.

1003.3.7.5 Restaurants. Restaurant meals per day shall be calculated in accordance with 1003.3.7.5.1 or 1003.3.7.5.2

1003.3.7.5.1 Fast food/quick service restaurants. Fastfood/quick service restaurant meals per day shall be calculated as 40 meals times total service hours per day.

1003.3.7.5.2 Full service restaurants. Full service restaurant meals per day shall be calculated as 50 meals times total service hours per day.

1003.3.7.6 Event spaces. Event spaces, such as but not limited to, banquet halls, fraternal organizations, churches, and golf/country clubs shall have meals calculated based on the maximum anticipated number of events per year. Meals per event shall be calculated as 1 meal per allowable occupant. This total anticipated meals per year shall then be used to establish a service interval correlating the storage capacity of the fats, oils and grease interceptor with the number of events per year. Capacity should be selected so that the service interval stays within a 3-month maximum interval.

1003.3.7.7 Ballparks, arenas, and stadiums. Ballpark, arena, and stadium shall have meals calculated based on the maximum anticipated number of events per year. Meals per event shall be calculated by multiplying total allowable occupancy times 2. This total anticipated meals per event shall then be used to establish a service interval correlating the rentetion capacity of the fats, oils and grease interceptor with the number of events per year. Capacity shall be selected so that the service interval stays within a 3-month maximum interval.

Exception: Where there are multiple food service operations within the ballpark, arena, or stadium, the meals per event can be divided by the total number of food service operations when each food service operation is provided with a dedicated fats, oils, and grease interceptor. Each dedicated interceptor retention capacity shall be selected so that the service interval stays within a 3-month maximum interval.

1003.3.8 Grease discharge per meal. Fats, oils, and grease discharge per meal shall be referenced from Table 1003.3.8 based on the occupancy type and service type.

Table 1003.3.8 Fats, oils, and grease discharge per meal values

Restaurant Type	Grease Production Values	Examples
Low grease producer	0.005 lbs(2.268 g)/meal (no flatware)	Elementary cafeteria, grocery meat department, hotel breakfast bar, deli/sub shop, sushi, carryout pizza
	0.0065 lbs(2.268 g)/meal (with flatware)	
Medium grease producer	0.025 lbs(2.268 g)/meal (no flatware)	Cafe, coffee shop, Convenience store, Greek cuisine, Indian cuisine, Japanese cuisine, Korean cuisine, Vietnamese cuisine
	0.0325 lbs(2.268 g)/meal (with flatware)	
High grease producer	0.035 lbs(2.268 g)/meal (no flatware)	Full-fare family, fast-food hamburger, hamburger bar and grill, German cuisine, Italian cuisine, fast-food Mexican cuisine
	0.0455 lbs(2.268 g)/meal (with flatware)	
Very high grease producer	0.058 lbs(2.268 g)/meal (no flatware)	Full-fare BBQ, fast-food fried chicken, full-fare Mexican cuisine, steak and seafood restaurants, Chinese cuisine, Hawaiian cuisine
	0.075 lbs(2.268 g)/meal (with flatware)	

1003.3.9 Designed Service Interval. The designed service interval for fats, oils, and grease interceptors shall be established by the designer and shall be included in the design.The designed service interval for fats, oils, and grease interceptors shall be within 90 days between intervals. The designed service interval shall be within the interceptor storage capacity for the connected food service operation or event space.

> **Exception:** The designed service interval for concrete interceptors shall be within 30 days.

1003.3.10 Flow rates. Flow rates for hydromechanical interceptors and automatic grease removal devices shall be calculated as indicated in section 1003.3.10.1, flow rates for gravity interceptors shall be calculated as indicated in section 1003.3.10.2.

1003.3.10.1 Peak flow rate. The peak flow rate shall include all fixtures listed in section 1003.3.1 that discharge fats, oils, and grease laden waste to a hydromechanical interceptor or an automatic grease removal device. Total discharge shall be expressed in gallons per minute (GPM).

1003.3.10.2 Calculated peak flow rate. Calculated peak flow rate shall shall be calculated using equation 10-01, and shall include all fixtures listed in section 1003.3.1 that discharge fats, oils, and grease laden waste to a gravity interceptor, this can include pre-rinse sinks with or without food waste disposals.

(Equation 10-01) TD/60=CPFR

where: TD = Total possible discharge for 1 hour for all fixtures discharging fats, oils, and grease to the interceptor.
60 = minutes in one hour

CPFR = Calculated Peak Flow Rate in Gallon per Minute (GPM)

1003.3.10.2.1 Sinks. Calculated peak flow rate shall be the maximum discharge expressed in gallons per minute (GPM) that could occur based on fill time for the number of fixture vessel and sizes (total gallons), faucet discharge in GPM, plus a drain down period of 1 minute for sinks unless the manufacturer has a published drain down time period. Sink volume shall be calculated in gallons in accordance with section 1003.3.10.2.1.1.

> **Exception:** For gravity interceptors, pre-rinse sink discharge shall be calculated using faucet GPM x 60. For hydromechanical interceptor and automatic grease removal devices, the pre-rinse sink faucet discharge shall be added to the single cycle discharge of all fixtures connected to the interceptor.

1003.3.10.2.1.1. Sink Volume. Each sink vessel volume shall be calculated using equation10-2. For multiple vessel sinks, the volume for each vessel shall be added together to establish the total volume for the sink.

> **Exception:** The volume of each vessel of a food utensil, dishes, pots and pans sink shall be calculated using equation 10-3. The volume for each vessel shall be added together to establish the total volume for the sink.

(10-2) ((L x W x D)/1728) x 7.47

where:

L = Length in inches
W = Width in inches

D = Depth in inches

1728 converts cubic inches into cubic feet

7.47 gallons per cubic foot.

(10-3) (((L x W x D)/1728) x.75[a]) x 7.47.

where:
L = Length in inches

W = Width in inches

D = Depth in inches

1728 converts cubic inches into cubic feet

7.47 gallons per cubic foot.

a. Food utensil, dishes, pots, and pans sinks are assumed to have 1/4 the volume taken up by dirty utensils, dishes, pots, and pans.

1003.3.10.2.2 Dishwashers. Calculated peak flow rate for dishwasher shall be based on the number of possible cycles per hour and gallons per cycle converted to GPM.

(10-4) C x G = GPH

where:
C = cycles or racks possible per hour

G = gallons per cycles

GPH = Gallons per Hour

1003.3.10.2.3 Other waste receptors. Other types of fats, oils, and grease waste receptors discharge shall be calculated using equation 10-5.

(10-5) G x C = GPH

where:
G = gallons per cycle

C = cycles per hour

GPH = gallon per hour

1003.3.11 Grease interceptor sizing. Grease interceptors shall be sized in accordance with 1003.3.11.1, or 1003.3.11.2.

1003.3.11.1 Gravity grease interceptor sizing. Gravity grease interceptors shall be sized as follows:

1. Required volume to allow separation to occur shall be established by multiplying the calculated peak flow rate in GPM by 30 minutes retention time.
2. Anticipated pounds of fats, oils, and grease discharge per day/event shall be established by multiplying meals per day/event by the appropriate fats, oils, and grease discharge per meal value in table 1003.3.8.

   Exception: For event spaces, areas, ballparks, and stadiums, the anticipated pounds of fats, oils, and grease discharge per day/event shall be established by multiplying meals per event by 0.075 lbs.
3. The designed service interval in days shall be multiplied by the anticipated pounds of fats, oils and grease discharge per day.

   Exception: For event spaces, areas, ballparks, and stadiums, the designed service interval shall be established using the number of events that can occur between intervals, but in no case shall exceed 90 days.
4. The anticipated pounds of fats, oils and grease discharge per designed service interval shall be converted to gallons using equation 10-6.

5. The anticipated gallons of fats, oils and grease discharge shall be added to the required volume established in step 1 to establish the minimum total volume of the gravity interceptor.

(10-6) P/6.4=Gwhere: P = Pounds of anticipated fats, oils, and grease discharge for the designed service interval.

6.4 = Average weight of fats, oils, and grease in pounds per gallon.

G = Converted pounds of anticipated fats, oils, and grease discharge to gallons of anticipated fats, oils, and grease discharge.

1003.3.11.2 Hydromechanical interceptor and automatic grease removal device sizing. Hydromechanical interceptors shall be sized in accordance with section 1003.3.10.2.1 and automatic grease removal devices shall be sized in accordance with section 1003.3.10.2.2.

1003.3.11.2.1 Hydromechanical interceptor sizing. Hydromechanical interceptors shall be sized as follows:

1. Anticipated pounds of fats, oils, and grease discharge per day shall be established by multiplying meals per day by the appropriate fats, oils, and grease discharge per meal value in table 1003.3.8.

   Exception: For event spaces, areas, ballparks, and stadiums, the anticipated pounds of fats, oils, and grease discharge per day shall be established by multiplying meals per event by 0.075 lbs.

2. The designed service interval in days shall be multiplied by the anticipated pounds of fats, oils and grease discharge per day/event.

   Exception: For event spaces, arenas, ballparks, and stadiums, the designed service interval shall be established using the number of events that can occur between intervals, but in no case shall exceed 90 days.

3. A hydromechanical interceptor shall be selected with a flow rate that can accommodate the peak flow rate established in 1003.3.9 with a 1 minute drain down period and enough retention capacity to accommodate the anticipated pounds of fats, oils, and grease discharge for the design service interval established in step 2.

   Exception: A 2 minute drain down may be used provided the retention capacity and flow rate can be accommodated by the interceptor.

1003.3.11.2.2 Automatic grease removal device sizing. Automatic grease removal devices shall be sized as follows:

1. Anticipated pounds of fats, oils, and grease discharge per day/event shall be established by multiplying meals per day/event by the appropriate fats, oils, and grease discharge per meal value in table 1003.3.8.

   Exception: For event spaces, areas, ballparks, and stadiums, the anticipated pounds of fats, oils, and grease discharge per day/event shall be established by multiplying meals per event by 0.075 lbs.

2. The designed service interval shall be established as a number of services per day and hours between services.

   Exception: For event spaces, arenas, ballparks, and stadiums, the designed service interval shall be at the completion of each event.

3. The anticipated pounds of fats, oils, and grease discharge per day/event shall be divided by the number of service intervals per day/event.

   Exception: Event spaces, arenas, ballparks, and stadiums.

4. The anticipated fats, oils, and grease discharge established in step 3 shall be used to establish the minimum storage capacity of the automatic grease removal device.

   Exception: For event spaces, arenas, ballparks, and stadiums, the anticipated fats, oils, and grease discharge per event shall be used to establish the minimum storage capacity for the automatic grease removal device.

Revise as follows:

~~1003.10~~ 1003.9 Access and maintenance of interceptors and separators.
Access shall be provided to each interceptor and separator for service and maintenance. Interceptors and separators shall be maintained by periodic removal of accumulated grease, scum, oil, or other floating substances and solids deposited in the interceptor or separator.

Attached Files

- **SIZING FOG WASTE INTERCEPTORS.docx.pdf**
  https://www.cdpaccess.com/proposal/9947/30659/files/download/4556/

Reason: The current section for sizing interceptors includes only part of the data needed to properly size an interceptor. Data collect via the "2011 Brown Grease Supply Study" resulted in the ability to identify the amount of fats, oils, and grease discharged per meal at various types of Food Service Operations (FSOs). Other data points, such as service hours, flow rate design and design service intervals are also needed. This proposal includes these necessary data points, as well as table 8-3 from ASPE Plumbing Design Manual which was developed in conjunction with the 2011 Brown Grease Supply Study.

Other changes to this section included in this proposal include re-organization of some of the sections, including moving section 1003.3.4 "Grease interceptor and automatic grease removal devices not required" to an exception in listing in section 1003.3.1 "Grease interceptor and automatic grease removal devices required." As well as moving sections 1003.3.8 "Direct connection" and 1003.9 "Venting of interceptors" into sub-sections of 1003.2 "Approval" as these sections should apply to all interceptors as part of an approval.

Please reference the attached file for the Bibliography which includes background on the additions and sizing methodology included in this proposal.

Bibliography: See attached file.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is to provide a prescriptive method for sizing fats, oils, and grease interceptors. Sizing is already required, however, it does not include enough information and provides no direction. The overall effect of this proposal would technically result in lowering the cost of construction, especially for gravity interceptors, as well as the potential to decrease maintenance costs depending of the designed service interval selected.

P143-24

P144-24

IPC: 1003.2, 1003.3.1, 1003.3.5, 1003.9, 1003.10

Proponents: Max Weiss, Plumbing and Drainage Institute, PDI (mweiss@pdionline.org)

2024 International Plumbing Code

Revise as follows:

1003.2 Approval.
The size, type and location of each interceptor and of each separator shall be designed and installed in accordance with the manufacturer's instructions and the requirements of this section based on the anticipated conditions of use and rate of peak discharge as calculated in accordance with ASME A112.14.3; ASME A112.14.4; CSA B 481.1 or PDI G101. Wastes that do not require treatment or separation shall not be discharged into any interceptor or separator.

1003.3.1 Grease interceptors and automatic grease removal devices required.
A grease interceptor or automatic grease removal device shall be required to receive the drainage from fixtures and equipment with grease-laden waste located in food preparation areas, such as in restaurants, hotel kitchens, hospitals, school kitchens, bars, factory cafeterias and clubs. Fixtures and equipment shall include pot sinks, prerinse sinks; soup kettles or similar devices; wok stations; floor drains or sinks into which kettles are drained; automatic hood wash units and dishwashers without prerinse sinks. Grease interceptors and automatic grease removal devices shall receive waste ~~only~~ from fixtures and equipment that allow fats, oils or grease to be discharged. Where lack of space or other constraints prevent the installation or replacement of a single grease interceptor, one or more grease interceptors shall be permitted to be installed on or ~~above~~ in the floor. ~~and upstream of an existing grease interceptor~~.

1003.3.5 Hydromechanical grease interceptors, fats, oils and greases disposal systems and automatic grease removal devices.
Hydromechanical grease interceptors; fats, oils, and greases disposal systems and automatic grease removal devices shall be sized in accordance with ASME A112.14.3, ASME A112.14.4, ASME A112.14.6, CSA B481.3 or PDI G101. Hydromechanical grease interceptors; fats, oils, and greases disposal systems and automatic grease removal devices shall be designed and ~~tested~~ certified in accordance with ASME A112.14.3, ASME A112.14.4, CSA B481.1, PDI G101 or PDI G102. Hydromechanical grease interceptors; fats, oils, and greases disposal systems and automatic grease removal devices shall be installed in accordance with the manufacturer's instructions. Where manufacturer's instructions are not provided, hydromechanical grease interceptors; fats, oils, and greases disposal systems and automatic grease removal devices shall be installed in compliance with ASME A112.14.3, ASME A112.14.4, ASME A112.14.6, CSA B481.3 or PDI G101.

1003.9 Venting of interceptors and separators.
Interceptors and separators shall be designed so as not to become air bound. Interceptors and separators shall be trapped and vented in accordance with one of the methods in Chapter 9.

1003.10 Access and maintenance of interceptors and separators.
Access shall be provided to each interceptor and separator for service and maintenance. Interceptors and separators shall be maintained by periodic removal of accumulated grease, scum, oil, or other floating substances and solids deposited in the interceptor or separator.
Interceptors shall be serviced prior to: contents reaching a pH of five (5); accumulations greater in depth than twenty-five percent (25%) of the wetted depth of the interceptor or thirty (30) days, whichever condition first occurs.

Reason: Clarification is necessary to ensure empirical hydraulic sizing, service, and application of grease interceptors.

Bibliography: ASSESSMENT OF GREASE INTERCEPTOR PERFORMANCE
Water Environment Research Foundation.
Library of Congress Catalog Card Number: 2008934928
Printed in the United States of America
IWAP ISBN: 978-1-84339-526-3/1-84339-526-6

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposed code changes do not add materials; only clarify methodologies.

P144-24

P145-24

IPC: 1003.3.1

Proponents: Eric Thompson, Schier Products, Schier Products

2024 International Plumbing Code

Revise as follows:

1003.3.1 Grease interceptors and automatic grease removal devices required.
A grease interceptor or automatic grease removal device shall be required to receive the drainage from fixtures and equipment with grease-laden waste located in food preparation areas, such as in restaurants, hotel kitchens, hospitals, school kitchens, bars, factory cafeterias and clubs. Fixtures and equipment shall include pot sinks, prerinse sinks; soup kettles or similar devices; wok stations; floor drains or sinks into which kettles are drained; automatic hood wash units and dishwashers ~~without prerinse sinks~~. Grease interceptors and automatic grease removal devices shall receive waste only from fixtures and equipment that allow fats, oils or grease to be discharged. Where lack of space or other constraints prevent the installation or replacement of a grease interceptor, one or more grease interceptors shall be permitted to be installed on or above the floor and upstream of an existing grease interceptor.

Reason: All fixtures and equipment that allow fats, oils or grease should be connected to the interceptor, regardless of the upstream fixtures.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Fixtures that connect do not impact the cost of the change. Dishwashers and pre-rinse sinks, if present, are already a part of the system so there is no additional cost to construction.

P145-24

P146-24

IPC: 1003.3.2

Proponents: Eric Thompson, Schier Products, Schier Products

2024 International Plumbing Code

Revise as follows:

1003.3.2 Food waste disposers restriction.
A food waste disposer shall not discharge to a grease interceptor.

> **Exception:** Food waste disposers shall be permitted to discharge to grease interceptors or solids interceptors that are designed to receive the discharge of food waste.

Reason: Larger grease interceptors have solids capability to allow for additional food waste. Solids interceptors are designed to handle food waste when installed before a grease interceptor and can handle the discharge of food waste disposers.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Grease interceptors are already a part of the project so there would be no additional cost impact in construction. Solids interceptors could be installed additionally which could add cost, however they would not be required per the change.

P146-24

P147-24

IPC: 1003.3.5.1, TABLE 1003.3.5.1

Proponents: Eric Thompson, Schier Products, Schier Products

2024 International Plumbing Code

Revise as follows:

1003.3.5.1 Grease interceptor capacity.
Grease interceptors shall have the minimum grease retention capacity indicated in Table 1003.3.5.1 for the flow-through rates indicated.

TABLE 1003.3.5.1 CAPACITY OF GREASE INTERCEPTORS[a]

TOTAL FLOW-THROUGH RATING (gpm)	GREASE RETENTION CAPACITY (pounds)
4	8
6	12
7	14
9	18
10	20
12	24
14	28
15	30
18	36
20	40
25	50
35	70
50	100
75	150
100	200

For SI: 1 gallon per minute = 3.785 L/m, 1 pound = 0.454 kg.

a. For total flow-through ratings greater than 100 (gpm), double the flow-through rating to determine the grease retention capacity (pounds).

Reason: ASME A112.14.3, one of the standards for grease interceptors, allows for interceptors to be tested beyond the minimum capacity. The table implies that only interceptors certified to that grease capacity would be allowed under the code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Grease interceptors are tested to ASME A112.14.3 to a minimum grease capacity requirement. This change clarifies that there is a minimum and allows for interceptors that are certified beyond the capacities as shown in the table. There is no impact as interceptors will hold more than the minimum requirement, manufacturers choose to continue the test to maximum capacity at their own expense.

P147-24

P148-24

IPC: 1003.4, 1003.4.2, 1003.4.2.1, 1003.4.2.2, IAPMO Chapter 15 (New)

Proponents: Andrew Heck, Striem, Manufacturer (andrew.heck@striemco.com)

2024 International Plumbing Code

Revise as follows:

1003.4 Oil separators required. ~~At repair garages where floor or trench drains are provided, car washing facilities, factories where oily and flammable liquid wastes are produced and hydraulic elevator pits, oil separators shall be installed into which oil-bearing, grease-bearing or flammable wastes shall be discharged before emptying into the building drainage system or other point of disposal.~~The following facilities shall require an oil separator before discharging into the sanitary sewer system:

1. Automobile service or repair garages.
2. Facilities where automobiles are washed.
3. Vehicle parking areas not intended for storm drainage.
4. Manufacturing, storage, maintenance, repair, or testing process facilities that have oily, flammable, or both types of wastes.
5. Liquid waste that is pumped or drained from hydraulic elevator pits.

~~**Exception:** An oil separator is not required in hydraulic elevator pits where an approved alarm system is installed. Such alarm systems shall not terminate the operation of pumps utilized to maintain emergency operation of the elevator by firefighters.~~

1003.4.2 Oil separator ~~design~~ compliance.
Oil separators shall comply with IAPMO IGC 183 or IAPMO IGC 325 ~~be listed and labeled, or designed in accordance with Sections 1003.4.2.1 and 1003.4.2.2.~~.

1003.4.2.1 General design requirements.
The oil separator shall be provided with gastight covers that shall be readily accessible. The vapor compartment in the oil separator shall be independently vented to atmosphere, and the outlet opening shall contain a water seal.
~~Oil separators shall have a depth of not less than 2 feet (610 mm) below the invert of the discharge drain. The outlet opening of the separator shall have not less than an 18-inch (457 mm) water seal.~~

1003.4.2.2 ~~Garages and service stations~~ Oil separator sizing.
The size of an oil separator shall be based on one of the following methods.

1. Where automobiles are serviced, greased, repaired or washed or where gasoline is dispensed, oil separators shall have a capacity of not less than 6 cubic feet (0.168 m^3) for the first 100 square feet (9.3 m^2) of area to be drained, plus 1 cubic foot (0.028 m^3) for each additional 100 square feet (9.3 m^2) of area to be drained into the separator. ~~Parking garages in which servicing, repairing or washing is not conducted, and in which gasoline is not dispensed, shall not require a separator. Areas of commercial garages utilized only for storage of automobiles are not required to be drained through a separator.~~
2. Where not more than three motor vehicles are stored, interceptors shall have a minimum capacity of 6 cubic feet (0.168m^3), and 1 cubic foot (0.028 m^3) of capacity shall be added for each vehicle up to 10 vehicles. For greater than 10 vehicles, an additional 0.15 cu. ft (0.004 m^3) per vehicle shall be added to the interceptor's total capacity.
3. A method approved by the code official.

~~Where automobiles are serviced, greased, repaired or washed or where gasoline is dispensed, oil separators shall have a capacity of not less than 6 cubic feet (0.168 m³) for the first 100 square feet (9.3 m²) of area to be drained, plus 1 cubic foot (0.028 m³) for each additional 100 square feet (9.3 m²) of area to be drained into the separator. Parking garages in which servicing, repairing or washing is not conducted, and in which gasoline is not dispensed, shall not require a separator. Areas of commercial garages utilized only for storage of automobiles are not required to be drained through a separator.~~

Add new standard(s) as follows:

IAPMO Group
4755 E. Philadelphia Street
Ontario, CA 91761 USA

IAPMO

<u>IGC 183:2016</u> <u>Oil/Water Separators and Coalescing Plate Separators</u>

<u>IGC 325:2023</u> <u>High Efficiency Oil/Water Separators Performance</u>

Staff Analysis: A review of the standard proposed for inclusion in the code, IGC 183:2016 *Oil/Water Separators and Coalescing Plate Separators* and IGC 325:2023 *High Efficiency Oil/Water Separators Performance*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: 10003.4 - Created a numbered list format as it is more legible and comprehensible. Elaborated on existing applications. Added more application types to cover all bases for oil separators. Included parking and storage facilities since they are very popular. Parking garages, and specifically sizing an oil separator for them, is to be discussed in 1003.4.2.2. Removed the exception for hydraulic elevator pits.

Substantiation against an approved alarm system:

1. A standard (and approved) sump pump connected to an oil separator always guarantees a dry elevator pit. One could argue that the introduction of a duplex pump system (or similar) that pumps oil and water separately guarantees a dry pit. However, that introduces more points of potential mechanical failure.

2.The elevator will never be shut down due to accumulated liquid in the pit. This is especially relevant for firefighter emergency operations during an emergency.

3. Any oil that is removed the pit can be pumped to an accessible location for proper maintenance and monitoring. Any oily waste accumulating in an elevator pit poses health, safety, and maintenance risks.

Reason 1003.4.2 - Simplifying this section by providing two standards that are specific to oil separators. IGC 183 is a *design-based* standard and IGC 325 is a *performance-based* standard. Both of these standards are very robust in their requirements, and should supersede the minimal language referenced in the subsequent sections.

Reason 1003.4.2.1 - Removed the language regarding minimum depth below the discharge drain and water seal. This is language that is not typically enforced and doesn't carry any specific logic to be present. Replaced with universally accepted design guidelines for oil separators: sealed and gastight cover, trap on the outlet, independent vent.

Reason 1003.4.2.2 - Changed the section title to better align with the section content: sizing options for oil separators. Broke this section down into (3) bullet point options for simplicity.

The first is the (unedited) square footage sizing methodology for service/maintenance applications.

The second is a sizing methodology for covered parking-only facilities as described in section 1003.4. Again, these are a popular application and are often required by municipalities and local water authorities. Similar to the square footage sizing, provided is a minimum baseline formula. In sum: 1-3 vehicles = 6 cubic feet of capacity required. Then you add (1) additional cu. ft. per vehicles up to 10 vehicles. Above 10 vehicles, add .15 additional cu. ft. per vehicle. The logic behind .15 additional cubic feet is due to the average vehicle holding between 4-6 quarts of oil, which translates to roughly .15 cu. ft.

- Further, unlike the square footage sizing methodology for service/maintenance applications, parking facilities generally produce little to no flow from a constant source. This sizing guide allows the designer/owner to select a unit that is more appropriately sized than it would be otherwise by using square footage sizing. For example: at roughly 180 square feet per stall, a 200 stall covered garage area would require a minimum of 36,000 square feet of drainage area. Using square footage sizing, that would require the oil interceptor to have a minimum gallon capacity of 2,730 gallons. Using the proposed methodology, the minimum would be 310 gallons.

The third method is any method deemed appropriate by the AHJ.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposed changes are meant for clarity and simplification. They also do not limit competition for oil separator manufacturers. For example, all oil separator manufacturers have the opportunity to design to the standards outlined in 1003.4.2.

Note: Proposed changes to sections 1003.4 and 1003.4.2.2 would require added scope/cost of an oil separator for covered parking facilities. Currently, the IPC does not require oil separators for parking garages. However, they are still common and regularly enforced. We've addressed mitigating the cost impact by detailing the sizing methodology as outlined in 1003.4.2.2. To summarize: Sizing is more conducive to smaller tanks. Smaller tanks = less install and maintenance cost.

P148-24

P149-24

IPC: 1003.4.2, UL Chapter 15 (New)

Proponents: Jonathan Roberts, UL Solutions, UL Solutions (jonathan.roberts@ul.com)

2024 International Plumbing Code

Revise as follows:

1003.4.2 Oil separator design.
Oil separators shall be listed and labeled <u>in accordance with UL 2215,</u> or designed in accordance with Sections 1003.4.2.1 and 1003.4.2.2.

Add new standard(s) as follows:

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062-2096

<u>2215-19</u> <u>Outline of Investigation for Oil/Water Separators</u>

Staff Analysis: A review of the standard proposed for inclusion in the code, UL 2215-9 *Outline of Investigation for Oil/Water Separators*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: This proposal identifies UL 2215 as the standard requirements used for third party certification (listed and labeled) oil/water separators. These requirements cover stationary gravity or pump fed aboveground and underground, atmospheric type oil/water separator systems intended to remove oil, having a specific gravity of 0.83 – 0.94 at 15°C (59°F), suspended in water from rainwater runoff or normal washdown of streets, highways, and parking lots at an inlet rate not exceeding the marked maximum influent concentration and flow rate. These requirements cover gravity or pump fed oil/water separator systems having capacities of 60 to 50,000 gallons (227 – 189,270 L) total. There are 17 manufacturers who have products certified in accordance with UL 2215.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is providing clarification as to which standard applies to listed oil/water separators, there is no substantive change as these are already required by the code to be listed.

P149-24

P150-24

IPC: 1102.4 (New)

Proponents: Sidney Lee Cavanaugh, Cavanaugh Consulting, WRT (sidneycavanaugh@yahoo.com)

2024 International Plumbing Code

Add new text as follows:

1102.5 Relining Storm Drainage. The relining and rehabilitation of storm drainage systems using cured-in-place pipe (CIPP) shall be in accordance with ASTM F2599.

Staff Analysis: The proposed standard is in the current edition of the code.

Reason: Storm drainage is certainly a candidate for rehabilitation by CIPP and it should be added to Chapter 11.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The cost allowance is already recognized by fact that the standard is already referenced in the code and technology is currently being used in drainage systems.

P150-24

P151-24

IPC: 1102.6, ASME Chapter 15, ASME Chapter 15 (New)

Proponents: Justin Cassamassino, ASME, A112 Main Committee (cassamassinoj@asme.org)

2024 International Plumbing Code

Revise as follows:

1102.6 Roof drains.
Roof drains shall conform to ASME A112.3.1 or ASME A112.6.4<u>/CSA B79.4</u>. Roof drains, other than siphonic roof drains, shall be tested and rated in accordance with ASME A112.6.4<u>/CSA B79.4</u> or ASPE/IAPMO Z1034.

ASME

American Society of Mechanical Engineers
Two Park Avenue
New York, NY 10016-5990

~~A112.6.4—2003 (R2020)~~ ~~Roof, Deck, and Balcony Drains~~

Add new standard(s) as follows:

ASME

American Society of Mechanical Engineers
Two Park Avenue
New York, NY 10016-5990

<u>A112.6.4/CSA B79.4 -2022</u> <u>Roof, Deck, and Balcony Drains</u>

Staff Analysis: A review of the standard proposed for inclusion in the code, ASME A112.6.4/CSA B79.4-2022 *Roof, Deck, and Balcony Drains*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: The ASME A112.6.3 was harmonized with CSA B79 standard. The intent of this proposal is to replace the current standard with the new standard.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Clarification to call out the new harmonized satndard, no addtional requirements.

P151-24

P152-24

IPC: 1106.2, 1106.2.1, TABLE 1106.2, 1106.2.2 (New), 1106.2.3 (New), TABLE 1106.2.3 (New), TABLE 1106.2.3(1) (New), TABLE 1106.2.3(2) (New), TABLE 1106.2.3(3) (New), 1106.2.4 (New), TABLE 1106.2.4 (New)

Proponents: Christopher Winnie PE CPD, SmithGroup, self (chris.winnie@smithgroup.com)

2024 International Plumbing Code

Revise as follows:

1106.2 Size of storm drain piping.
~~Vertical and horizontal *storm drain* piping shall be sized based on the flow rate through the roof drain. The flow rate, as calculated in accordance with Section 1106.2.1, shall be checked against the roof drain manufacturer's published flow rate for the specific roof drain model and size to verify that the selected roof drain will handle the anticipated flow. The flow rate in *storm drain* piping shall not exceed that specified in Table 1106.2.~~ The size of storm drain piping shall be in accordance with Sections 1106.2.1 through 1106.2.4.

1106.2.1 ~~Rainfall rate conversion method~~ Maximum storm water demand.
~~The rainfall rate falling on a roof surface shall be converted to a gallon per minute (L/m) flow rate in accordance with Equation 11-1.~~

$$GPM = R \times A \times 0.0104$$ **~~(Equation 11-1)~~**

~~where:~~
~~*R* = Rainfall intensity in inches (mm) per hour.~~
~~*A* = Roof area in square feet (m²).~~

The volumetric flow rate of storm drainage shall be the sum of the connected roof drain(s). The total connected load shall be used as the basis for pipe sizing, assuming all roof drains are at full capacity simultaneously.

Delete without substitution:

~~TABLE 1106.2 STORM DRAIN PIPE SIZING~~

PIPE SIZE (inches)	CAPACITY (gpm)				
	VERTICAL DRAIN	SLOPE OF HORIZONTAL DRAIN			
		$^1/_{16}$ inch per foot	$^1/_8$ inch per foot	$^1/_4$ inch per foot	$^1/_2$ inch per foot
2	34	15	22	31	44
3	87	39	55	79	111
4	180	81	115	163	231
5	311	117	165	234	331
6	538	243	344	487	689
8	1,117	505	714	1,010	1,429
10	2,050	927	1,311	1,855	2,623
12	3,272	1,480	2,093	2,960	4,187
15	5,543	2,508	3,546	5,016	7,093

~~For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 gallon per minute = 3.785 L/m.~~

Add new text as follows:

1106.2.2 Sizing. Storm drain pipe sizing shall be sized in accordance with one of the following:

1. Pipe sizing tables or equations in accordance with Section 1106.2.3 and 1106.2.4
2. The sizing tables included in a listed piping system's manufacturer's installation instructions
3. Engineering methods.

1106.2.3 **Sizing tables and equations.** This section applies to horizontal drainage systems using building gravity. Where the drainage system material is known, Tables 1106.2.3(1), 1106.2.3(2) and 1106.2.3(3) shall be used to size drainage piping.
Where Equation 11-1 is used to determine the expected flow rate seen at a roof drain, or building drain.

Where Equations 11-2, 11-3 and 11-4 are used to size drainage piping based on the drainage pipe material used.

1. The rainfall rate falling on a roof surface shall be converted to a gallon per minute (L/m) flow rate in accordance with Equation 11-1, The Rational Method. $Q = C \times R \times A \times 0.0104$ (Equation 11-1)
   Where: C = Discharge Coefficient, *the roughness of the roof's surface.* Use 1.0 unless permitted by the local authority to factor in roof roughness for primary storm drainage. Secondary drainage shall use 1.0 in all cases.
   Q = Flow rate in gallons per minute (L/m)
   R= Rainfall intensity in inches (mm) per hour.
   A = Projected roof area in square feet (m^2)
2. The flow rates for horizontal sloped drains shall be calculated by use of the Flow Rate Equation and the Manning Equation based on full flow for pipe diameters of a given material, or coefficient of roughness.

   The Flow Rate Equation, Equation 11-2
   $Q = A \times V$ (Equation 11-2)

   Where: Q = Flow rate in gallons per minute (L/m)
   A = Cross-sectional area of the full flow
   V = Velocity of flow, feet per second (L/s)

   The Manning Equation, Equation 11-3
   $V = (k/n) \times R^{2/3} \times S^{1/2}$ (Equation 11-3)
   Where: V = Velocity of flow, feet per second (m/s)
   k = unit conversion factor, 1.486 in English units
   n = roughness (Manning) coefficient
   R = hydraulic radius of pipe, ft (m); for full flow pipe, use radius of the pipe
   S = slope of pressure gradient

   The modified Flow Rate Equation, Equation 11-4
   $Q = A \times (k/n) \times R^{2/3} \times S^{1/2}$ (Equation 11-4)

TABLE 1106.2.3 ROUGHNESS COEFFICIENT, n, FOR USE IN EQUATION 11-4

Surface Material	Manning's Roughness Coefficient, n
Cast iron, new	0.012
Cast iron, aged	0.0151
Concrete pipe	0.013
Copper	0.011
PVC	0.010
Vitrified Clay	0.014

TABLE 1106.2.3(1) PVC PIPE

PIPE SIZE (inches)	CAPACITY (gpm)			
	SLOPE OF HORIZONTAL DRAIN			
	1/16 inch per ft	1/8 inch per ft	1/4 inch per ft	1/2 inch per ft
2	12	17	25	35
3	37	50	74	105
4	80	110	160	225
5	145	205	290	410
6	235	330	470	665
8	505	715	1,015	1,435
10	920	1,300	1,845	2,605
12	1,500	2,120	3,000	4,240
15	2,720	3,845	5,440	7,690

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 gallon per minute = 3.785 L/m

TABLE 1106.2.3(2) CAST IRON PIPE, AGED

PIPE SIZE (inches)	CAPACITY (gpm)			
	SLOPE OF HORIZONTAL DRAIN			
	1/16 inch per ft	1/8 inch per ft	1/4 inch per ft	1/2 inch per ft
2	8	11	15	23
3	24	35	49	69
4	53	75	105	150
5	95	135	190	270
6	155	220	310	440
8	335	475	670	950
10	610	860	1,220	1,725
12	990	1,405	1,985	2,810
15	1,800	2,545	3,600	5,095

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 gallon per minute = 3.785 L/m

TABLE 1106.2.3(3) CAST IRON PIPE, NEW

PIPE SIZE (inches)	CAPACITY (gpm)			
	SLOPE OF HORIZONTAL DRAIN			
	1/16 inch per ft	1/8 inch per ft	1/4 inch per ft	1/2 inch per ft
2	10	14	21	29
3	30	40	60	85
4	65	90	130	185
5	120	170	240	340
6	195	275	390	555
8	420	600	845	1,200
10	765	1,085	1,535	2,170
12	1,250	1,765	2,500	3,535

15	2,265	3,205	4,530	6,410

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 gallon per minute = 3.785 L/m

1106.2.4 Vertical sizing table. Vertical storm drain piping shall be sized for the expected flow rate through the roof drain(s). The flow rate, as calculated in accordance with Section 1106.2.2, shall be checked against the roof drain manufacturer's published flow rate for the specific roof drain model and size to verify that the selected roof drain will handle the anticipated flow. The storm drain piping shall not exceed that specified in Table 1106.2.4.

TABLE 1106.2.4 Vertical sizing table

PIPE SIZE (inches)	CAPACITY (gpm)
2	34
3	87
4	180
5	310
6	535
8	1,115
10	2,050
12	3,270
15	5,540

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 gallon per minute = 3.785 L/m

Attached Files

- **Storm Rationale Method_04-Storm Drainage Calc.xls**
  https://www.cdpaccess.com/proposal/10328/30804/files/download/4371/
- **Storm Rationale Method_04-Storm Drainage Calc.pdf**
  https://www.cdpaccess.com/proposal/10328/30804/files/download/4370/
- **Manning's Roughness Coefficients.pdf**
  https://www.cdpaccess.com/proposal/10328/30804/files/download/4369/
- **Manning Formula_proving code is based on Manning.pdf**
  https://www.cdpaccess.com/proposal/10328/30804/files/download/4368/
- **Manning Formula_pipe flow_PVC.pdf**
  https://www.cdpaccess.com/proposal/10328/30804/files/download/4366/
- **Manning Formula_pipe flow_new cast iron.pdf**
  https://www.cdpaccess.com/proposal/10328/30804/files/download/4365/
- **Manning Formula_pipe flow_aged cast iron.pdf**
  https://www.cdpaccess.com/proposal/10328/30804/files/download/4364/
- **Manning Formula_pipe flow and velocities.xlsx**
  https://www.cdpaccess.com/proposal/10328/30804/files/download/4363/
- **Manning Formula_pipe flow_coversheet.pdf**

https://www.cdpaccess.com/proposal/10328/30804/files/download/4362/

Reason: If a building using cast iron storm drain pipe built from the model 2015, 2018, 2021 or 2024 codes were to have roof issues in the future; there is risk to the ICC because of faulty information in sizing storm drains. This proposal aims to fix that so engineers can follow a more complete model code.

As engineers, we have an ethical contract to not impose a hazard onto the occupants of the buildings we design. In its current form, the storm piping code imposes a hazard onto the occupants of the buildings we design. If we follow the current storm drain sizing criteria in 1106 and cast iron pipe is used, then the pipes would undersized between 20-50%, pending the size and slope of the installed pipe. Undersizing roof drain pipes increasing the possibility of the primary drains being overloaded and water ponding on the roof greater than the assumptions made by the structural engineer. The printed Tables in the 2015, 2018, 2021 and 2024 codes are assuming PVC pipe. The printed Tables in the IPC 2012 and earlier editions assumed aged cast iron. We must change this code immediately for the safety of the public and for the engineer's awareness in sizing pipes for a proper working system. This proposed change is a large overhaul from prior storm drainage sections, a code and commentary could be provided, but I didn't submit the context for that here. The layout and wording used was mimicked from the International Fuel Gas Code for gas pipe sizing (section 402), with obvious differences, so that the ICC reads similarly.

Use of roughness coefficients for tall/thick green roofs is viable, which is why mention of the complete Rational Method is shared. It would be fantastic if plumbing engineers use the same formulas as our Civil friends. It is true, storm piping within a building would have gravitational influence to drain faster if there is ponding at the roof drain, but this level of complexity does not appear warranted.

The manipulation of units can be seen/tested in the excels attached. PDFs are also included. I trusted the Manning's Roughness Coefficients from engineering toolbox, and have included them as a reference. The aged cast iron value for "n" was reverse engineered from the legacy storm tables. See documents "Manning Formula_proving code is based on Manning.pdf" and "Storm Rationale Method_04-Storm Drainage Calc.pdf" to see how accurate use of Manning Equation is to the legacy storm tables, so 0.0152 was proposed for the 2027 code to give homage to all storm tables of the last 20 years. PDFs and excel justifying the proposed tables are attached to answer questions about how the numbers were generated, and the excel can be used to see how the proposed Equations can be used should a less common pipe material be used.

Bibliography: For pipe roughness coefficients:

https://www.engineeringtoolbox.com/mannings-roughness-d_799.html

The layout and wording used was mimicked from the International Fuel Gas Code for gas pipe sizing (section 402), with obvious differences

The Rational Method and Manning Equation were sourced from my college fluid dynamics book. But they are readily available formulae that need not be sourced, right? I can provide more information as needed.

Cost Impact: Increase

Estimated Immediate Cost Impact:

$20 / foot of storm pipe.

Estimated Immediate Cost Impact Justification (methodology and variables):

The potential cost increase would only be for cast iron (metal) pipe. The current code edition reflects pipe sizes for PVC/plastic pipe, and those values in the charts remain the same.

The cost was calculated on a cost per linear foot of pipe basis.

I found list prices from a leading cast iron foundry showing costs for 10-foot sections of no hub cast iron pipes. Note that from the reasoning section, PVC pipes can carry ~20% more water when compared to the same size cast iron pipes because of a smoother interior. Here are the costs for convenience on how the number above was guesstimated:

- 2" x 10' pipe --> $174

- 3" x 10' --> $240

- 4" x 10' --> $312

- 5" x 10' --> $449

- 6" x 10' --> $536

- 8" x 10' --> $834

- 10" x 10' --> $1,417

- 12" x 10' --> $2,059

- 15" x 10' --> $3,010

Note that the proposed code change will not require a certain material to be used, but with the differentiation of sizes between PVC and cast iron, more engineers may opt to use PVC pipe as a cost savings measure. To which, this cost impact analysis would be useless as pipe material change adds a certain degree of complexity. If the engineer uses PVC in all storm drain systems, then there would not be a cost impact.

Estimated Life Cycle Cost Impact:

no change

P152-24

P153-24

IPC: 1107.1, ASME Chapter 15, ASME Chapter 15 (New)

Proponents: Justin Cassamassino, ASME, A112 Main Committee (cassamassinoj@asme.org)

2024 International Plumbing Code

Revise as follows:

1107.1 General.
Siphonic roof drains and drainage systems shall be designed in accordance with ASME A112.6.9<u>/CSA B79.9</u> and ASPE 45.

ASME

American Society of Mechanical Engineers
Two Park Avenue
New York, NY 10016-5990

~~A112.6.9 - 2005 (R2024)~~ ~~Siphonic Roof Drains~~

Add new standard(s) as follows:

ASME

American Society of Mechanical Engineers
Two Park Avenue
New York, NY 10016-5990

<u>A112.6.9/CSA B79.9-2022</u> <u>Siphonic Roof Drains</u>

Staff Analysis: A review of the standard proposed for inclusion in the code, ASME A112.6.9/CSA B79.9 *Siphonic Roof Drains*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: The ASME A112.6.9 standard was harmonized with B79 standard. The intent of this proposal is to replace the current standard with the new standard.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Clarification to call out the new harmonized standard, no additional requirements

P153-24

P154-24

IPC: 1302.2.1

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Plumbing Code

Revise as follows:

1302.2.1 Prohibited sources.
Wastewater containing urine or fecal matter shall not be diverted to on-site nonpotable water reuse systems and shall discharge to the sanitary drainage system of the building or premises in accordance with Chapter 7. ~~Reverse osmosis system reject water,~~ Water ~~water~~ softener discharge water, kitchen sink wastewater, dishwasher wastewater and wastewater discharged from wet-hood scrubbers shall not be collected for reuse in an on-site nonpotable water reuse system.

Reason: Reverse osmosis reject water is a wastewater that has high total dissolved solids (TDS) and other contaminates that were already in the source water. This water can be safely used in graywater systems as such systems will have treatment protocols applied before being used for another purpose. There is no need to eliminate this water from use onsite nonpotable water systems.

This proposal is submitted by the ICC Plumbing Mechanical Gas Code Action Committee (PMGCAC)

PMGCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 PMGCAC has held 26 virtual meetings open to any interested party. In addition, there were several virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the PMGCAC website at PMGCAC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The choice to use reverse osmosis reject water is the responsibility of the designer. The code does not mandate the use of reverse osmosis reject water

P154-24

P155-24

IPC: 1302.6.1

Proponents: Kyle Thompson, Technical Director, Plumbing Manufacturers International (kthompson@safeplumbing.org)

2024 International Plumbing Code

Revise as follows:

1302.6.1 Graywater used for fixture flushing.
Graywater used for flushing water closets and urinals shall be disinfected and treated by an on-site water reuse treatment system complying with NSF 350. <u>Water closets supplied by an on-site water reuse treatment system for use in flushing shall also be supplied with an equal-sized potable water line that is dry until in use.</u>

Reason: The objective of this proposal is to safeguard an individual's freedom to choose between a conventional flush toilet and a smart toilet or personal hygiene device (bidet seat) for their home, ensuring that the code upholds this right.

The current code incorporates provisions for providing non-potable water indoors specifically for toilet flushing and other applications. In instances where a building is plumbed with a non-potable water supply line to the toilet, residents opting for a smart toilet or personal hygiene device, whether out of necessity or choice, must connect to the available non-potable water supply or re-pipe with a potable water supply line for proper installation of the smart toilet – often incurring prohibitive expenses. The code restricts the use of non-potable water for activities like bathing, washing with faucets, showerheads, tub spouts, etc. This same consideration should be extended to personal hygiene devices and smart toilets, crucial for many Americans due to medical conditions, or preferred for reasons of cleanliness, health, and environmental awareness.

Making an allowance in the existing code for the inclusion of these products, which adhere to all major plumbing codes and boast a longstanding presence in the market, is important for ensuring public health and safety. The U.S. smart toilet market, valued at $1.8 billion, is anticipated to surpass $3 billion within the next five years. Individuals across the United States incorporate these products into their bathrooms, with some relying on them for maintaining dignity, privacy, and self-reliance, especially those with special needs or limited mobility.

Ensuring ease of cleaning is immediately beneficial and crucial for seniors, significantly impacting their hygiene. Moreover, individuals facing colorectal issues like hemorrhoids, irritable bowel syndrome (IBS), and inflammatory bowel disease (IBD),[1.] along with pregnant women experiencing severe constipation or postpartum recovery,[2.] derive additional hygiene-related advantages from these products. They also contribute to maintaining hand hygiene, a critical factor in preventing the spread of diseases.[3.]

Beyond hygiene, many smart toilets feature health monitoring capabilities that analyze stool or urine to detect health issues such as sugar levels in diabetics. These innovations have proven especially beneficial for stroke rehabilitation[4.]. For certain individuals who cannot use toilet paper due to medical reasons, personal hygiene devices are indispensable. Additionally, these devices have demonstrated a reduction in instances of rashes, hemorrhoids, and urinary tract infections.

In essence, these products are vital for numerous individuals across the United States in preserving their health. However, the existing code could impede the installation of such products in residential bathrooms where the building is plumbed with a non-potable water supply line to the toilet.

This proposal aims to guarantee residents the freedom to choose personal hygiene devices or smart toilets for their homes. It specifies the availability of a potable water supply if builders opt to install non-potable water lines for toilet flushing. To prevent stagnant water conditions, the proposal necessitates keeping the potable water line dry until it is in use. Achieving this could involve installing a water line from the lavatory and incorporating a labeled shutoff valve at the lavatory.

Furthermore, the code already approves using personal hygiene devices that conform to ASME A112.4.2/CSA B45.16. This industry standard requires that a personal hygiene device includes backflow protection through an atmospheric vacuum breaker, air space type vacuum breaker, or air gap fitting.

Non-potable water treated to the level for use in toilet flushing that is compliant with the code, applicable laws, rules, ordinances, and NSF/ANSI 350 or IGC 324 is not equivalent to the level of safety that is dictated by federal law for potable water. Many individuals that use smart toilets and personal hygiene devices do so out of necessity due to disabilities and/or underlying health issues (e.g., arthritis, urinary tract infections, hemorrhoids, anal fissures). The quality level of water that is used with smart toilets and personal hygiene devices must be free of any pathogens, etc., that could cause infection or disease, and therefore, must be treated at a minimum in accordance with regulations for potable water.

Though it is always wise to consult a building official before tackling a new project, the codes do not require a permit to be pulled for every installation in a residential occupancy. For example, the IRC allows for the removal and reinstallation of a toilet without a permit if the installation does not involve or require the replacement or rearrangement of valves, pipes, or fixtures (Section R105.2). A personal hygiene device or smart toilet would meet this exemption as they are installed using the existing plumbing components and piping configuration.

Bibliography: 1. "How to Decide If You Need a Bidet," by Amber J. Tresca, 2019, Verywell Health, https://www.verywellhealth.com/do-i-need-a-bidet-1942839

2. "The Effect of Bidet Use on Severity of Constipation and Quality of Life Among Pregnant Women," by Sultan Alan, Ebru Gozuyesil and Sule Gokyildiz Surucu, August 2020, Yonago Acta Medica (YAM), Journal of Medical Sciences, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7435113/

3. "The Use of Electric Toilet Seats with Water Supply Is Efficacious in Maintaining Hand Hygiene in Experimental Model," by Shigeharu Oie, Hiromi Aoshika, Emiko Arita and Akira Kamiya, 2018, Japanese Journal of Infectious Diseases, https://www.jstage.jst.go.jp/article/yoken/71/4/71_JJID.2017.515/_article/-char/en

4. "Technology-assisted toilets: Improving independence and hygiene in stroke rehabilitation," by David Yachnin, Georges Gharib, Jeffrey Jutai and Hillel Finestone, August 2017, Journal of Rehabilitation and Assistive Technologies Engineering, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6453101/

Cost Impact: Increase

Estimated Immediate Cost Impact:

Increase cost of $175 for rough in of potable water supply line that is dry until in use.

Estimated Immediate Cost Impact Justification (methodology and variables):

a. Rough-in of potable water line that is dry until in use:
i. Parts: shutoff valve ($40), 20 ft copper pipe ($60).
ii. Plumbing Labor: 0.5-hour labor @$150/hr ($75).
iii. Total $175

Estimated Life Cycle Cost Impact:

Savings of $775 for re piping when compared with the cost of rough in of potable supply pipe.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

a. Re-pipe for potable water supply line after construction:
i. Construction
1. Parts: Estimate Drywall $2.50/sq ft., Tile $10/sq ft.
2. Construction Labor: $100/hr.
3. Construction Subtotal: Remove and restore 20sq ft of drywall and tile. 2 hr labor plus parts (Sub Total $450).
ii. Plumbing
1. Parts: Shutoff valve ($40), 20 ft copper pipe ($60).
2. Plumbing Labor: $150/hr.
3. Plumbing Subtotal: Reframe for new plumbing, pipe and fitting installation. 2 hr labor plus parts (Sub Total: $400).
iii. Permit: $100.

iv. Total $950 for re-pipe after construction.

P155-24

P156-24

IPC: 1303.10, IAPMO Chapter 15 (New)

Proponents: Terry Burger, IAPMO Group, IAPMO Group (terry.burger@asse-plumbing.org)

2024 International Plumbing Code

Revise as follows:

1303.10 Storage tanks.
Storage tanks utilized in nonpotable rainwater collection and conveyance systems shall comply with Sections 1301.9 and 1303.10.1 through 1303.10.3~~.~~, or comply with IAPMO Z1002

Add new standard(s) as follows:

IAPMO

IAPMO Group
4755 E. Philadelphia Street
Ontario, CA 91761 USA

Z1002 -2020	Rainwater Harvesting Tanks

Staff Analysis: A review of the standard proposed for inclusion in the code, IAPMO Z1002-2020 Sta*ndard for Rainwater Harvesting Tanks,* with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: There is a standard which cover these products. This change provides reference to an equivalent standard.

Bibliography: IAPMO Z1002 -2020 Rainwater Harvesting Tanks

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Products already exist in the market which are compliant to the referenced standard.

P156-24

P157-24 Part I

IPC: SECTION 202, SECTION 202 (New), CHAPTER 13, 1301.1, 1301.2, TABLE 1301.2(1) (New), TABLE 1301.2(2) (New), TABLE 1301.2(3) (New), 1301.2.1, 1301.2.2, 1301.3, 1301.4, 1301.5, 1301.6, 1301.7, 1301.8, 1301.9, 1301.9.1, 1301.9.2, 1301.9.3, 1301.9.3.1, 1301.9.3.2, 1301.9.4, 1301.9.5, 1301.9.6, 1301.9.7, 1301.9.8, 1301.9.9, 1301.9.10, 1301.10, 1301.10.1 (New), 1301.10.2 (New), 1301.10.3 (New), 1301.11, 1301.12, 1301.13 (New), SECTION 1302, 1302.1, 1302.2, 1302.2.1, 1302.4 (New), 1302.3, 1302.4, 1302.4.1, 1302.4.2, 1302.4.3, 1302.4.4, 1302.5, 1302.8 (New), 1302.6, 1302.6.1, 1302.7, 1302.7.1, 1302.7.2, 1302.8, 1302.8.1, 1302.8.2, 1302.9, 1302.10, 1302.11, 1302.11.1, 1302.11.2, 1302.11.3, 1302.12, 1302.12.1, 1302.12.2, 1302.12.3, 1302.12.4, 1302.12.5, 1302.12.6, 1302.14.7 (New), 1302.13, 1302.13.1, 1302.13.2, 1302.13.3, 1302.13.4, DOE (New), (New)

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

SECTION 202
GENERAL DEFINITIONS

Add new definition as follows:

BLACKWATER. Wastewater that contains urine or fecal matter.

BLACKWATER CONTRIBUTION (BWC). The fraction equal to the quantity of blackwater divided by the sum of the quantities of raw and treated blackwater plus surface water, groundwater, and water from approved potable water systems.

LOG REDUCTION VALUE (LRV). The measure of the ability of a treatment process to remove or inactivate microorganisms such as bacteria, protozoa and viruses. LRV is the logarithm base 10 of the ratio of the levels of a pathogenic organism or other contaminant before and after treatment.

POTABLE REUSE. The practice of treating wastewater and utilizing it for potable applications.

REUSE WATER. Wastewater or rainwater treated to a level of quality suitable for reuse.

WASTEWATER. The water generated after use of freshwater, raw water, drinking water, or saline water in a deliberate application or process.

WATER REUSE SYSTEM. A system for the treatment, storage, distribution, and reuse of water including, but not limited to, wastewater and captured rainwater.

Revise as follows:

CHAPTER 13 ~~NONPOTABLE~~ WATER REUSE SYSTEMS

1301.1 General.
The provisions of Chapter 13 shall govern the materials, design, construction and installation of systems for the ~~collection~~ treatment, storage, ~~treatment~~ and distribution of ~~nonpotable~~ reuse water. ~~For nonpotable rainwater systems, the~~ The provisions of CSA B805/ICC 805 shall be an alternative for regulating the materials, design, construction and installation of systems for rainwater collection, storage, treatment and distribution ~~of nonpotable water~~. The application of water reuse systems shall comply with all applicable laws, rules, and ordinances of the jurisdiction. ~~The use and application of nonpotable water shall comply with laws, rules and ordinances applicable in the jurisdiction~~.

1301.2 ~~Water~~ Reuse water quality.
~~Nonpotable~~ Reuse water ~~for each end use application~~ quality shall meet the minimum ~~water quality~~ requirements as specified in Tables

1301.2(1), 1301.2(2), 1301.2(3), and as established for the intended application by ~~the~~ all applicable laws, rules and ordinances ~~applicable in~~of the jurisdiction. Where ~~nonpotable~~ water from ~~different~~multiple sources is combined ~~in a system~~, the system shall comply with the most stringent of the requirements of this code that are applicable to such sources.

Add new text as follows:

TABLE 1301.2(1) REQUIRED WATER QUALITY FOR REUSE APPLICATIONS

Use Category	Application	Exposure[a]
Direct Potable Reuse	Direct Potable Reuse	DC
Indirect Potable Reuse (Treatment Follows Reuse Application)	Aquifer Recharge - Direct Injection	IC
	Aquifer Recharge - Surface Application	IC
	Aquifer Storage and Recovery	IC
	Rapid Infiltration Basins	IC
	Infiltration/Percolation Lagoons	IC
	Raw Water Augmentation	IC
	Saltwater Intrusion Barrier	IC
	Surface Water Augmentation to a Supply Source	IC
Irrigation of Food Crops for Human Consumption (Spray/Drip)	Food crop with processing that destroys pathogens (Restricted Access)	LC
	Orchards and Vineyards	AC/LC
	Water contacts edible portion of food crop (Includes Root Crops)	AC
	Water doesn't contact edible portion of food crop (Restricted Access)	IC
Irrigation of Crops Not for Human Consumption (Spray/Drip)	Christmas Tree Farms	AC/LC
	Hemp Crops	AC/LC
	Fiber crops	AC/LC
	Fodder /Feed Crop/ Forage Crops	AC/LC
	Ornamental nursery stock	AC/LC
	Seed Crops	AC/LC
	Silviculture / Tree Farms	AC/LC
	Sod/Turf Crops	AC/LC
	Tobacco	AC/LC
Landscape Irrigation (Spray/Drip)	Athletic Fields	AC/LC
	Cemeteries	AC/LC
	College and University Campuses	AC/LC
	Commercial Campuses	AC/LC
	Golf Courses (Restricted Access)	LC
	Golf Courses (Unrestricted Access)	AC/LC
	Highway/Freeway Medians/ Roadside Vegetation	AC/LC
	Open Access Land Irrigation	AC/LC
	Pasture for Milk Producing Animals (Restricted Access)	LC
	Pasture for Non-Milk Producing Animals (Restricted Access)	LC
	Parks	AC/LC
	Playgrounds	AC/LC
	Residential Irrigation	AC/LC
	Landscape Irrigation (Restricted Access)	LC
	Urban Landscaping	AC/LC
	Schoolyards	AC/LC
Water Features	Decorative Fountains	AC
	Landscape Impoundments (With Fountain(s))	AC
	Landscape Impoundments (Without Fountain(s))	LC
	Ponds and Lagoons	LC
	Recreational Impoundments (Restricted Access)	LC
	Recreational Impoundments (Unrestricted Access)	AC
	Reservoir Augmentation (Recreational)	AC
	Wetland Creation	LC
	Wetland Discharge / Application	LC
Life Safety	Fire Fighting Via Plane	AC
	Fire Hydrant Water Supply	AC
	Fire Protection systems	AC
	Non Structural Fire Fighting	AC
	Structural Fire Fighting	AC
Construction	Concrete and Cement mixing	LC
	Dust Control	LC
	Equipment Operation (Ex. Cooling Power Equipment)	LC
	Material Washing and Sieving	LC

	Soil Compaction and Consolidation	LC
Process Water	Agricultural Cleaning (Animal Washing & Animal Pens)	AC
	Aquaculture	LC
	Boiler Feed	LC
	Building Washing	AC
	Chemical Mixing (Herbicides, Pesticides, Fertilizers)	LC
	Commercial Car Washes	AC
	Commercial Laundries	AC
	Cooling Power Equipment	LC
	Cooling systems with aerosolization	AC
	Cooling systems with no aerosolization	LC
	Dust Control (Roads and Streets)	LC
	Flushing Sanitary Sewers	LC
	Flushing Toilets and Urinals	AC
	Bidets and personal hygiene devices	DC
	Frost Protection	LC
	Gas Pipeline Testing	LC
	Hydro Seeding	AC
	Impoundments at Fish Hatcheries	LC
	Industrial Oil and Gas Operations	LC
Process Water	Industrial Process Water (Possibility of Human Contact or Evaporative)	AC
	Industrial Washwater applications	AC
	Livestock Drinking Water (Milk Producing)	AC
	Livestock Drinking Water (Non-Milk Producing)	AC
	Parts Cleaning	LC
	Pool Water Makeup	AC
	Pressure Washing	AC
	Priming Drainage Traps	LC
	Road Milling	LC
	Ship Ballasting	LC
	Snow Making (Commercial / Recreational Use)	AC
	Snow Making (Storage)	AC
	Stack Scrubbing	LC
	Stream Flow Augmentation	LC
	Street, Sidewalk, Parking Lot Cleaning (Restricted Access)	LC
	Street, Sidewalk, Parking Lot Cleaning (Unrestricted Access)	AC
	Vehicle and equipment Washing	AC
	Wastewater Treatment (Process Uses)	LC
	Window Washing	AC

a. Where two Exposures and two Tiers are cited, the first refers to spray irrigation and the second refers to drip irrigation (or other subsurface irrigation).

b. Where the equipment manufacturer or the jurisdiction requires a level of free residual disinfectant that exceeds the requirement of the quality Tier indicated, such excess shall be provided.

DC (Quality Tier 4) = Direct Public Contact/Consumption Intended

AC (Quality Tier 3) = Aerosolization, or Accidental/Limited

Consumption Possible

IC (Quality Tier 2) = Indirect Public Consumption Intended or Possible

LC (Quality Tier 1) = Limited Contact / No Consumption Intended

TABLE 1301.2(2) WATER QUALITY FOR TIERS OF REUSE

Quality Tier	Minimun Design Water Quality
4	United States Environmental Protection Agency (USEPA) Primary and Secondary Drinking Water Quality Standards (40 CFR 141), plus 18/15/15 Log Removal of Enteric Viruses, Giardia, and Cryptosporidium
3	Compliant with all applicable laws, rules, ordinances and NSF 350
2	Compliant with all applicable laws, rules, ordinances, and end use fixture / equipment manufacturer requirements

1	Compliant with all applicable laws, rules, ordinances, and end use fixture / equipment manufacturer requirements

TABLE 1301.2(3) LOG REDUCTION (LRV) CREDITS APPLICALBLE TO DPR BASED ON SOURCE WATER

Source Water	Maximum LRV Credits for DPR
Blackwater	0/0/0
Blackwater blended with groundwater [a]	LRV credit [b] = negative log of BWC
Blackwater blended with surface water [a]	LRV credit [b] = negative log of BWC
Blackwater blended with groundwater and surface water [a]	LRV credit [b] = negative log of BWC
Graywater	Case by case basis
Stormwater	Case by case basis
Rainwater	Case by case basis
Industrial Water	Case by case basis
Process Water	Case by case basis

a. Groundwater and surface waters must be either an untreated source of drinking water approved by the jurisdiction or a treated drinking water approved by the jurisdiction.

b. LRV credit for all source waters containing blackwater shall not exceed 2.0.

Delete without substitution:

~~1301.2.1 Residual disinfectants~~.

~~Where chlorine is used for disinfection, the nonpotable water shall contain not more than 4 ppm (4 mg/L) of chloramines or free chlorine when tested in accordance with ASTM D1253. Where ozone is used for disinfection, the nonpotable water shall not contain gas bubbles having elevated levels of ozone at the point of use.~~

~~Exception:~~ ~~Reclaimed water sources shall not be required to comply with these requirements.~~

~~1301.2.2 Filtration required~~.

~~Nonpotable water utilized for water closet and urinal flushing applications shall be filtered by a 100-micron (0.1 mm) or finer filter.~~

~~Exception:~~ ~~Reclaimed water sources shall not be required to comply with these requirements.~~

Revise as follows:

1301.3 Signage required.

~~Nonpotable~~ Where nonpotable water is supplied to outlets such as hose connections, hydrants, open-ended pipes and faucets, each outlet shall be identified at the point of use ~~for each outlet~~ with signage that reads as follows: "~~Nonpotable water is utilized for [application name].~~ CAUTION: NONPOTABLE WATER – DO NOT DRINK." The words shall be legibly and indelibly printed on a tag or sign constructed of corrosion-resistant waterproof material or shall be indelibly printed on the fixture. The letters of the words shall be not less than 0.5 inch (12.7 mm) in height and in colors in contrast to the background on which they are applied. In addition to the required ~~wordage~~ text, the pictograph shown in Figure 1301.3 shall appear on the signage required by this section.

1301.4 Permits.

Permits shall be required for the construction, installation, operation, alteration and repair of ~~nonpotable~~ water reuse systems. Construction documents, engineering calculations, diagrams, operations and maintenence manuals,and other such data pertaining to the ~~nonpotable~~ water reuse systems shall be submitted with each permit application.

1301.5 Potable water connections.

Where a potable system is connected to a nonpotable water system, the potable water supply shall be protected against backflow in accordance with Section 608.

Revise as follows:

1301.6 Components and materials.
Piping, plumbing components and materials used in ~~collection and~~ conveyance and distibution systems shall be of material approved ~~by the manufacturer~~ for the intended application.

1301.7 Insect and vermin control.
The system shall be protected to prevent the entrance of insects and vermin into process tanks and equipment, storage tanks and piping systems. Screen materials shall be compatible with contacting system components and shall not accelerate the corrosion of system components.

1301.8 Freeze protection.
Where ~~sustained~~ freezing temperatures occur, provisions shall be made to keep storage tanks, process tanks and equipment and the related piping from freezing.

1301.9 ~~Nonpotable water storage~~ Water tanks.
~~Nonpotable w~~Water storage and process tanks shall comply with Sections 1301.9.1 through 1301.9.10.

1301.9.1 Location. Any storage tank, process tank and equipment
or portion thereof that is above grade shall be protected from direct exposure to sunlight by one of the following methods:

1. Tank construction using opaque, UV-resistant materials such as heavily tinted plastic, fiberglass, lined metal, concrete, ~~wood,~~ or painted to prevent algae growth.
2. Specially constructed sun barriers.
3. Installation in garages, crawl spaces or sheds.

1301.9.2 Materials.
~~Where collected on-site,~~ Prior to treatment for reuse, water shall be collected in an *approved* tank constructed of durable, nonabsorbent and corrosion-resistant materials. The ~~storage~~ tank shall be constructed of materials compatible with ~~any~~ all disinfection systems used to treat water upstream of the tank and with ~~any~~all systems used to maintain water quality in the tank. ~~Wooden storage tanks that are not equipped with a makeup water source shall be provided with a flexible liner.~~

1301.9.3 Foundation and supports.
~~Storage~~ All tanks shall be supported on a firm base capable of withstanding the weight of the ~~storage~~ tank when filled to capacity. ~~Storage t~~Tanks shall be supported in accordance with the *International Building Code*.

1301.9.3.1 Ballast.
Where the soil can become saturated, an underground ~~storage~~ tank shall be ballasted, or otherwise secured, to ~~prevent the tank from floating out of the ground~~ resist buoyant forces when empty. The combined weight of the empty tank and hold-down ballast shall ~~meet or~~ exceed the buoyancy force ~~of~~ applied to the tank. Where the installation requires a foundation, the foundation shall be flat and shall be designed to resist the maximum buoyant forces when the tank is empty, and to support the weight of the ~~storage~~ tank when full, consistent with the bearing capability of adjacent soil.

1301.9.3.2 Structural support.
Where installed below grade, ~~storage~~ tank installations shall be designed to withstand earth and surface structural loads without damage and with minimal deformation when empty or filled with water.

1301.9.4 Makeup water.

Where an uninterrupted supply is required for the intended application, ~~potable or reclaimed water shall be provided as a~~an additional source of makeup water shall be provided for the storage tank. ~~The~~ All makeup water suppl~~y~~ies shall be protected against backflow in accordance with Section 608. A *full-open valve* located on the makeup water supply lines to the storage tank ~~shall be provided~~. ~~Inlets to~~ Flow into the storage tank shall be controlled by fill valves or other automatic supply valves installed to prevent the tank from overflowing and to prevent the water level from dropping below a predetermined point. ~~Where makeup water is provided,~~ ~~t~~The water level shall not be permitted to drop below the ~~source water inlet or the~~ intake of any ~~attached~~ pump supplying makeup water.

1301.9.5 Overflow.
~~The storage~~ ~~t~~Tanks shall be equipped with an overflow pipe having a diameter not less than that shown in Table ~~606.5.4~~ 606.5(4). The overflow pipe shall be protected from insects ~~or~~ and vermin and shall discharge in a manner consistent with all applicable laws, rules, and ordinances of the jurisdiction for storm water runoff requirements of the jurisdiction. The overflow pipe shall discharge at a sufficient distance from the tank to avoid damaging the tank foundation or the adjacent property. Drainage from overflow pipes shall be directed to prevent freezing on roof walkways, and on sidewalks, pavement, and other accessways subject to vehicular or pedestrian traffic. The overflow drain shall not be equipped with a shutoff valve. A cleanout shall be provided on each overflow pipe in accordance with Section 708.

1301.9.6 Access. Not less than one access opening shall be provided to allow inspection and cleaning of the tank interior. Access openings shall have an *approved* locking device or other *approved* method of securing access. Below-grade ~~storage~~ tanks, located outside of the building, shall be provided with ~~a manhole~~ an access opening either not less than 24 inches (610 mm) square or with an inside diameter not less than 24 inches (610 mm). ~~Manholes~~ Access opening shall extend not less than 4 inches (102 mm) above ground ~~or~~ and shall be designed to prevent water infiltration. ~~Finished~~ The finished grade shall be sloped away from the ~~manhole~~ maintenance hole to divert surface water. ~~Manhole~~ Access opening covers shall be secured to prevent unauthorized access. Service ports in ~~manhole~~ access opening covers shall be not less than 8 inches (203 mm) in diameter and shall be not less than 4 inches (102 mm) above the finished grade level. The service port shall be secured to prevent unauthorized access. Access locations to confined spaces shall be labeled "CONFINED SPACE."

> **Exception:** ~~Treated-water storage~~ ~~t~~Tanks that are less than 800 gallons (3028 L) in volume and installed below grade shall not be required to be equipped with a manhole an access opening provided that the tank has a service port of not less than 8 inches (203 mm) in diameter.

1301.9.7 Venting.
~~Storage t~~Tanks that receive flow by gravity shall be provided with a vent sized in accordance with Chapter 9 and based on the aggregate diameter of all tank influent pipes. The reservoir vent shall not be connected to sanitary drainage system vents. Vents shall be protected from contamination by means of an *approved* cap or U-bend installed with the opening directed downward. Vent outlets shall extend not less than 4 inches (102 mm) above grade or as necessary to prevent surface water from entering the ~~storage~~ tank. Vent openings shall be protected against the entrance of vermin and insects in accordance with the requirements of Section 1301.7.

1301.9.8 Draining of tanks.
Tanks shall be provided with a means of emptying the contents for the purpose of service or cleaning. Tanks shall be drained by using a pump or by a drain located at the lowest point in the tank. The tank drain pipe shall discharge as required for overflow pipes and shall not be smaller in size than specified in Table ~~606.5.7~~ 606.5(7). Not less than one cleanout shall be provided on each drain pipe in accordance with Section 708.

Revise as follows:

1301.9.9 Marking and signage.
Each nonpotable water ~~storage~~ tank shall be labeled with its rated volumetric capacity. The contents of ~~storage~~ tanks shall be identified with the words "CAUTION: NONPOTABLE WATER – DO NOT DRINK." Where an opening is provided that could allow the entry of personnel, the opening shall be marked with the words, "DANGER – CONFINED SPACE." Markings shall be indelibly printed on the tank or on a tag or sign constructed of corrosion-resistant waterproof material that is mounted on the tank. The letters of the words shall be not less than 0.5 inch (12.7 mm) in height and shall be of a color in contrast with the background on which they are applied.

1301.9.10 ~~Storage~~ ~~t~~Tank tests.

~~Storage~~ Pressurized tanks shall be be certified in accordance with Section 303.4. Tanks that receive flow by gravity shall tested in accordance with the following:~~Storage t~~Tanks shall be filled with water to the overflow line prior to and during inspection. Seams and joints shall be left exposed and the tank shall remain watertight without leakage for a period of 24 hours.

1. After 24 hours, supplemental water shall be introduced for a period of 15 minutes to verify proper drainage of the overflow system and that there are no leaks.
2. The tank drain shall be observed for proper operation.
3. The makeup water system shall be observed for proper operation and successful automatic shutoff of the system at the refill threshold shall be verified.

1301.10 System abandonment.
If the owner of an on-site ~~nonpotable~~ water reuse system or ~~rainwater collection and conveyance system~~ components thereof, elects to cease use of, or fails to properly maintain such system, the system shall be abandoned and shall comply with ~~the following:~~ Sections 1301.10.1 through 1301.10.3.

1. ~~All system piping connecting to a utility-provided water system shall be removed or disabled.~~
2. ~~The distribution piping system shall be replaced with an *approved* potable water supply piping system. Where an existing potable pipe system is already in place, the fixtures shall be connected to the existing system.~~
3. ~~The storage tank shall be secured from accidental access by sealing or locking tank inlets and access points, or filling with sand or equivalent.~~

Add new text as follows:

1301.10.1 Utility-Connected Piping. All system piping connecting to a utility-provided water system shall be removed or disabled.

1301.10.2 Distribution Piping. The distribution piping system shall be removed or replaced with an approved potable water supply piping system. Where an existing potable pipe system is already in place, the fixtures shall be connected to the existing system.

1301.10.3 Tanks. Tanks shall be removed, or secured from accidental access by sealing or locking tank inlets and access points, or filling with sand or equivalent.

Revise as follows:

1301.11 Trenching requirements for nonpotable water piping.
Nonpotable water ~~collection and~~ distribution ~~piping and reclaimed water~~ piping shall be separated from the *building sewer* and potable water piping underground by 5 feet (1524 mm) of undisturbed or compacted earth. Nonpotable water ~~collection and~~ distribution piping shall not be located in, under or above cesspools, septic tanks, septic tank drainage fields or seepage pits. Buried nonpotable water piping shall comply with the requirements of Section 306.

Exceptions:

1. The required separation distance shall not apply where the bottom of the nonpotable water pipe within 5 feet (1524 mm) of the *sewer* is not less than 12 inches (305 mm) above the top of the highest point of the *sewer* and the pipe materials conform to Table 702.3.
2. The required separation distance shall not apply where the bottom of the potable water service pipe within 5 feet (1524 mm) of the nonpotable water pipe is not less than 12 inches (305 mm) above the top of the highest point of the nonpotable water pipe and the pipe materials comply with the requirements of Table 605.4.
3. Nonpotable water pipe is permitted to be located in the same trench with a *building sewer*, provided that such *sewer* is constructed of materials that comply with the requirements of Table 702.2.

4. The required separation distance shall not apply where a nonpotable water pipe crosses a *sewer* pipe, provided that the pipe is sleeved to not less than 5 feet (1524 mm) horizontally from the *sewer* pipe centerline on both sides of such crossing, with pipe materials that comply with Table 702.2.
5. The required separation distance shall not apply where a potable water service pipe crosses a nonpotable water pipe, provided that the potable water service pipe is sleeved for a distance of not less than 5 feet (1524 mm) horizontally from the centerline of the nonpotable pipe on both sides of such crossing, with pipe materials that comply with Table 702.2.
6. Irrigation piping located outside of a building and downstream of the backflow preventer is not required to meet the trenching requirements where nonpotable water is used for outdoor applications.

1301.12 Outdoor outlet access.
Sill cocks, hose bibbs, wall hydrants, yard hydrants and other outdoor outlets supplied by nonpotable water shall be located in a locked vault or shall be operable only by means of a removable key and marked in accordance with Section 1301.3.

Add new text as follows:

1301.13 Operations and monitoring. The design, installation, and continued operation of water reuse systems shall be in accordance with an approved operating and monitoring program. The program shall be implemented by an individual or entity in accordance with the requirements of the *International Property Maintenance Code.*

Revise as follows:

SECTION 1302
~~ON-SITE NONPOTABLE~~ WATER REUSE SYSTEMS

1302.1 General.
The provisions of ASTM E2635 and Section 1302 shall govern the construction, installation, alteration and repair of water reuse systems. ~~on-site nonpotable water reuse systems for the collection, storage, treatment and distribution of on-site sources of nonpotable water as permitted by the jurisdiction water reuse systems.~~.

1302.2 Graywater ~~S~~sources. ~~On-site nonpotable water~~ Graywater reuse systems shall collect waste discharge from only the following sources: bathtubs, showers, lavatories, clothes washers ~~and laundry trays~~ , laundry trays, condensate, and other domestic wastewaters that are not expected to contain urine, fecal matter, grease, or food wastes. ~~Where *approved* and as appropriate for the intended application, water from other nonpotable sources shall be collected for reuse by on-site nonpotable water reuse systems.~~.

1302.3 ~~1302.2.1 Prohibited~~ Blackwater sources.
~~Wastewater containing urine or fecal matter~~ Blackwater shall ~~not~~ be ~~diverted to on-site nonpotable water reuse systems and shall discharge~~ discharged to the sanitary drainage system ~~of the building or premises~~ in accordance with Chapter 7~~. Reverse osmosis system reject water, water softener discharge water, kitchen sink wastewater, dishwasher wastewater and wastewater discharged from wet-hood scrubbers shall not be collected for reuse in an on-site nonpotable water~~or to an approved on-site blackwater reuse system.

Add new text as follows:

1302.4 Other sources.. Other sources including, but not limited to, condensate, reverse osmosis system reject water, water softener discharge water, and wastewater discharged from wet-hood scrubbers shall also be considered for use in a water reuse system.

Revise as follows:

1302.5 ~~1302.3~~ Traps.
Traps serving fixtures and devices discharging ~~wastewater to on-site nonpotable~~ water to water reuse systems shall comply with Section 1002.4.

Delete without substitution:

~~**1302.4 Collection pipe**~~**.**

~~On-site nonpotable water reuse systems shall utilize drainage piping *approved* for use in plumbing drainage systems to collect and convey untreated water for reuse. Vent piping *approved* for use in plumbing venting systems shall be utilized for vents in the graywater system. Collection and vent piping materials shall comply with Section 702.~~

~~**1302.4.1 Installation**~~**.**

~~Collection piping conveying untreated water for reuse shall be installed in accordance with Section 704.~~

~~**1302.4.2 Joints**~~**.**

~~Collection piping conveying untreated water for reuse shall utilize joints *approved* for use with the distribution piping and appropriate for the intended applications as specified in Section 705.~~

~~**1302.4.3 Size**~~**.**

~~Collection piping conveying untreated water for reuse shall be sized in accordance with drainage sizing requirements specified in Section 710.~~

Revise as follows:

1302.6 ~~**1302.4.4**~~ **Pipe marking.**

Additional marking of collection piping conveying untreated water for reuse shall not be required beyond that required for sanitary drainage, waste and vent piping by Chapter 7.

1302.7 ~~**1302.5 Filtration**~~ **Treatment.**

~~Untreated w~~Water collected for reuse shall be ~~filtered as required for the intended end use. Filters shall be provided with *access* for inspection and maintenance. Filters shall utilize a pressure gauge or other *approved* method to provide indication when a filter requires servicing or replacement. Filters shall be installed with shutoff valves immediately upstream and downstream to allow for isolation during maintenance.~~treated to meet the quality standards required in Tables 1301.2(1) and 1301.2(2).

Add new text as follows:

1302.8 Treatment systems.. Treatment systems shall be installed to allow access for inspection and maintenance. All treatment equipment shall utilize pressure gauges, level sensors, intensity meters, or other approved methods to indicate when servicing or replacement is required. All treatment equipment shall be installed with shutoff valves immediately upstream and downstream to allow for isolation during maintenance.

Revise as follows:

1302.9 ~~**1302.6 Disinfection and treatment**~~ **Tanks.** ~~Where the intended application for nonpotable water collected on-site for reuse requires disinfection or other treatment or both, it shall be disinfected as needed to ensure that the required water quality is delivered at the point of use. Nonpotable water collected on-site containing untreated graywater shall be retained in collection reservoirs for not longer than 24 hours.~~ Nopotable tanks utilized in water reuse systems shall comply with Sections 1301.9, 1302.8.1 and 1302.8.2.

Delete without substitution:

~~**1302.6.1 Graywater used for fixture flushing**~~**.**

~~Graywater used for flushing water closets and urinals shall be disinfected and treated by an on-site water reuse treatment system~~

~~complying with NSF 350.~~

~~**1302.7 Storage tanks.**~~
~~Storage tanks utilized in on-site nonpotable water reuse systems shall comply with Sections 1301.9, 1302.7.1 and 1302.7.2.~~

Revise as follows:

1302.9.1 ~~1302.7.1~~ Location.
~~Storage t~~Tanks shall be located with a minimum horizontal distance between various elements as indicated in Table ~~1302.7.1~~ 1302.7(1).

1302.9.2 ~~1302.7.2~~ Outlets.
Outlets shall be located not less than 4 inches (102 mm) above the bottom of the ~~storage~~ tank and shall not skim water from the surface.

1302.10 ~~1302.8~~ Valves.
Valves shall be ~~supplied~~ installed on ~~on-site nonpotable~~ the collection of the water reuse systems in accordance with Sections 1302.~~8~~ 9 .1 and 1302.~~8~~ 9.2.

1302.10.1 ~~1302.8.1~~ Bypass valve.
One three-way diverter valve listed and labeled to NSF 50 or other *approved* device shall be installed on collection piping upstream of each storage tank, ~~or drain field,~~ as applicable, to divert untreated on-site reuse sources to the sanitary *sewer* or approved receiving tank to allow servicing and inspection of the system. Bypass valves shall be installed downstream of fixture traps and vent connections. Bypass valves shall be marked to indicate the direction of flow~~, connection and storage tank or drainfield connection~~. Bypass valves shall be provided with *access* that allows for removal. Two shutoff valves shall not be installed to serve as a bypass valve.

1302.10.2 ~~1302.8.2~~ Backwater valve.
One or more backwater valves shall be installed on each overflow and tank drain pipe. Backwater valves shall be installed in accordance with Section 714.

1302.11 ~~1302.9~~ Pumping and control system.
Mechanical equipment including pumps, valves and ~~filters~~ treatment units shall have *access* ~~and be removable~~ in order to ~~perform~~ to replace, repair, ~~maintenance~~ maintain and clean~~ing~~. The minimum flow rate and flow pressure delivered by the pumping system shall be appropriate for the application and in accordance with Section 604.

1302.12 ~~1302.10~~ Water pressure-reducing valve or regulator.
Where the water pressure supplied by the pumping system exceeds 80 psi (552 kPa) static, a pressure-reducing valve shall be installed to reduce the pressure in the ~~nonpotable~~ water distribution system piping to 80 psi (552 kPa) static or less. Pressure-reducing valves shall be specified and installed in accordance with Section 604.8.

1302.13 ~~1302.11~~ Distribution piping.
Distribution piping utilized in ~~on-site nonpotable~~ water reuse systems shall comply with Sections ~~1302.11.1~~ 1302.12.1 through ~~1302.11.3~~ 1302.12.3.

Exception: Irrigation piping located outside of the building and downstream of a backflow preventer.

~~1302.11.1~~ 1302.13.1 Materials, joints and connections.
Distribution piping shall conform to the standards and requirements specified in Section 605.

~~1302.11.2~~ 1302.13.2 Design.
~~On-site nonpotable w~~Water reuse distribution piping systems shall be designed and sized in accordance with Section 604 for the intended application.

~~1302.11.3~~ 1302.13.3 Labeling and marking.
~~On-site n~~Nonpotable water distribution piping labeling and marking shall comply with Section 608.9.

1302.14 ~~1302.12~~ Tests and inspections.
Tests and inspections shall be witnessed by the designer and performed in accordance with Sections 1302.12 14.1 through 1302.12 14 .6.

1302.14.1 ~~1302.12.1~~ Collection pipe and vent test.
Drain, waste and vent piping used for on-site water reuse systems shall be tested in accordance with Section 312.

1302.14.2 ~~1302.12.2~~ ~~Storage t~~Tank tests.
~~Storage t~~Tanks shall be tested in accordance with Section 1301.9.10.

1302.14.3 ~~1302.12.3~~ Water supply system test.
The testing of makeup water supply piping and distribution piping shall be conducted in accordance with Section 312.6.

1302.14.4 ~~1302.12.4~~ Inspection and testing of backflow prevention assemblies.
The testing of backflow preventers and backwater valves shall be conducted in accordance with Section 312.11.

1302.14.5 ~~1302.12.5~~ Inspection of vermin and insect protection.
Inlets and vents to the system shall be inspected to verify that each is protected to prevent the entrance of insects and vermin into the ~~storage~~ tank and piping systems in accordance with Section 1301.7.

1302.14.6 ~~1302.12.6~~ Initial ~~W~~water quality test.
The quality of the water for the intended application shall be verified at the point of use in accordance with ~~the requirements~~ all applicable laws, rules, and ordinances of the jurisdiction.

Add new text as follows:

1302.14.7 Operational water quality testing.. The quality of the water for the intended application(s) shall be verified at the point of use in accordance with all applicable laws, rules, ordinances of the jurisdiction, and in accordance with the operation and maintenance manual, and where required, the operating permit.

Revise as follows:

1302.15 ~~1302.13~~ Operation and maintenance manuals. Operation and maintenance materials shall be supplied with nonpotable on-site water reuse systems in accordance with Sections 1302.13.1 through 1302.13.4~~.~~ and the maintenance program shall be implemented by an individual or entity in accordance with the requirements of the *International Property Maintenance Code.*

1302.15.1 ~~1302.13.1~~ Manual.
A detailed operations and maintenance manual shall be supplied in hardcopy form with all systems.

1302.15.2 ~~1302.13.2~~ Schematics.
The manual shall include a detailed system schematic, and the locations and a list of all system components, including manufacturer and model number.

1302.15.3 ~~1302.13.3~~ Maintenance procedures.
The manual shall provide a schedule and procedures for all system components requiring periodic maintenance. Consumable parts, including filters, shall be noted along with part numbers.

1302.15.4 ~~1302.13.4~~ Operations procedures.
The manual shall include system startup and shutdown procedures. The manual shall include detailed operating procedures for the

system.

Add new text as follows:

Add new standard(s) as follows:

. 40 CFR 141 United States Environmental Protection Agency (USEPA) Primary and Secondary Drinking Water Quality Standards

Staff Analysis: A review of the standard proposed for inclusion in the code, DOE 40 CFR 141 *United States Environmental Protection Agency (USEPA) Primary and Secondary Drinking Water Quality Standards* , with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

P157-24 Part I

P157-24 Part II

IRC: SECTION R202, SECTION 202 (New), SECTION P2910, P2910.1, P2910.2, P2910.2.1, P2910.2.2, P2910.3, FIGURE P2910.3, P2910.4, P2910.5, P2910.6, P2910.7, P2910.8, P2910.9, P2910.9.1, P2910.9.2, P2910.9.3, P2910.9.4, P2910.9.4.1, P2910.9.4.2, P2910.9.5, P2910.9.5.1, P2910.9.6, TABLE P2910.9.6, P2910.9.7, P2910.9.8, SECTION P2911, P2910.9.9, P2910.10, P2910.11, P2910.12, P2910.13, P2910.14, P2911.1, P2911.2, P2911.2.1, P2911.3, P2911.4, P2911.4.1, P2911.4.2, P2911.4.3, P2911.4.4, P2911.5, P2911.6, P2911.6.1, P2911.7, P2911.7.1, TABLE P2911.7.1, P2911.7.2, P2911.7.3, P2911.8, P2911.8.1, P2911.8.2, P2911.9, P2911.10, P2911.11, P2911.11.1, P2911.11.2, P2911.11.3, P2911.12, P2911.12.1, P2911.12.2, P2911.12.3, P2911.12.4, P2911.12.5, P2911.12.6, P2911.13, P2911.13.1, P2911.13.2, P2911.13.3, P2911.13.4, SECTION P2912, P2912.1, P2912.2, P2912.3, P2912.4, P2912.5, P2912.5.1, P2912.5.2, P2912.6, P2912.7, P2912.7.4, P2912.7.2, P2912.7.3, P2912.7.1, P2912.8, P2912.9, P2912.10, P2912.10.1, TABLE P2912.10.1, P2912.10.2, P2912.10.3, P2912.11, P2912.11.1, P2912.11.2, P2912.12, P2912.13, P2912.14, P2912.14.1, P2912.14.2, P2912.14.3, P2912.15, P2912.15.1, P2912.15.2, P2912.15.3, P2912.15.4, P2912.15.5, P2912.15.6, P2912.15.7, P2912.15.8, P2912.16, P2912.16.1, P2912.16.2, P2912.16.3, P2912.16.4, SECTION P2913, P2913.1, P2913.2, P2913.3, P2913.3.1, P2913.3.1.1, P2913.3.1.2, P2913.3.1.3, P2913.4, P2913.4.1, P2913.4.2, CHAPTER 34 (New), SECTION 3401 (New), P3401.1 (New), P3401.2 (New), TABLE P3401.2(1) (New), TABLE P3401.2(3) (New), TABLE P3401.2.2(2) (New), P3401.3 (New), FIGURE P3401.3 (New), P3401.4 (New), P3401.5 (New), P3401.6 (New), P3401.7 (New), P3401.8 (New), P3401.9 (New), P3401.9.1 (New), P3401.9.2 (New), P3401.9.3 (New), P3401.9.3.1 (New), P3401.9.3.2 (New), P3401.9.4 (New), P3401.9.5 (New), TABLE P3401.9.5 (New), P3401.9.6 (New), P3401.9.7 (New), P3401.9.8 (New), P3401.9.9 (New), P3401.9.10 (New), P3401.10 (New), P3401.10.1 (New), P3401.10.2 (New), P3401.10.3 (New), P3401.11 (New), P3401.12 (New), P3401.13 (New), SECTION P3402 (New), P3402.1 (New), 3402.2 (New), P3402.3 (New), P3402.4 (New), P3402.5 (New), P3402.6 (New), P3402.7 (New), P3402.8 (New), P3402.9 (New), P3402.9.1 (New), TABLE P3402.9.1 (New), P3402.9.2 (New), P3402.10 (New), P3402.10.1 (New), P3402.10.2 (New), P3402.11 (New), P3402.12 (New), P3402.13 (New), P3402.13.1 (New), P3402.13.2 (New), P3402.13.3 (New), P3402.14 (New), P3402.14.1 (New), P3402.14.2 (New), P3402.14.3 (New), P3402.14.4 (New), P3402.14.5 (New), P3402.14.6 (New), P3402.14.7 (New), P3402.15 (New), P3402.15.1 (New), P3402.15.2 (New), P3402.15.3 (New), P3402.15.4 (New), SECTION 3403 (New), P3403.1 (New), P3403.2 (New), P3403.3 (New), P3403.4 (New), P3403.5 (New), P3403.5.1 (New), P3403.5.2 (New), P3403.6 (New), P3403.7 (New), P3403.7.1 (New), P3403.7.2 (New), P3403.7.3 (New), P3403.7.4 (New), P3403.8 (New), P3403.9 (New), P3403.10 (New), P3403.10.1 (New), TABLE P3403.10.1 (New), P3403.10.2 (New), P3403.10.3 (New), P3403.11 (New), P3403.11.1 (New), P3403.11.2 (New), P3403.12 (New), P3403.13 (New), P3403.14 (New), P3403.14.1 (New), P3403.14.2 (New), P3403.14.3 (New), P3403.15 (New), P3403.15.1 (New), P3403.15.2 (New), P3403.15.3 (New), P3403.15.4 (New), P3403.15.5 (New), P3403.15.6 (New), P3403.15.7 (New), P3403.15.8 (New), >P3403.16 (New), P3403.16.1 (New), P3403.16.2 (New), P3403.16.3 (New), P3403.16.4 (New), SECTION P3404 (New), P3404.1 (New), P3404.2 (New), P3404.3 (New), P3404.3.1 (New), P3404.3.1.1 (New), P3404.3.1.2 (New), P3404.3.1.3 (New), P3404.4 (New), P3404.4.1 (New), P3404.4.2 (New), 44 DOE, (New)

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2024 International Residential Code

SECTION R202 DEFINITIONS

Add new definition as follows:

BLACKWATER

. Wastewater that contains urine or fecal matter.

BLACKWATER CONTRIBUTION (BWC)

.

The fraction equal to the quantity of blackwater divided by the sum of the quantities of raw and treated blackwater plus surface water, groundwater, and water from approved potable water systems.

LOG REDUCTION VALUE (LRV).

The measure of the ability of a treatment process to remove or inactivate microorganisms such as bacteria, protozoa and viruses. LRV is the logarithm base 10 of the ratio of the levels of a pathogenic organism or other contaminant before and after treatment.

POTABLE REUSE

. The practice of treating *wastewater* and utilizing it for potable applications.

REUSE WATER

. Wastewater or rainwater treated to a level of quality suitable for reuse.

WASTEWATER

.
The water generated after use of freshwater, raw water, drinking water, or saline water in a deliberate application or process.

WATER REUSE SYSTEM

.
A system for the treatment, storage, distribution, and reuse of water including, but not limited to, wastewater and captured rainwater.

Delete without substitution:

~~SECTION P2910~~
~~NONPOTABLE WATER SYSTEMS~~

~~**P2910.1 Scope.** The provisions of this section shall govern the materials, design, construction and installation of systems for the collection, storage, treatment and distribution of nonpotable water. The use and application of nonpotable water shall comply with laws, rules and ordinances applicable in the *jurisdiction*.~~

~~**P2910.2 Water quality.** Nonpotable water for each end use application shall meet the minimum water quality requirements as established for the intended application by the laws, rules and ordinances applicable in the *jurisdiction*. Where nonpotable water from different sources is combined in a system, the system shall comply with the most stringent requirements of this code applicable to such sources.~~

~~**P2910.2.1 Residual disinfectants.** Where chlorine is used for disinfection, the nonpotable water shall contain not more than 4 ppm (4 mg/L) of chloramines or free chlorine. Where ozone is used for disinfection, the nonpotable water shall not contain gas bubbles having elevated levels of ozone at the point of use.~~

~~**Exception:** Reclaimed water sources shall not be required to comply with the requirements of this section.~~

~~**P2910.2.2 Filtration required.** Nonpotable water utilized for water closet and urinal flushing applications shall be filtered by a 100 micron or finer filter.~~

~~**Exception:** Reclaimed water sources shall not be required to comply with the requirements of this section.~~

~~**P2910.3 Signage required.**~~
~~Nonpotable water outlets such as hose connections, open-ended pipes and faucets shall be identified at the point of use for each outlet with signage that reads, "Nonpotable water is utilized for [application name]. CAUTION: NONPOTABLE WATER. DO NOT DRINK." The words shall be legibly and indelibly printed on a tag or sign constructed of corrosion-resistant, waterproof material or shall be indelibly printed on the fixture. The letters of the words shall be not less than 0.5 inches (12.7 mm) in height and in colors contrasting the background on which they are applied. In addition to the required wordage, the pictograph shown in Figure P2910.3 shall appear on the signage required by this section.~~

~~FIGURE P2910.3 PICTOGRAPH—DO NOT DRINK~~

~~**P2910.4 Permits.**~~
~~*Permits* shall be required for the construction, installation, *alteration* and *repair* of nonpotable water systems. *Construction documents*, engineering calculations, diagrams and other such data pertaining to the nonpotable water system shall be submitted with each *permit* application.~~

~~**P2910.5 Potable water connections.**~~
~~Where a potable system is connected to a nonpotable water system, the potable water supply shall be protected against backflow in accordance with Section P2902.~~

~~**P2910.6 Approved components and materials.** Piping, plumbing components and materials used in collection and conveyance systems shall be manufactured of material *approved* for the intended application and compatible with any disinfection and treatment systems used.~~

~~**P2910.7 Insect and vermin control.** The system shall be protected to prevent the entrance of insects and vermin into storage tanks and piping systems. Screen materials shall be compatible with contacting system components and shall not accelerate the corrosion of system components.~~

~~**P2910.8 Freeze protection.** Where sustained freezing temperatures occur, provisions shall be made to keep storage tanks and the related piping from freezing.~~

~~**P2910.9 Nonpotable water storage tanks.**~~
~~Nonpotable water storage tanks shall comply with Sections P2910.9.1 through P2910.9.11.~~

~~**P2910.9.1 Sizing.** The holding capacity of the storage tank shall be sized in accordance with the anticipated demand.~~

~~**P2910.9.2 Location.** Storage tanks shall be installed above or below grade. Above-grade storage tanks shall be protected from direct sunlight and shall be constructed using opaque, UV-resistant materials such as, but not limited to, heavily tinted plastic, lined metal, concrete and wood; or painted to prevent algae growth; or shall have specially constructed sun barriers including, but not limited to, installation in garages, *crawl spaces* or sheds. Storage tanks and their manholes shall not be located directly under any soil piping, waste piping or any source of contamination.~~

~~**P2910.9.3 Materials.** Where collected on site, water shall be collected in an *approved* tank constructed of durable, nonabsorbent and corrosion-resistant materials. The storage tank shall be constructed of materials compatible with any disinfection systems used to treat water upstream of the tank and with any systems used to maintain water quality within the tank. Wooden storage tanks that are not equipped with a makeup water source shall be provided with a flexible liner.~~

~~**P2910.9.4 Foundation and supports.** Storage tanks shall be supported on a firm base capable of withstanding the weight of the storage tank when filled to capacity. Storage tanks shall be supported in accordance with this code.~~

~~**P2910.9.4.1 Ballast.** Where the soil can become saturated, an underground storage tank shall be ballasted or otherwise secured to prevent the tank from floating out of the ground when empty. The combined weight of the tank and hold-down ballast shall meet or exceed the buoyancy force of the tank. Where the installation requires a foundation, the foundation shall be flat and shall be designed to support the storage tank weight when full, consistent with the bearing capability of adjacent soil.~~

~~**P2910.9.4.2 Structural support.** Where installed below grade, storage tank installations shall be designed to withstand earth and surface structural loads without damage and with minimal deformation when empty or filled with water.~~

~~**P2910.9.5 Makeup water.**~~

~~Where an uninterrupted nonpotable water supply is required for the intended application, potable or reclaimed water shall be provided as a source of makeup water for the storage tank. The makeup water supply shall be protected against backflow by means of an *air gap* not less than 4 inches (102 mm) above the overflow or an *approved* backflow device in accordance with Section P2902. A *full-open valve* located on the makeup water supply line to the storage tank shall be provided. Inlets to the storage tank shall be controlled by fill valves or other automatic supply valves installed to prevent the tank from overflowing and to prevent the water level from dropping below a predetermined point. Where makeup water is provided, the water level shall be prohibited from dropping below the source water inlet or the intake of any attached pump.~~

~~**P2910.9.5.1 Inlet control valve alarm.**~~

~~Makeup water systems shall be fitted with a warning mechanism that alerts the user to a failure of the inlet control valve to close correctly. The alarm shall activate before the water within the storage tank begins to discharge into the overflow system.~~

~~**P2910.9.6 Overflow.**~~

~~The storage tank shall be equipped with an overflow pipe having a diameter not less than that shown in Table P2910.9.6. The overflow outlet shall discharge at a point not less than 6 inches (152 mm) above the roof or roof drain; floor or *floor drain*; or over an open water-supplied fixture. The overflow outlet shall be covered with a corrosion-resistant screen of not less than 16 by 20 mesh per inch (630 by 787 mesh per m) and by $^1/_4$-inch (6.4 mm) hardware cloth or shall terminate in a horizontal angle seat check valve. Drainage from overflow pipes shall be directed to prevent freezing on roof walks. The overflow drain shall not be equipped with a shutoff valve. Not less than one cleanout shall be provided on each overflow pipe in accordance with Section P3005.2.~~

~~**TABLE P2910.9.6 SIZE OF DRAIN PIPES FOR WATER TANKS**~~

TANK CAPACITY (gallons)	DRAIN PIPE (inches)
Up to 750	1
751 to 1,500	1$^1/_2$
1,501 to 3,000	2
3,001 to 5,000	2$^1/_2$
5,001 to 7,500	3
Over 7,500	4

~~For SI: 1 gallon = 3.875 liters, 1 inch = 25.4 mm.~~

~~**P2910.9.7 Access.**~~

~~Not less than one access opening shall be provided to allow inspection and cleaning of the tank interior. Access openings shall have an *approved* locking device or other *approved* method of securing access. Below-grade storage tanks, located outside of the *building*, shall be provided with a manhole either not less than 24 inches (610 mm) square or with an inside diameter not less than 24 inches (610 mm). Manholes shall extend not less than 4 inches (102 mm) above ground or shall be designed to prevent water infiltration. Finished grade shall be sloped away from the manhole to divert surface water. Manhole covers shall be secured to prevent unauthorized access. Service ports in manhole covers shall be not less than 8 inches (203 mm) in diameter and shall be not less than 4 inches (102 mm)~~

~~above the finished grade level. The service port shall be secured to prevent unauthorized access.~~

> ~~**Exception:** Storage tanks under 800 gallons (3028 L) in volume installed below grade shall not be required to be equipped with a manhole, but shall have a service port not less than 8 inches (203 mm) in diameter.~~

~~P2910.9.8 Venting~~.
~~Storage tanks shall be provided with a vent sized in accordance with Chapter 31 and based on the aggregate diameter of all tank influent pipes. The reservoir vent shall not be connected to sanitary drainage system vents. Vents shall be protected from contamination by means of an *approved* cap or a U-bend installed with the opening directed downward. Vent outlets shall extend not less than 4 inches (102 mm) above grade, or as necessary to prevent surface water from entering the storage tank. Vent openings shall be protected against the entrance of vermin and insects in accordance with the requirements of Section P2910.7.~~

~~SECTION P2911~~
~~ON-SITE NONPOTABLE WATER REUSE SYSTEMS~~

~~P2910.9.9 Drain~~.
~~A drain shall be located at the lowest point of the storage tank. The tank drain pipe shall discharge as required for overflow pipes and shall not be smaller in size than specified in Table P2910.9.6. Not less than one cleanout shall be provided on each drain pipe in accordance with Section P3005.2.~~

~~P2910.10 Marking and signage~~.
~~Each nonpotable water storage tank shall be *labeled* with its rated capacity. The contents of storage tanks shall be identified with the words, "CAUTION: NONPOTABLE WATER. DO NOT DRINK." Where an opening is provided that could allow the entry of personnel, the opening shall be marked with the words, "DANGER—CONFINED SPACE." Markings shall be indelibly printed on the tank, or on a tag or sign constructed of corrosion-resistant waterproof material that is mounted on the tank. The letters of the words shall be not less than 0.5 inches (12.7 mm) in height and shall be of a color in contrast with the background on which they are applied.~~

~~P2910.11 Storage tank tests~~.
~~Storage tanks shall be tested in accordance with the following:~~

1. ~~Storage tanks shall be filled with water to the overflow line prior to and during inspection. Seams and joints shall be left exposed and the tank shall remain watertight without leakage for a period of 24 hours.~~
2. ~~After 24 hours, supplemental water shall be introduced for a period of 15 minutes to verify proper drainage of the overflow system and leaks do not exist.~~
3. ~~Following a successful test of the overflow, the water level in the tank shall be reduced to a level that is 2 inches (51 mm) below the makeup water trigger point by using the tank drain. The tank drain shall be observed for proper operation. The makeup water system shall be observed for proper operation, and successful automatic shutoff of the system at the refill threshold shall be verified. Water shall not be drained from the overflow at any time during the refill test.~~

~~P2910.12 System abandonment.~~ ~~If the *owner* of an on-site nonpotable water reuse system or rainwater collection and conveyance system elects to cease use of or fails to properly maintain such system, the system shall be abandoned and shall comply with the following:~~

1. ~~System piping connecting to a utility-provided water system shall be removed or disabled.~~
2. ~~The distribution piping system shall be replaced with an *approved* potable water supply piping system. Where an existing potable water pipe system is already in place, the fixtures shall be connected to the existing system.~~

3. ~~The storage tank shall be secured from accidental access by sealing or locking tank inlets and access points, or filled with sand or equivalent.~~

~~**P2910.13 Separation requirements for nonpotable water piping**~~**.**
~~Nonpotable water collection and distribution piping and reclaimed water piping shall be separated from the *building sewer* and potable water piping underground by 5 feet (1524 mm) of undisturbed or compacted earth. Nonpotable water collection and distribution piping shall not be located in, under or above cesspools, septic tanks, septic tank drainage fields or seepage pits. Buried nonpotable water piping shall comply with the requirements of Section P2604.~~

~~**Exceptions:**~~

1. ~~The required separation distance shall not apply where the bottom of the nonpotable water pipe within 5 feet (1524 mm) of the sewer is not less than 12 inches (305 mm) above the top of the highest point of the sewer and the pipe materials conforms to Table P3002.2.~~
2. ~~The required separation distance shall not apply where the bottom of the potable water service pipe within 5 feet (1524 mm) of the nonpotable water pipe is not less than 12 inches (305 mm) above the top of the highest point of the nonpotable water pipe and the pipe materials comply with the requirements of Table P2906.5.~~
3. ~~The required separation distance shall not apply where a nonpotable water pipe is located in the same trench with a *building sewer* that is constructed of materials that comply with the requirements of Table P3002.2.~~
4. ~~The required separation distance shall not apply where a nonpotable water pipe crosses a sewer pipe provided that the nonpotable water pipe is sleeved to not less than 5 feet (1524 mm) horizontally from the sewer pipe centerline on both sides of such crossing, with pipe materials that comply with Table P3002.2.~~
5. ~~The required separation distance shall not apply where a potable water service pipe crosses a nonpotable water pipe, provided that the potable water service pipe is sleeved for a distance of not less than 5 feet (1524 mm) horizontally from the centerline of the nonpotable pipe on both sides of such crossing, with pipe materials that comply with Table P3002.2.~~
6. ~~The required separation distance shall not apply to irrigation piping located outside of a building and downstream of the backflow preventer where nonpotable water is used for outdoor applications.~~

~~**P2910.14 Outdoor outlet access**~~**.**
~~Sillcocks, hose bibbs, wall hydrants, yard hydrants and other outdoor outlets supplied by nonpotable water shall be located in a locked vault or shall be operable only by means of a removable key.~~

~~**P2911.1 General.**~~ ~~The provisions of this section shall govern the construction, installation, *alteration* and *repair* of *on-site nonpotable water reuse systems* for the collection, storage, treatment and distribution of on-site sources of nonpotable water as permitted by the *jurisdiction*.~~

~~**P2911.2 Sources**~~**.** ~~*On-site nonpotable water reuse systems* shall collect waste discharge only from the following sources: bathtubs, showers, lavatories, clothes washers and laundry trays. Water from other *approved* nonpotable sources including swimming pool backwash operations, air conditioner condensate, rainwater, foundation drain water, fluid cooler discharge water and fire pump test water shall be permitted to be collected for reuse by *on-site nonpotable water reuse systems*, as *approved* by the *building official* and as appropriate for the intended application.~~

~~**P2911.2.1 Prohibited sources.**~~ ~~Reverse osmosis system reject water, water softener backwash water, *kitchen* sink wastewater, dishwasher wastewater and wastewater containing urine or fecal matter shall not be collected for reuse within an on-site nonpotable water reuse system.~~

~~**P2911.3 Traps**~~**.**
~~Traps serving fixtures and devices discharging wastewater to *on-site nonpotable water reuse systems* shall comply with the Section~~

~~P3201.2.~~

~~P2911.4 Collection pipe~~.

~~*On-site nonpotable water reuse systems* shall utilize drainage piping *approved* for use within plumbing drainage systems to collect and convey untreated water for reuse. Vent piping *approved* for use within plumbing venting systems shall be utilized for vents within the *graywater* system. Collection and vent piping materials shall comply with Section P3002.~~

~~P2911.4.1 Installation~~.

~~Collection piping conveying untreated water for reuse shall be installed in accordance with Section P3005.~~

~~P2911.4.2 Joints~~.

~~Collection piping conveying untreated water for reuse shall utilize joints *approved* for use with the distribution piping and appropriate for the intended applications as specified in Section P3002.~~

~~P2911.4.3 Size~~.

~~Collection piping conveying untreated water for reuse shall be sized in accordance with drainage sizing requirements specified in Section P3005.4.~~

~~P2911.4.4 Marking~~.

~~Additional marking of collection piping conveying untreated water for reuse shall not be required beyond that required for sanitary drainage, waste and vent piping by Chapter 30.~~

~~P2911.5 Filtration~~. ~~Untreated water collected for reuse shall be filtered as required for the intended end use. Filters shall be accessible for inspection and maintenance. Filters shall utilize a pressure gauge or other *approved* method to provide indication when a filter requires servicing or replacement. Filters shall be installed with shutoff valves immediately upstream and downstream to allow for isolation during maintenance.~~

~~P2911.6 Disinfection~~.

~~Nonpotable water collected on site for reuse shall be disinfected, treated or both to provide the quality of water needed for the intended end-use application. Where the intended end-use application does not have requirements for the quality of water, disinfection and treatment of water collected on site for reuse shall not be required. Nonpotable water collected on site containing untreated *graywater* shall be retained in collection reservoirs for not more than 24 hours.~~

~~P2911.6.1 Graywater used for fixture flushing~~.

~~*Graywater* used for flushing water closets and urinals shall be disinfected and treated by an on-site water reuse treatment system complying with NSF 350.~~

~~P2911.7 Storage tanks~~.

~~Storage tanks utilized in *on-site nonpotable water reuse systems* shall comply with Section P2910.9 and Sections P2911.7.1 through P2911.7.3.~~

~~P2911.7.1 Location~~.

~~Storage tanks shall be located with a minimum horizontal distance between various elements as indicated in Table P2911.7.1.~~

~~**TABLE P2911.7.1 LOCATION OF NONPOTABLE WATER REUSE STORAGE TANKS**~~

ELEMENT	MINIMUM HORIZONTAL DISTANCE FROM STORAGE TANK (feet)
Critical root zone (CRZ) of protected trees	2
Lot line adjoining private lots	5
Public water main	10
Seepage pits	5
Septic tanks	5
Streams and lakes	50
Water service	5
Water wells	50

~~For SI: 1 foot = 304.8 mm.~~

~~**P2911.7.2 Inlets.** Storage tank inlets shall be designed to introduce water into the tank with minimum turbulence, and shall be located and designed to avoid agitating the contents of the storage tank.~~

~~**P2911.7.3 Outlets.** Outlets shall be located not less than 4 inches (102 mm) above the bottom of the storage tank, and shall not skim water from the surface.~~

~~**P2911.8 Valves.**~~

~~Valves shall be supplied on *on-site nonpotable water reuse systems* in accordance with Sections P2911.8.1 and P2911.8.2.~~

~~**P2911.8.1 Bypass valve.**~~

~~One three-way diverter valve certified to NSF 50 or other *approved* device shall be installed on collection piping upstream of each storage tank, or drainfield, as applicable, to divert untreated on-site reuse sources to the sanitary sewer to allow servicing and inspection of the system. Bypass valves shall be installed downstream of fixture traps and vent connections. Bypass valves shall be *labeled* to indicate the direction of flow, connection and storage tank or drainfield connection. Bypass valves shall be installed in accessible locations. Two shutoff valves shall not be installed to serve as a bypass valve.~~

~~**P2911.8.2 Backwater valve.**~~

~~Backwater valves shall be installed on each overflow and tank drain pipe. Backwater valves shall be in accordance with Section P3008.~~

~~**P2911.9 Pumping and control system.**~~

~~Mechanical equipment including pumps, valves and filters shall be accessible and removable in order to perform *repair*, maintenance and cleaning. The minimum flow rate and *flow pressure* delivered by the pumping system shall be appropriate for the application and in accordance with Section P2903.~~

~~**P2911.10 Water pressure-reducing valve or regulator.**~~

~~Where the water pressure supplied by the pumping system exceeds 80 psi (552 kPa) static, a pressure-reducing valve shall be installed to reduce the pressure in the nonpotable water distribution system piping to 80 psi (552 kPa) static or less. Pressure-reducing valves shall be specified and installed in accordance with Section P2903.3.2.~~

~~**P2911.11 Distribution pipe.**~~

~~Distribution piping utilized in *on-site nonpotable water reuse systems* shall comply with Sections P2911.11.1 through P2911.11.3.~~

~~**Exception:** Irrigation piping located outside of the *building* and downstream of a backflow preventer.~~

~~P2911.11.1 Materials, joints and connections~~.

~~Distribution piping shall conform to the standards and requirements specified in Section P2906 for nonpotable water.~~

P2911.11.2 Design.

On-site nonpotable water reuse distribution piping systems shall be designed and sized in accordance with Section P2903 for the intended application.

Delete without substitution:

~~P2911.11.3 Marking~~.

~~On-site nonpotable water distribution piping labeling and marking shall comply with Section P2901.2.~~

~~P2911.12 Tests and inspections~~.

~~Tests and inspections shall be performed in accordance with Sections P2911.12.1 through P2911.12.6.~~

~~P2911.12.1 Collection pipe and vent test~~.

~~Drain, waste and vent piping used for on-site water reuse systems shall be tested in accordance with Section P2503.~~

~~P2911.12.2 Storage tank test~~.

~~Storage tanks shall be tested in accordance with Section P2910.11.~~

~~P2911.12.3 Water supply system test~~.

~~The testing of makeup water supply piping and distribution piping shall be conducted in accordance with Section P2503.7.~~

~~P2911.12.4 Inspection and testing of backflow prevention assemblies~~.

~~The testing of backflow preventers and backwater valves shall be conducted in accordance with Section P2503.8.~~

~~P2911.12.5 Inspection of vermin and insect protection~~.

~~Inlets and vents to the system shall be inspected to verify that each is protected to prevent the entrance of insects and vermin into the storage tank and piping systems in accordance with Section P2910.7.~~

~~P2911.12.6 Water quality test~~.

~~The quality of the water for the intended application shall be verified at the point of use in accordance with the requirements of the *jurisdiction*.~~

~~P2911.13 Operation and maintenance manuals~~.

~~Operation and maintenance materials shall be supplied with nonpotable on-site water reuse systems in accordance with Sections P2911.13.1 through P2911.13.4.~~

~~**P2911.13.1 Manual.** A detailed operations and maintenance manual shall be supplied in hard-copy form for each system.~~

~~**P2911.13.2 Schematics.** The manual shall include a detailed system schematic, the location of system components and a list of system components that includes the manufacturers and model numbers of the components.~~

~~**P2911.13.3 Maintenance procedures.** The manual shall provide a schedule and procedures for system components requiring periodic maintenance. Consumable parts including filters shall be noted along with part numbers.~~

~~**P2911.13.4 Operations procedures.** The manual shall include system startup and shutdown procedures. The manual shall include detailed operating procedures for the system.~~

~~SECTION P2912~~
~~NONPOTABLE RAINWATER COLLECTION AND DISTRIBUTION SYSTEMS~~

~~**P2912.1 General.**~~

~~The provisions of this section shall govern the construction, installation, *alteration* and *repair* of rainwater collection and conveyance systems for the collection, storage, treatment and distribution of rainwater for nonpotable applications. For nonpotable rainwater systems, the provisions of CSA B805/ICC 805 shall be an alternative for regulating the materials, design, construction and installation of systems for rainwater collection, storage, treatment and distribution of nonpotable water. The use and application of nonpotable water shall comply with laws, rules and ordinances applicable in the *jurisdiction*.~~

~~**P2912.2 Collection surface.** Rainwater shall be collected only from above-ground impervious roofing surfaces constructed from *approved* materials. Collection of water from vehicular parking or pedestrian walkway surfaces shall be prohibited except where the water is used exclusively for landscape irrigation. Overflow and bleed-off pipes from roof-mounted *appliances* including, but not limited to, evaporative coolers, water heaters and solar water heaters shall not discharge onto rainwater collection surfaces.~~

~~**P2912.3 Debris excluders.** Downspouts and leaders shall be connected to a roof washer and shall be equipped with a debris excluder or equivalent device to prevent the contamination of collected rainwater with leaves, sticks, pine needles and similar material. Debris excluders and equivalent devices shall be self-cleaning.~~

~~**P2912.4 Roof washer.** An amount of rainwater shall be diverted at the beginning of each rain event, and not allowed to enter the storage tank, to wash accumulated debris from the collection surface. The amount of rainfall to be diverted shall be field adjustable as necessary to minimize storage tank water contamination. The roof washer shall not rely on manually operated valves or devices and shall operate automatically. Diverted rainwater shall not be drained to the roof surface and shall be discharged in a manner consistent with the stormwater runoff requirements of the *jurisdiction*. Roof washers shall be accessible for maintenance and service.~~

~~**P2912.5 Roof gutters and downspouts.**~~

~~Gutters and downspouts shall be constructed of materials that are compatible with the collection surface and the rainwater quality for the desired end use. Joints shall be watertight.~~

~~**P2912.5.1 Slope.** Roof gutters, leaders and rainwater collection piping shall slope continuously toward collection inlets and shall be free of leaks. Gutters and downspouts shall have a slope of not less than $^1/_8$ inch per foot (10.4 mm/m) along their entire length. Gutters and downspouts shall be installed so that water does not pool at any point.~~

~~**P2912.5.2 Cleanouts.** Cleanouts shall be provided in the water conveyance system to allow *access to* filters, flushes, pipes and downspouts.~~

~~**P2912.6 Drainage.** Water drained from the roof washer or debris excluder shall not be drained to the sanitary sewer. Such water shall be diverted from the storage tank and shall discharge to a location that will not cause erosion or damage to property. Roof washers and~~

~~debris excluders shall be provided with an automatic means of self-draining between rain events and shall not drain onto roof surfaces.~~

~~P2912.7 Collection pipe~~.
~~Rainwater collection and conveyance systems shall utilize drainage piping *approved* for use within plumbing drainage systems to collect and convey captured rainwater. Vent piping *approved* for use within plumbing venting systems shall be utilized for vents within the rainwater system. Collection and vent piping materials shall comply with Section P3002.~~

~~P2912.7.4 Marking~~.
~~Additional marking of collection piping conveying captured rainwater for reuse shall not be required beyond that required for sanitary drainage, waste, and vent piping by Chapter 30.~~

~~P2912.7.2 Joints~~.
~~Collection piping conveying captured rainwater shall utilize joints *approved* for use with the distribution piping and appropriate for the intended applications as specified in Section P3003.~~

~~P2912.7.3 Size~~.
~~Collection piping conveying captured rainwater shall be sized in accordance with drainage sizing requirements specified in Section P3005.4.~~

~~P2912.7.1 Installation~~.
~~Collection piping conveying captured rainwater shall be installed in accordance with Section P3005.3.~~

~~P2912.8 Filtration~~. ~~Collected rainwater shall be filtered as required for the intended end use. Filters shall be accessible for inspection and maintenance. Filters shall utilize a pressure gauge or other *approved* method to provide indication when a filter requires servicing or replacement. Filters shall be installed with shutoff valves installed immediately upstream and downstream to allow for isolation during maintenance.~~

~~P2912.9 Disinfection~~. ~~Where the intended application for rainwater requires disinfection or other treatment or both, it shall be disinfected as needed to ensure that the required water quality is delivered at the point of use.~~

~~P2912.10 Storage tanks~~.
~~Storage tanks utilized in nonpotable rainwater collection and conveyance systems shall comply with Section P2910.9 and Sections P2912.10.1 through P2912.10.3.~~

~~P2912.10.1 Location~~.
~~Storage tanks shall be located with a minimum horizontal distance between various elements as indicated in Table P2912.10.1.~~

~~TABLE P2912.10.1 LOCATION OF RAINWATER STORAGE TANKS~~

ELEMENT	MINIMUM HORIZONTAL DISTANCE FROM STORAGE TANK (feet)
Critical root zone (CRZ) of protected trees	2
Lot line adjoining private lots	5
Seepage pits	5
Septic tanks	5

~~For SI: 1 foot = 304.8 mm~~

~~P2912.10.2 Inlets~~. ~~Storage tank inlets shall be designed to introduce collected rainwater into the tank with minimum turbulence, and shall be located and designed to avoid agitating the contents of the storage tank.~~

~~P2912.10.3 Outlets~~. ~~Outlets shall be located not less than 4 inches (102 mm) above the bottom of the storage tank and shall not skim water from the surface.~~

~~P2912.11 Valves~~.
~~Valves shall be supplied on rainwater collection and conveyance systems in accordance with Sections P2912.11.1 and P2912.11.2.~~

~~P2912.11.1 Influent diversion~~.
~~A means shall be provided to divert storage tank influent to allow for maintenance and repair of the storage tank system.~~

~~P2912.11.2 Backwater valve~~.
~~Backwater valves shall be installed on each overflow and tank drain pipe. Backwater valves shall be in accordance with Section P3008.~~

~~P2912.12 Pumping and control system~~.
~~Mechanical equipment including pumps, valves and filters shall be easily accessible and removable in order to perform repair, maintenance and cleaning. The minimum flow rate and~~ ~~*flow pressure*~~ ~~delivered by the pumping system shall be appropriate for the application and in accordance with Section P2903.~~

~~P2912.13 Water pressure-reducing valve or regulator~~.
~~Where the water pressure supplied by the pumping system exceeds 80 psi (552 kPa) static, a pressure-reducing valve shall be installed to reduce the pressure in the rainwater distribution system piping to 80 psi (552 kPa) static or less. Pressure-reducing valves shall be specified and installed in accordance with Section P2903.3.2.~~

~~P2912.14 Distribution pipe~~.
~~Distribution piping utilized in rainwater collection and conveyance systems shall comply with Sections P2912.14.1 through P2912.14.3.~~

> **~~Exception:~~** ~~Irrigation piping located outside of the~~ ~~*building*~~ ~~and downstream of a backflow preventer.~~

~~P2912.14.1 Materials, joints and connections~~.
~~Distribution piping shall conform to the standards and requirements specified in Section P2906 for nonpotable water.~~

~~P2912.14.2 Design~~.
~~Distribution piping systems shall be designed and sized in accordance with Section P2903 for the intended application.~~

~~P2912.14.3 Labeling and marking~~.
~~Nonpotable rainwater distribution piping labeling and marking shall comply with Section P2901.2.~~

~~P2912.15 Tests and inspections~~.

~~Tests and inspections shall be performed in accordance with Sections P2912.15.1 through P2912.15.8.~~

~~P2912.15.1 Roof gutter inspection and test.~~
~~Roof gutters shall be inspected to verify that the installation and slope is in accordance with Section P2912.5.1. Gutters shall be tested by pouring not less than 1 gallon of water (3.8 L) into the end of the gutter opposite the collection point. The gutter being tested shall not leak and shall not retain standing water.~~

~~P2912.15.2 Roofwasher test.~~
~~Roofwashers shall be tested by introducing water into the gutters. Proper diversion of the first quantity of water in accordance with the requirements of Section P2912.4 shall be verified.~~

~~P2912.15.3 Collection pipe and vent test.~~
~~Drain, waste and vent piping used for rainwater collection and conveyance systems shall be tested in accordance with Section P2503.~~

~~P2912.15.4 Storage tank test.~~
~~Storage tanks shall be tested in accordance with Section P2910.11.~~

~~P2912.15.5 Water supply system test.~~
~~The testing of makeup water supply piping and distribution piping shall be conducted in accordance with Section P2503.7.~~

~~P2912.15.6 Inspection and testing of backflow prevention assemblies.~~
~~The testing of backflow preventers and backwater valves shall be conducted in accordance with Section P2503.8.~~

~~P2912.15.7 Inspection of vermin and insect protection.~~
~~Inlets and vents to the system shall be inspected to verify that each is protected to prevent the entrance of insects and vermin into the storage tank and piping systems in accordance with Section P2910.7.~~

~~P2912.15.8 Water quality test.~~
~~The quality of the water for the intended application shall be verified at the point of use in accordance with the requirements of the *jurisdiction*.~~

~~P2912.16 Operation and maintenance manuals.~~
~~Operation and maintenance manuals shall be supplied with rainwater collection and conveyance systems in accordance with Sections P2912.16.1 through P2912.16.4.~~

~~P2912.16.1 Manual.~~ ~~A detailed operations and maintenance manual shall be supplied in hard-copy form for each system.~~

~~P2912.16.2 Schematics.~~ ~~The manual shall include a detailed system schematic, the location of system components and a list of system components that includes the manufacturers and model numbers of the components.~~

~~P2912.16.3 Maintenance procedures.~~ ~~The manual shall provide a maintenance schedule and procedures for system components requiring periodic maintenance. Consumable parts, including filters, shall be noted along with part numbers.~~

~~P2912.16.4 Operations procedures~~.

~~The manual shall include system startup and shutdown procedures, and detailed operating procedures.~~

~~SECTION P2913~~
~~RECLAIMED WATER SYSTEMS~~

~~P2913.1 General~~.

~~The provisions of this section shall govern the construction, installation, *alteration* and *repair* of systems supplying nonpotable reclaimed water.~~

~~P2913.2 Water pressure-reducing valve or regulator~~.

~~Where the reclaimed water pressure supplied to the *building* exceeds 80 psi (552 kPa) static, a pressure-reducing valve shall be installed to reduce the pressure in the reclaimed water distribution system piping to 80 psi (552 kPa) static or less. Pressure-reducing valves shall be specified and installed in accordance with Section P2903.3.2~~

~~P2913.3 Reclaimed water systems~~.

~~The design of the reclaimed water systems shall conform to accepted engineering practice.~~

~~P2913.3.1 Distribution pipe~~.

~~Distribution piping shall comply with Sections P2913.3.1.1 through P2913.3.1.3.~~

> **~~Exception:~~** ~~Irrigation piping located outside of the *building* and downstream of a backflow preventer.~~

~~P2913.3.1.1 Materials, joints and connections~~.

~~Distribution piping conveying reclaimed water shall conform to standards and requirements specified in Section P2906 for nonpotable water.~~

~~P2913.3.1.2 Design~~.

~~Distribution piping systems shall be designed and sized in accordance with Section P2903 for the intended application.~~

~~P2913.3.1.3 Labeling and marking~~.

~~Nonpotable rainwater distribution piping labeling and marking shall comply with Section P2901.2.~~

~~P2913.4 Tests and inspections~~.

~~Tests and inspections shall be performed in accordance with Sections P2913.4.1 and P2913.4.2.~~

~~P2913.4.1 Water supply system test.~~

~~The testing of makeup water supply piping and reclaimed water distribution piping shall be conducted in accordance with Section P2503.7.~~

~~P2913.4.2 Inspection and testing of backflow prevention assemblies~~.

~~The testing of backflow preventers shall be conducted in accordance with Section P2503.8.~~

Add new text as follows:

CHAPTER 34 WATER REUSE SYSTEMS

SECTION 3401 GENERAL

P3401.1 General. The provisions of this chapter shall govern the materials, design, construction, and installation of systems for the treatment, storage, and distribution of *reuse water*. The provisions of CSA B805/ICC 805 shall be an alternative for regulating the materials, design, construction and installation of systems for rainwater collection, storage, treatment, and distribution. The application of water reuse systems shall comply with all applicable laws, rules, and ordinances of the jurisdiction.

P3401.2 Reuse water quality. Reuse water quality shall meet the minimum requirements as specified in Tables P3401.2(1), P3401.2(2), P3401.2(3), and as established for the intended application by all applicable laws, rules, and ordinances of the jurisdiction. Where water from multiple sources is combined, the system shall comply with the most stringent of the requirements of this code that are applicable to such sources.

TABLE P3401.2(1) REQUIRED WATER QUALITY FOR REUSE APPLICATIONS

Use Category	Application	Exposure[a]	Quality Tier[b]
Direct Potable Reuse	Direct Potable Reuse	DC	4
Indirect Potable Reuse (Treatment Follows Reuse Application)	Aquifer Recharge - Direct Injection	IC	2
	Aquifer Recharge - Surface Application	IC	2
	Aquifer Storage and Recovery	IC	2
	Rapid Infiltration Basins	IC	2
	Infiltration/Percolation Lagoons	IC	2
	Raw Water Augmentation	IC	2
	Saltwater Intrusion Barrier	IC	2
	Surface Water Augmentation to a Supply Source	IC	2
Irrigation of Food Crops for Human Consumption (Spray/Drip)	Food crop w/ processing that destroys pathogens (Restricted Access)	LC	1
	Orchards and Vineyards	AC/LC	4/1
	Water contacts edible portion of food crop (Includes Root Crops)	AC	4
	Water doesn't contact edible portion of food crop (Restricted Access)	IC	2
Irrigation of Crops Not for Human Consumption (Spray/Drip)	Christmas Tree Farms	AC/LC	3/1
	Hemp Crops	AC/LC	3/1
	Fiber crops	AC/LC	3/1
	Fodder /Feed Crop/ Forage Crops	AC/LC	3/1
	Ornamental nursery stock	AC/LC	3/1
	Silviculture / Tree Farms	AC/LC	3/1
	Sod/Turf Crops	AC/LC	3/1
	Tobacco	AC/LC	3/1
Landscape Irrigation (Spray/Drip)	Athletic Fields	AC/LC	3/1
	Cemeteries	AC/LC	3/1
	College and University Campuses	AC/LC	3/1
	Commercial Campuses	AC/LC	3/1
	Golf Courses (Restricted Access)	LC	1
	Golf Courses (Unrestricted Access)	AC/LC	3/1
	Highway/Freeway Medians/ Roadside Vegetation	AC/LC	3/1
	Open Access Land Irrigation	AC/LC	3/1
	Pasture for Milk Producing Animals (Restricted Access)	LC	1
	Pasture for Non-Milk Producing Animals (Restricted Access)	LC	1
	Parks	AC/LC	3/1
	Playgrounds	AC/LC	3/1

	Residential Irrigation	AC/LC	3/1
	Landscape Irrigation (Restricted Access)	LC	1
	Urban Landscaping	AC/LC	3/1
	Schoolyards	AC/LC	3/1
Water Features	Decorative Fountains	AC	3
	Landscape Impoundments (With Fountain(s))	AC	3
	Landscape Impoundments (Without Fountain(s))	LC	1
	Ponds and Lagoons	LC	1
	Recreational Impoundments (Restricted Access)	LC	1
	Recreational Impoundments (Unrestricted Access)	AC	3
	Reservoir Augmentation (Recreational)	AC	3
	Wetland Creation	LC	1
	Wetland Discharge / Application	LC	1
Life Safety	Fire Fighting Via Plane	AC	3
	Fire Hydrant Water Supply	AC	3
	Fire Protection systems	AC	3
	Non Structural Fire Fighting	AC	3
	Structural Fire Fighting	AC	3
Construction	Concrete and Cement mixing	LC	1
	Dust Control	LC	1
	Equipment Operation (Ex. Cooling Power Equipment)	LC	1
	Material Washing and Sieving	LC	1
	Soil Compaction and Consolidation	LC	1
Process Water	Agricultural Cleaning (Animal Washing & Animal Pens)	AC	3
	Aquaculture	LC	1
	Boiler Feed	LC	1
	Building Washing	AC	3
	Chemical Mixing (Herbicides, Pesticides, Fertilizers)	LC	1
	Commercial Car Washes	AC	3
	Commercial Laundries	AC	3
	Cooling Power Equipment	LC	1
	Cooling systems with aerosolization	AC	3
	Cooling systems with no aerosolization	LC	1
	Dust Control (Roads and Streets)	LC	1
	Flushing Sanitary Sewers	LC	1
	Flushing Toilets and Urinals	AC	3
	Bidets and personal hygiene devices	DC	4
	Frost Protection	LC	1
	Gas Pipeline Testing	LC	1
	Hydro Seeding	AC	3
	Impoundments at Fish Hatcheries	LC	1
	Industrial Oil and Gas Operations	LC	1
	Industrial Process Water (No Possibility of Human Contact)	LC	1
Process Water	Industrial Process Water (Possibility of Human Contact or Evaporative)	AC	3
	Industrial Washwater applications	AC	3
	Livestock Drinking Water (Milk Producing)	AC	3
	Livestock Drinking Water (Non-Milk Producing)	AC	3
	Parts Cleaning	LC	1
	Pool Water Makeup	AC	3
	Pressure Washing	AC	3
	Priming Drainage Traps	LC	1
	Road Milling	LC	1
	Ship Ballasting	LC	1
	Snow Making (Commercial / Recreational Use)	AC	3
	Snow Making (Storage)	AC	3
	Stack Scrubbing	AC	3
	Stream Flow Augmentation	LC	1
	Street, Sidewalk, Parking Lot Cleaning (Restricted Access)	LC	1
	Street, Sidewalk, Parking Lot Cleaning (Unrestricted Access)	AC	3
	Vehicle and equipment Washing	AC	3
	Wastewater Treatment (Process Uses)	LC	1
	Window Washing	AC	3

TABLE P3401.2(3) LOG REDUCTION (LRV) CREDITS APPLICABLE TO DPR BASED ON SOURCE WATER

Source Water	Maximum LRV Credits for DPR
Blackwater	0/0/0

Blackwater blended with ground water [a]	*LRV* credit [b] = negative log of *BWC*
Blackwater blended with surface water [a]	LRV credit [b] = negative log of BWC
Blackwater blended with groundwater and surface water [a]	*LRV* credit [b] = negative log of *BWC*
Graywater	Case by case basis
Stormwater	Case by case basis
Rainwater	Case by case basis
Industrial Water	Case by case basis
Process water	Case by case basis

a. Groundwater and surface waters must be either an untreated source of drinking water approved by the jurisdiction or a treated drinking water approved by the jurisdiction.

b. LRV credit for all source waters containing blackwater shall not exceed 2.0.

TABLE P3401.2.2(2) WATER QUALITY FOR TIERS OF REUSE

Quality Tier	Minimum Design Water Quality
4	United States Environmental Protection Agency (USEPA) Primary and Secondary Drinking Water Quality Standards (40 CFR 141), plus 18/15/15 Log Removal of Enteric Viruses, Giardia, and Cryptosporidium
3	Compliant with all applicable laws, rules, ordinances, and NSF/ANSI 350
2	Compliant with all applicable laws, rules, ordinances, and end use fixture / equipment manufacturer requirements
1	Compliant with all applicable laws, rules, ordinances, and end use fixture / equipment manufacturer requirements

P3401.3 Signage required. Where nonpotable water is supplied to outlets such as hose connections, hydrants, open-ended pipes and faucets each outlet shall be identified at the point of use with signage that reads as follows: “CAUTION: NONPOTABLE WATER – DO NOT DRINK.” The words shall be legibly and indelibly printed on a tag or sign constructed of corrosion-resistant waterproof material or shall be indelibly printed on the fixture. The letters of the words shall be not less than 0.5 inch (12.7 mm) in height and in colors in contrast to the background on which they are applied. In addition to the required text, the pictograph shown in Figure P3401.3 shall appear on the signage required by this section.

FIGURE P3401.3 PICTOGRAPH—DO NOT DRINK

P3401.4 Permits. Permits shall be required for the construction, installation, operation, alteration and repair of water reuse systems. Construction documents, engineering calculations, diagrams, operation and maintenance manuals, and other such data pertaining to the water reuse system shall be submitted with each permit application.

P3401.5 Potable water connections. Where a potable system is connected to a nonpotable water system, the potable water supply shall be protected against backflow in accordance with Section P2902.

P3401.6 Components and materials. Piping, plumbing components, and materials used in conveyance and distribution systems shall be of material *approved* for the intended application.

P3401.7 Insect and vermin control. The system shall be protected to prevent the entrance of insects and vermin into process tanks and equipment, storage tanks and piping systems. Screen materials shall be compatible with contacting system components and shall not accelerate the corrosion of system components.

P3401.8 Freeze protection. Where freezing temperatures occur, provisions shall be made to keep storage tanks, process tanks and equipment, and the related piping from freezing.

P3401.9 Water tanks. Water storage and process tanks shall comply with Sections P3401.9.1 through P3401.9.10.

P3401.9.1 Location. Any storage tank, process tank and equipment, or portion thereof that is above grade shall be protected from direct exposure to sunlight by one of the following methods:

1. Tank construction using opaque, UV-resistant materials such as heavily tinted plastic, fiberglass, lined metal, concrete, or painted to prevent algae growth.
2. Specially constructed sun barriers.
3. Installation in garages, crawl spaces or sheds.

P3401.9.2 Materials. Prior to treatment for reuse, water shall be collected in an *approved* tank constructed of durable, nonabsorbent and corrosion-resistant materials. The tank shall be constructed of materials compatible with all disinfection systems used to treat water upstream of the tank and with all systems used to maintain water quality in the tank.

P3401.9.3 Foundation and supports.. All tanks shall be supported on a firm base capable of withstanding the weight of the tank when filled to capacity. Tanks shall be supported in accordance with the *International Building Code*.

P3401.9.3.1 Ballast. Where the soil can become saturated, an underground tank shall be ballasted, or otherwise secured, to resist buoyant forces when empty. The combined weight of the empty tank and hold-down ballast shall exceed the buoyancy force applied to the tank. Where the installation requires a foundation, the foundation shall be flat and shall be designed to resist the maximum buoyant forces when the tank is empty, and to support the weight of the tank when full, consistent with the bearing capability of adjacent soil.

P3401.9.3.2 Structural support. Where installed below grade, tank installations shall be designed to withstand earth and surface structural loads without damage and with minimal deformation when empty or filled with water.

P3401.9.4 Makeup water. Where an uninterrupted supply is required for the intended application, an additional source of makeup water shall be provided for the storage tank. All makeup water supplies shall be protected against backflow in accordance with Section P2902. A *full-open valve* located on the makeup water supply lines to the storage tank shall be provided. Flow into the storage tank shall be controlled by fill valves or other automatic supply valves installed to prevent the tank from overflowing and to prevent the water level from dropping below a predetermined point. The water level shall not be permitted to drop below the intake of any pump supplying makeup water.

P3401.9.5 Overflow. Tanks shall be equipped with an overflow pipe having a diameter not less than that shown in Table P3401.9.5. The overflow pipe shall be protected from insects and vermin and shall discharge in a manner consistent with all applicable laws, rules, and ordinances of the jurisdiction for storm water runoff requirements. The overflow pipe shall discharge at a sufficient distance from the tank to avoid damaging the tank foundation or the adjacent property. Drainage from overflow pipes shall be directed to prevent freezing on roof walkways, and on sidewalks, pavement, and other accessways subject to vehicular or pedestrian traffic. The overflow drain shall not be equipped with a shutoff valve. A cleanout shall be provided on each overflow pipe in accordance with Section P3005.2.

TABLE P3401.9.5 SIZE OF DRAIN PIPES FOR WATER TANKS

TANK CAPACITY (gallons)	DRAIN PIPE (inches)
Up to 750	1
751 to 1,500	1 1/2
1,501 to 3,000	2
3,001 to 3,000	2 1/2
5,001 to 7,500	3
Over 7,500	4

For SI: 1 gallon = 3.875 liters, 1 inch = 25.4 mm.

P3401.9.6 Access. Not less than one access opening shall be provided to allow inspection and cleaning of the tank interior. Access openings shall have an *approved* locking device or other *approved* method of securing access. Below-grade tanks, located outside of the building, shall be provided with an access opening either not less than 24 inches (610 mm) square or with an inside diameter not less than 24 inches (610 mm). An access opening shall extend not less than 4 inches (102 mm) above ground and shall be designed to prevent water infiltration. The finished grade shall be sloped away from the maintenance hole to divert surface water. Access opening covers shall be secured to prevent unauthorized access. Service ports in an access opening shall be not less than 8 inches (203 mm) in diameter and shall be not less than 4 inches (102 mm) above the finished grade level. The service port shall be secured to prevent unauthorized access. Access locations to confined spaces shall be labeled “CONFINED SPACE.”

Exception: Tanks that are less than 800 gallons (3028 L) in volume and installed below grade shall not be required to be equipped with an access opening provided that the tank has a service port of not less than 8 inches (203mm) in diameter.

P3401.9.7 Venting. Tanks that receive flow by gravity shall be provided with a vent sized in accordance with Chapter 31 and based on the aggregate diameter of all tank influent pipes. The reservoir vent shall not be connected to sanitary drainage system vents. Vents shall be protected from contamination by means of an approved cap or U-bend installed with the opening directed downward. Vent outlets shall extend not less than 4 inches (102 mm) above grade or as necessary to prevent surface water from entering the tank. Vent openings shall be protected against the entrance of vermin and insects in accordance with the requirements of Section P3401.7.

P3401.9.8 Draining of tanks. Tanks shall be provided with a means of emptying the contents for the purpose of service or cleaning. Tanks shall be drained by using a pump or by a drain located at the lowest point in the tank. The tank drain pipe shall discharge as required for overflow pipes and shall not be smaller in size than specified in Table P3401.9.5.Not less than one cleanout shall be provided on each drain pipe in accordance with Section P3005.2.

P3401.9.9 Marking and signage. Each nonpotable water tank shall be labeled with its rated volumetric capacity. The contents of tanks shall be identified with the words “CAUTION: NONPOTABLE WATER – DO NOT DRINK.” Where an opening is provided that could allow the entry of personnel, the opening shall be marked with the words, “DANGER – CONFINED SPACE.” Markings shall be indelibly printed on the tank or on a tag or sign constructed of corrosion-resistant waterproof material that is mounted on the tank. The letters of the words shall be not less than 0.5 inch (12.7 mm) in height and shall be of a color in contrast with the background on which they are applied

P3401.9.10 Tank tests. Pressurized tanks shall be certified in accordance with Section P2609.4. Tanks that receive flow by gravity shall be tested in accordance with the following:
Tanks shall be filled with water to the overflow line prior to and during inspection. Seams and joints shall be left exposed and the tank shall remain watertight without leakage for a period of 24 hours.

1. After 24 hours, supplemental water shall be introduced for a period of 15 minutes to verify proper drainage of the overflow system and that there are no leaks.
2. The tank drain shall be observed for proper operation.
3. The makeup water system shall be observed for proper operation, and successful automatic shutoff of the system at the refill threshold shall be verified.

P3401.10 System abandonment. If the owner of an on-site *water reuse system* or components thereof elects to cease use of, or fails to properly maintain such system, the system shall be abandoned and shall comply with Sections P3401.10.1 through P3401.10.3.

P3401.10.1 Utility-connected piping. All system piping connecting to a utility-provided water system shall be removed or disabled.

P3401.10.2 Distribution piping. The distribution piping system shall be removed or replaced with an approved potable water supply piping system. Where an existing potable pipe system is already in place, the fixtures shall be connected to the existing system.

P3401.10.3 Tanks. Tank(s) shall be removed, or secured from accidental access by sealing or locking tank inlets and access points, or filling with sand or equivalent.

P3401.11 Trenching requirements for nonpotable water piping. Nonpotable water distribution piping shall be separated from the *building sewer* and potable water piping underground by 5 feet (1524 mm) of undisturbed or compacted earth. Nonpotable water distribution piping shall not be located in, under or above cesspools, septic tanks, septic tank drainage fields or seepage pits. Buried nonpotable water piping shall comply with the requirements of Section P2604.

Exceptions:

1. The required separation distance shall not apply where the bottom of the nonpotable water pipe within 5 feet (1524 mm) of the sewer is not less than 12 inches (305 mm) above the top of the highest point of the *sewer* and the pipe materials conform to Table P3002.2.
2. The required separation distance shall not apply where the bottom of the potable water service pipe within 5 feet (1524 mm) of the nonpotable water pipe is not less than 12 inches (305 mm) above the top of the highest point of the nonpotable water pipe and the pipe materials comply with the requirements of Table P2906.5
3. Nonpotable water pipe is permitted to be located in the same trench as a *building sewer*, provided that such sewer is constructed of materials that comply with the requirements of Table P3002.1(2).
4. The required separation distance shall not apply where a nonpotable water pipe crosses a sewer pipe, provided that the pipe is sleeved to not less than 5 feet (1524 mm) horizontally from the sewer pipe centerline on both sides of such crossing, with pipe materials that comply with Table P3002.1(2).
5. The required separation distance shall not apply where a potable water service pipe crosses a nonpotable water pipe, provided that the potable water service pipe is sleeved for a distance of not less than 5 feet (1524 mm) horizontally from the centerline of the nonpotable pipe on both sides of such crossing, with pipe materials that comply with Table P3002.1(2).
6. Irrigation piping located outside of a building and downstream of the backflow preventer is not required to meet the trenching requirements where nonpotable water is used for outdoor applications.

P3401.12 Outdoor outlet access. Sillcocks, hose bibbs, wall hydrants, yard hydrants and other outdoor outlets supplied by nonpotable water shall be located in a locked vault or shall be operable only by means of a removable key and marked in accordance with Section P3401.3.

P3401.13 Operation and Monitoring. The design, installation and continued operation of water reuse systems shall be in accordance with an approved operating and monitoring program. The program shall be implemented by an individual or entity in accordance with the requirements of the *International Property Maintenance Code*.

SECTION P3402
GRAYWATER AND BLACKWATER REUSE

P3402.1 General. The provisions of ASTM E2635 and Section P3402 shall govern the construction, installation, alteration and repair of water reuse systems.

3402.2 Graywater sources. Graywater reuse systems shall collect waste discharge from only the following sources: bathtubs, showers, lavatories, clothes washers, laundry trays, condensate and other domestic wastewaters that are not expected to contain urine, fecal matter, grease or food wastes.

P3402.3 Blackwater sources. Blackwater shall be discharged to the sanitary drainage system in accordance with Chapter 30 or to an approved on-site blackwater reuse system.

P3402.4 Other sources. Other sources including, but not limited to, condensate, reverse osmosis system reject water and water softener discharge water shall also be considered for use in a water reuse system.

P3402.5 Traps. Traps serving fixtures and devices discharging water to water reuse systems shall comply with Section P3201.2.

P3402.6 Pipe marking. Additional marking of collection piping conveying untreated water for reuse shall not be required beyond that required for sanitary drainage, waste and vent piping by Chapter 30.

P3402.7 Treatment. Water collected for reuse shall be treated to meet the quality standards required in Tables P3401.2(1) and P3401.2(2).

P3402.8 Treatment systems. Treatment systems shall be installed to allowaccess for inspection and maintenance. All treatment equipment shall utilize pressure gauges, level sensors, intensity meters or other approved methods to indicate when servicing or replacement is required. All treatment equipment shall be installed with shutoff valves immediately upstream and downstream to allow for isolation during maintenance.

P3402.9 Tanks. Nonpotabletanksutilized in water reuse systems shall comply with Sections P3401.9, P3402.9.1 and P3402.9.2.

P3402.9.1 Location. Tanks shall be located with a minimum horizontal distance between various elements as indicated in Table P3402.9.1.

TABLE P3402.9.1 LOCATION OF NONPOTABLE WATER REUSE TANKS

ELEMENT	MINIMUM HORIZONTAL DISTANCE FROM TANK (feet)
Critical root zone (CRZ) of protected trees	2
Lot line adjoining private lots	5
Public water main	10
Seepage pits	5
Septic tanks	5
Streams and lakes	50
Water service	5
Water wells	50

1 foot = 304.8 mm.

P3402.9.2 Outlets. Outlets shall be located not less than 4 inches (102 mm) above the bottom of the tank and shall not skim water from the surface.

P3402.10 Valves. Valves shall be installed on the collection piping of the *water reuse system*s in accordance with Sections P3402.10.1 and P3402.10.2.

P3402.10.1 Bypass valve. One three-way diverter valve listed and labeled to NSF 50 or other *approved* device shall be installed on collection piping upstream of each storage tank, as applicable, to divert untreated on-site reuse sources to the sanitary sewer or approved receiving tank to allow servicing and inspection of the system. Bypass valves shall be installed downstream of fixture traps and vent connections. Bypass valves shall be marked to indicate the direction of flow. Bypass valves shall be provided with access that allows for removal. Two shutoff valves shall not be installed to serve as a bypass valve.

P3402.10.2 Backwater valve. One or more backwater valves shall be installed on each overflow and tank drain pipe. Backwater valves shall be installed in accordance with Section P3008.

P3402.11 Pumping and control system. Mechanical equipment including pumps, valves, and treatment units shall have *access* in order to replace, repair, maintain and clean. The minimum flow rate and flow pressure delivered by the pumping system shall be appropriate for the application and in accordance with Section P2903.

P3402.12 Water pressure-reducing valve or regulator. Where the water pressure supplied by the pumping system exceeds 80 psi (552 kPa) static, a pressure-reducing valve shall be installed to reduce the pressure in the water distribution system piping to 80 psi (552 kPa) static or less. Pressure-reducing valves shall be specified and installed in accordance with Section P2903.3.2.

P3402.13 Distribution piping. Distribution piping utilized in water reuse systems shall comply with Sections P3402.13.1 through P3402.13.3.

Exception: Irrigation piping located outside of the building and downstream of a backflow preventer.

P3402.13.1 Materials, joints and connections. Distribution piping shall conform to the standards and requirements specified in Section P2906.

P3402.13.2 Design. Water reuse distribution piping systems shall be designed and sized in accordance with Section P2903 for the intended application.

P3402.13.3 Labeling and marking. Nonpotable water distribution piping labeling and marking shall comply with Section P2901.2.

P3402.14 Tests and Inspections. Tests and inspections shall be witnessed by the designer and performed in accordance with Sections P3402.14.1 through P3402.14.7.

P3402.14.1 Collection pipe and vent test. Drain, waste and vent piping used for on-site water reuse systems shall be tested in accordance with Section P2503.5.

P3402.14.2 Tank test. Tanks shall be tested in accordance with Section P3401.9.10.

P3402.14.3 Water supply system test. The testing of makeup water supply piping and distribution piping shall be conducted in accordance with Section P2503.7.

P3402.14.4 Inspection and testing of backflow prevention assemblies. The testing of backflow preventers and backwater valves shall be conducted in accordance with Section P2503.8.

P3402.14.5 Inspection of vermin and insect protection. Inlets and vents to the system shall be inspected to verify that each is protected to prevent the entrance of insects and vermin into the tank and piping systems in accordance with Section P3401.7.

P3402.14.6 Initial water quality test. The quality of the water for the intended application shall be verified at the point of use in accordance with all applicable laws, rules and ordinances of the jurisdiction.

P3402.14.7 Operational water quality testing. The quality of the water for the intended application(s) shall be verified at the point of use in accordance with all applicable laws, rules, ordinances of the jurisdiction, and in accordance with the operation and maintenance manual, and where required, the operating permit.

P3402.15 Operation and maintenance manuals. Operation and maintenance materials shall be supplied with ~~nonpotable on-site~~*water reuse system*s in accordance with Sections P3402.15.1 through P3402.15.4 and the maintenance program shall be implemented by an individual or entity in accordance with the requirements of the *International Property Maintenance Code*.

P3402.15.1 Manual. A detailed operations and maintenance manual shall be supplied in hardcopy form with all systems.

P3402.15.2 Schematics. The manual shall include a detailed system schematic, and the locations and a list of all system components, including manufacturer and model number.

P3402.15.3 Maintenance procedures. The manual shall provide a schedule and procedures for all system components requiring periodic maintenance. Consumable parts, including filters, shall be noted along with part numbers.

P3402.15.4 Operations procedures. The manual shall include system startup and shutdown procedures. The manual shall include detailed operating procedures for the system.

SECTION 3403
NONPOTABLE RAINWATER COLLECTION SYSTEMS

P3403.1 General. The provisions of this section shall govern the construction, installation, alteration and repair of rainwater collection and conveyance systems for the collection, storage, treatment and distribution of rainwater for nonpotable applications. For nonpotable rainwater systems, the provisions of CSA B805/ICC 805 shall be an alternative for regulating the materials, design, construction and installation of systems for rainwater collection, storage, treatment and distribution of nonpotable water. The use and application of nonpotable water shall comply with laws, rules and ordinances applicable in the jurisdiction.

P3403.2 Collection surface. Rainwater shall be collected only from above-ground impervious roofing surfaces constructed from approved materials. Collection of water from vehicular parking or pedestrian walkway surfaces shall be prohibited except where the water is used exclusively for landscape irrigation. Overflow and bleed-off pipes from roof-mounted appliances including, but not limited to, evaporative coolers, water heaters and solar water heaters shall not discharge onto rainwater collection surfaces.

P3403.3 Debris excluders. Downspouts and leaders shall be connected to a roof washer and shall be equipped with a debris excluder or equivalent device to prevent the contamination of collected rainwater with leaves, sticks, pine needles and similar material. Debris excluders and equivalent devices shall be self-cleaning.

P3403.4 Roof washer. An amount of rainwater shall be diverted at the beginning of each rain event, and not allowed to enter the storage tank, to wash accumulated debris from the collection surface. The amount of rainfall to be diverted shall be field adjustable as necessary to minimize storage tank water contamination. The roof washer shall not rely on manually operated valves or devices, and shall operate automatically. Diverted rainwater shall not be drained to the roof surface, and shall be discharged in a manner consistent with the stormwater runoff requirements of the jurisdiction. Roof washers shall be accessible for maintenance and service.

P3403.5 Roof gutters and downspouts . Gutters and downspouts shall be constructed of materials that are compatible with the collection surface and the rainwater quality for the desired end use. Joints shall be watertight.

P3403.5.1 Slope. Roof gutters, leaders and rainwater collection piping shall slope continuously toward collection inlets and shall be free of leaks. Gutters and downspouts shall have a slope of not less than $^{1}/_{8}$ inch per foot (10.4 mm/m) along their entire length. Gutters and downspouts shall be installed so that water does not pool at any point.

P3403.5.2 Cleanouts. Cleanouts shall be provided in the water conveyance system to allow access to filters, flushes, pipes and downspout

P3403.6 Drainage. Water drained from the roof washer or debris excluder shall not be drained to the sanitary sewer. Such water shall be diverted from the storage tank and shall discharge to a location that will not cause erosion or damage to property. Roof washers and debris excluders shall be provided with an automatic means of self-draining between rain events and shall not drain onto roof surfaces.

P3403.7 Collection pipe. Rainwater collection and conveyance systems shall utilize drainage piping approved for use within plumbing drainage systems to collect and convey captured rainwater. Vent piping approved for use within plumbing venting systems shall be utilized for vents within the rainwater system. Collection and vent piping materials shall comply with Section P3002.

P3403.7.1 Installation. Collection piping conveying captured rainwater shall be installed in accordance with Section P3005.3.

P3403.7.2 Joints. Collection piping conveying captured rainwater shall utilize joints approved for use with the distribution piping and appropriate for the intended applications as specified in Section P3003.

P3403.7.3 Size. Collection piping conveying captured rainwater shall be sized in accordance with drainage-sizing requirements specified in Section P3005.4

P3403.7.4 Marking. Additional marking of collection piping conveying captured rainwater for reuse shall not be required beyond that required for sanitary drainage, waste, and vent piping by Chapter 30.

P3403.8 Filtration. Collected rainwater shall be filtered as required for the intended end use. Filters shall be accessible for inspection and maintenance. Filters shall utilize a pressure gauge or other approved method to provide indication when a filter requires servicing or replacement. Filters shall be installed with shutoff valves installed immediately upstream and downstream to allow for isolation during maintenance.

P3403.9 Disinfection. Where the intended application for rainwater requires disinfection or other treatment or both, it shall be disinfected as needed to ensure that the required water quality is delivered at the point of use.

P3403.10 Storage tanks. Storage tanks utilized in nonpotable rainwater collection and conveyance systems shall comply with Section P3401.9 and Sections P3403.10.1 through P3403.10.3.

P3403.10.1 Location. Storage tanks shall be located with a minimum horizontal distance between various elements as indicated in Table P3403.10.1.

TABLE P3403.10.1 LOCATION OF RAINWATER STORAGE TANKS

ELEMENT	MINIMUM HORIZONTAL DISTANCE (feet)
Critical root zone	2
Lot line adjoining private lots	5
Seepage pits	5
Septic tanks	5

For SI: 1 foot = 304.8 mm

P3403.10.2 Inlets. Storage tank inlets shall be designed to introduce collected rainwater into the tank with minimum turbulence, and shall be located and designed to avoid agitating the contents of the storage tank.

P3403.10.3 Outlets. Outlets shall be located not less than 4 inches (102 mm) above the bottom of the storage tank and shall not skim water from the surface.

P3403.11 Valves. Valves shall be supplied on rainwater collection and conveyance systems in accordance with Sections P3403.11.1 and P3403.11.2.

P3403.11.1 Influent diversion. A means shall be provided to divert storage tank influent to allow for maintenance and repair of the storage tank system.

P3403.11.2 **Backwater valve.** Backwater valves shall be installed on each overflow and tank drain pipe. Backwater valves shall be in accordance with Section P3008.

P3403.12 **Pumping and control system..** Mechanical equipment including pumps, valves and filters shall be easily accessible and removable in order to perform repair, maintenance and cleaning. The minimum flow rate and flow pressure delivered by the pumping system shall appropriate for the application and in accordance with Section P2903.

P3403.13 **Water pressure-reducing valve or regulator.** Where the water pressure supplied by the pumping system exceeds 80 psi (552 kPa) static, a pressure-reducing valve shall be installed to reduce the pressure in the rainwater distribution system piping to 80 psi (552 kPa) static or less. Pressure-reducing valves shall be specified and installed in accordance with Section P2903.3.2.

P3403.14 **Distribution pipe.** Distribution piping utilized in rainwater collection and conveyance systems shall comply with Sections P3403.14.1 through P3403.14.3.

> **Exception:** Irrigation piping located outside of the building and downstream of a backflow preventerrigation piping located outside of the building and downstream of a backflow preventer.

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P3403.14.1 **Materials, joints and connections.** Distribution piping shall conform to the standards and requirementsspecified in Section P2906 for nonpotable water.

P3403.14.2 **Design.** Distribution piping systems shall be designed and sized in accordance with the Section P2903 for the intended application.

P3403.14.3 **Labeling and marking.** Nonpotable rainwater distribution piping labeling and marking shall comply with Section P2901.2.

P3403.15 **Tests and inspections.** Tests and inspections shall be performed in accordance with Sections P3403.15.1 through P3403.15.8.

P3403.15.1 **Roof gutter inspection and test.** Roof gutters shall be inspected to verify that the installation and slope is in accordance with Section P3403.5.1. Gutters shall be tested by pouring not less than 1 gallon of water (3.8 L) into the end of the gutter opposite the collection point. The gutter being tested shall not leak and shall not retain standing water.

P3403.15.2 **Roofwasher test..** Roofwashers shall be tested by introducing water into the gutters. Proper diversion of the first quantity of water in accordance with the requirements of Section P3403.4 shall be verified.

P3403.15.3 **Collection pipe and vent test.** Drain, waste and vent piping used for rainwater collection and conveyance systems shall be tested in accordance with Section P2503.5.

P3403.15.4 **Storage tank test .** Storage tanks shall be tested in accordance with the Section P3401.9.10.

P3403.15.5 **Water supply system test.** The testing of makeup water supply piping and distribution piping shall be conducted in accordance with Section P2503.7.

P3403.15.6 **Inspection and testing of backflow prevention assemblies.** The testing of backflow preventers and backwater valves shall be conducted in accordance with Section P2503.8.

P3403.15.7 **Inspection of vermin and insect protection.** Inlets and vents to the system shall be inspected to verify that each is protected to prevent the entrance of insects and vermin into the storage tank and piping systems in accordance with Section P3401.7.

P3403.15.8 Water quality test. The quality of the water for the intended application shall be verified at the point of use in accordance with the requirements of the jurisdiction.

>P3403.16 Operation and maintenance manuals.. Operation and maintenance manuals shall be supplied with rainwater collection and conveyance systems in accordance with Sections P3403.16.1 through P3403.16.4.

P3403.16.1 Manual.. A detailed operations and maintenance manual shall be supplied in hard-copy form for each system.

P3403.16.2 Schematics. The manual shall include a detailed system schematic, the location of system components and a list of system components that includes the manufacturers and model numbers of the components.

P3403.16.3 Maintenance procedures. The manual shall provide a maintenance schedule and procedures for system components requiring periodic maintenance. Consumable parts, including filters, shall be noted along with part numbers.

P3403.16.4 Operations procedures. The manual shall include system startup and shutdown procedures, and detailed operating procedures.

SECTION P3404
RECLAIMED WATER SYSTEMS

P3404.1 General. The provisions of this section shall govern the construction, installation, alteration and repair of systems supplying nonpotable reclaimed water.

P3404.2 Water pressure-reducing valve or regulator. Where the reclaimed water pressure supplied to the building exceeds 80 psi (552 kPa) static, a pressure-reducing valve shall be installed to reduce the pressure in the reclaimed water distribution system piping to 80 psi (552 kPa) static or less. Pressure-reducing valves shall be specified and installed in accordance with Section P2903.3.2.

P3404.3 Reclaimed water systems. The design of the reclaimed water systems shall conform to accepted engineering practice.

P3404.3.1 Distribution pipe. Distribution piping shall comply with Sections P3404.3.1.1 through P3404.3.1.3.

Exception: Irrigation piping located outside of the building and downstream of a backflow preventer.

P3404.3.1.1 Materials, joints and connections. . Distribution piping conveying reclaimed water shall conform to standards and requirements specified in Section P2906 for nonpotable water.

P3404.3.1.2 Design. Distribution piping systems shall be designed and sized in accordance with Section P2903 for the intended application.

P3404.3.1.3 Labeling and marking. Nonpotable rainwater distribution piping labeling and marking shall comply with Section P3401.3.

P3404.4 Tests and inspections.. Tests and inspections shall be performed in accordance with Sections P3404.4.1 and P3404.4.2.

P3404.4.1 Water supply system test. The testing of makeup water supply piping and reclaimed water distribution piping shall be conducted in accordance with Section P2503.7.

P3404.4.2 Inspection and testing of backflow prevention assemblies. . The testing of backflow preventers shall be conducted in accor dance with Section P2503.8.

Add new standard(s) as follows:

. 40 CFR 141 United States Environmental Protection Agency (USEPA) Primary and Secondary Drinking Water Quality Standards

Staff Analysis: A review of the standard proposed for inclusion in the code, DOE 40 CFR 141 *United States Environmental Protection Agency (USEPA) Primary and Secondary Drinking Water Quality Standards* , with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: A version of this proposal was presented in 2020 and rejected. Feedback from the PMGCAC has been considered and addressed herein as follows:

The definitions of graywater, wastewater, and blackwater are unclear.

It is unclear how a code official would enforce odor controls.

Odors are addressed in this proposal by reference to 40 CFR 141, NSF 350, and required compliance with all applicable laws, rules, and ordinances. Furthermore, The designer is required to address odor control in the operation and monitoring program, if the code official has any concerns.

Wastewater reuse should be governed locally, not in ICC code.

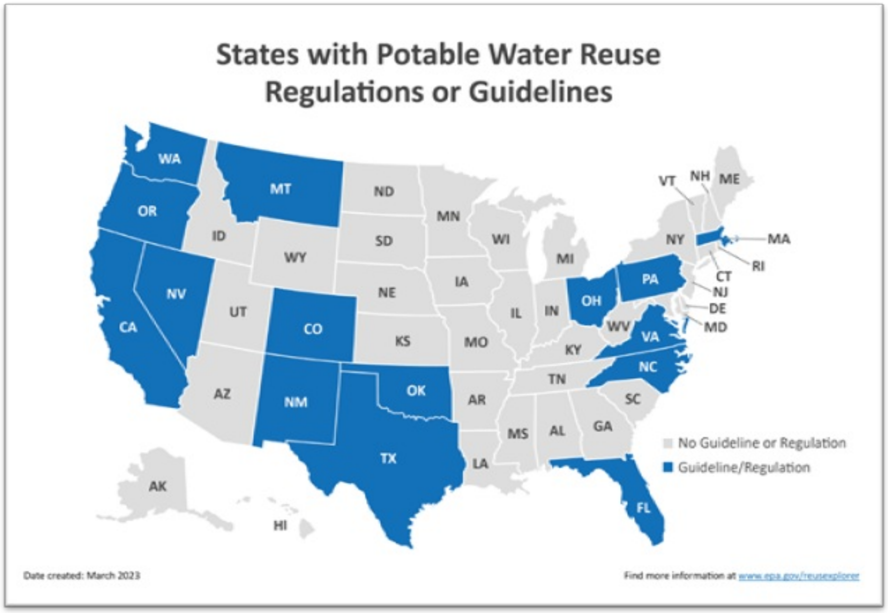
More detail is needed on blackwater reuse and related quality.

This proposal includes rigorous quality standards based on current science and focused on public safety.

Water reuse options should be expanded in the plumbing code not only because of the moral imperative to improve water efficiency and reduce consumption of valuable potable water for nonpotable purposes, but also because current technologies safely enable such practices. For example, by treating and reusing its own wastewater, a commercial office building can offset 100% of its toilet and urinal flushing demand, which can represent up to 70% of its total indoor potable water demands. In San Francisco, the San Francisco Public Utilities Commission headquarters building treats wastewater onsite for toilet and urinal flushing, reducing the use of potable water within the building by approximately 50%. In Sydney, Australia at 1 Bligh Street, a commercial high rise tower is offsetting 100% of the building's nonpotable water demands by reusing wastewater. In Portland, Oregon the Hassalo on Eighth eco-district, a cluster of residential, commercial, and mixed-use buildings is collecting its wastewater and reusing it for toilet flushing and irrigation. This system saves up to 7 million gallons of potable water per year. In New York City, the Solaire Building has successfully operated an onsite blackwater reuse system for two decades to meet the building's toilet flushing, cooling tower makeup, and irrigation demands. Similar to San Francisco, New York City has several buildings treating blackwater onsite for non-potable end uses. These are just a few examples of successfully operating nonpotable reuse systems with long histories.

Today, focus has shifted to Indirect Potable Reuse (IPR) and Direct Potable Reuse (DPR). IPR is when treated wastewater is supplied to a raw drinking water source such as an aquifer or reservoir. The naturally blended water is then withdrawn for treatment in a drinking water treatment facility prior to public consumption. DPR eliminates the environmental buffer and provides treated wastewater directly for public consumption.

According to the EPA, treated wastewater can be used for potable consumption in California, Colorado, Connecticut, Delaware, Florida, Massachusetts, Montana, Nevada, New Mexico, North Carolina, Oklahoma, Oregon, Pennsylvania, Texas, Virginia, and Washington. Some of these states also permit DPR. Still other states are in the process of developing DPR regulations, including Arizona where the practice is currently labeled "Advanced Water Purification" (AWP) instead of DPR.



ADEQ
Arizona Department of Environmental Quality
azdeq.gov

FACT SHEET

Publication Number: FS-23-03

What Is Advanced Water Purification?

Advanced Water Purification (AWP) is an innovative set of water treatment processes that purifies recycled water into safe drinking without the need for an environmental buffer, such as a river or lake. The purified water is then blended with other sources of water, such as groundwater or surface water, and distributed as drinking water to consumers. AWP can help increase the availability of water in areas with water scarcity and reduce the dependence on limited sources of water.

Consumer → Wastewater Treatment → Advanced Water Treatment

Key Facts About AWP

- AWP involves using proven technologies such as UltraViolet (UV) light, Reverse Osmosis (RO), ozone and biofiltration to purify water to meet or exceed state and federal drinking water standards.
- The treatment process effectively targets pathogens and harmful chemical contaminants.
- AWP is safe and effective in providing high-quality drinking water. Studies have shown that the purified water is of comparable or better quality than conventional drinking water sources.

What Is ADEQ Doing And Why?

Just like water conservation, water recycling and other sustainable water management practices, AWP is a part of Arizona's long-term strategy to ensure a safe and adequate drinking water supply sufficient to support Arizona's existing and future population.

ADEQ is working on a rule to establish a permitting process for collecting and treating wastewater to meet protective standards so that it may be used as a drinking water source.

What Are The Benefits Of AWP?

AWP is a valuable strategy for managing water resources, offering numerous benefits:

- Increased Water Quality
- Drought Resilience & Water Security
- Improved Public Health
- Reduced Environmental Impact
- Energy Efficiency
- Sustainability

Learn more about what ADEQ is doing to help utilities provide AWP as a viable drinking water source for Arizona communities and how you can get involved:

azdeq.gov/AWP

For translations or other communications aids, please email the Title VI Coordinator, Leonard Drago, at Drago.Leonard@azdeq.gov or call 602-771-2288.

Para traducciones u otras ayudas de comunicación, envíe un correo electrónico al Coordinador del Título VI, Leonard Drago, a Drago.Leonard@azdeq.gov o llame al 602-771-2288.

Health & Safety. Standards such as NSF 350 exist to guide the implementation of onsite treatment and reuse systems. Water quality standards are also evolving as public health regulators and utilities from across the country are adopting a health risk-based approach that applies to water sources including blackwater, graywater, and rainwater. This health risk- framework focuses on the removal of pathogens and ongoing monitoring to ensure water is treated appropriately based on the end use. Public health and safety is paramount. States including California and Washington are proceeding with establishing health risk-based frameworks for the treatment of onsite blackwater.

The quality defined for the sole Tier 4 application (DPR) is by necessity not only based on common drinking water quality standards (USEPA), but also on the recognition that additional biological barriers are appropriate, given the source water's origin. Extensive studies have been conducted in the past few decades to determine the level of treatment required to ensure public health and safety.

Log removals of Enteric Viruses, Giardia, and Cryptosporidium (18/15/15, respectively) are based on the National Water Research Institute's "DPR Criteria Expert Panel: Preliminary Findings and Recommendations", Fountain Valley, California, June 23, 2023

These log reductions, mean that enteric viruses are reduced by 99.9999999999999999% (18 nines), that giardia and cryptosporidium oocysts are each reduced by 99.9999999999999% (15 nines)

Engineering process design is expected to be based on treatment technique log removal values (LRVs), as published by generally accepted industry leaders and institutions (e.g., United States Environmental Protection Agency, Water Environment & Research Foundation, World Health Organization, etc.). Treatment verification is expected to be demonstrated by periodic challenge tests, as described by generally accepted industry leaders and institutions (see above). Due to the rapid evolution and variety of treatment techniques and challenge test protocols, neither are further specified herein although they may be in the future. Additionally, periodic challenge testing may not be required where treatment process surrogates are monitored to ensure ongoing performance within a credited window. At this time, flexibility is needed to promote water conservation and to empower decision makers.

This proposal does not seek to specifically define water quality requirements for Tier 1 and 2 applications. It is recognized that such standards may be highly dependent on source water quality,and should remain flexible to empower decision makers.

Public health and safety are further assured by requiring competent management of all water reuse systems. Section 1302.14 specifies Management Model 4 or Management Model 5 of USEPA's Management Guidelines for Decentralized Wastewater Management (EPA 832-B-03-001, March 2003)

The Five Management Models

- **Management Model 1 - "Homeowner Awareness"** specifies appropriate program elements and activities where treatment systems are owned and operated by individual property owners in areas of low environmental sensitivity. This program is adequate where treatment technologies are limited to conventional systems that require little owner attention. To help ensure that timely maintenance is performed, the regulatory authority mails maintenance reminders to owners at appropriate intervals.
- **Management Model 2 - "Maintenance Contracts"** specifies program elements and activities where more complex designs are employed to enhance the capacity of conventional systems to accept and treat wastewater. Because of treatment complexity, contracts with qualified technicians are needed to ensure proper and timely maintenance.
- **Management Model 3 - "Operating Permits"** specifies program elements and activities where sustained performance of treatment systems is critical to protect public health and water quality. Limited-term operating permits are issued to the owner and are renewable for another term if the owner demonstrates that the system is in compliance with the terms and conditions of the permit. Performance-based designs may be incorporated into programs with management controls at this level.
- **Management Model 4 - "Responsible Management Entity (RME) Operation and Maintenance"** specifies program elements and activities where frequent and highly reliable operation and maintenance of decentralized systems is required to ensure water resource protection in sensitive environments. Under this model, the operating permit is issued to an RME instead of the property owner to provide the needed assurance that the appropriate maintenance is performed.
- **Management Model 5 - "RME Ownership"** specifies that program elements and activities for treatment systems are owned, operated, and maintained by the RME, which removes the property owner from responsibility for the system. This program is analogous to central sewerage and provides the greatest assurance of system performance in the most sensitive of environments.

SAMPLE LRV CREDIT CALCULATION REGARDING IPC TABLE 1301.2(3) and IRC Table P3401.2(3):

10,000 gpd of Blackwater

70,000 gpd of groundwater

20,000 gpd of surface water

BWC = 10,000 / (10,000 + 70,000 + 20,000)

BWC = 0.10

LRV Credit = -log (BWC)

LRV Credit = -log (0.10)

LRV Credit = 1.0

This proposal is submitted by the ICC Plumbing Mechanical Gas Code Action Committee (PMGCAC) PMGCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 PMGCAC has held 26 virtual meetings open to any interested party. In addition, there were several virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the PMGCAC website at PMGCAC.

Bibliography: Alsup, Kayla and Alsup, Kayla E., "Sustainable Water Treatment Systems: A Direct Potable Proposal" (2021). Murray State University Honors College Theses. 89.

Case Studies of Innovative Water Reuse and Resource Recovery Projects, San Francisco Public Utilities Commission (SFPUC), https://sfpuc.org/documents/case-studies-innovative-water-reuse-and-resource-recovery-projects, accessed July 27, 2023.

Derivation of Log Removal Values for the Addendum to A Framework for Regulating Direct Potable Reuse, presenting an early draft of the anticipated criteria for DPR

, California State Water Board Division of Drinking Water, June 15, 2021.

Drinking Water Quality Standards, United States Environmental Protection Agency, Code of Federal Regulation https://www.ecfr.gov/current/title-40/chapter-I/subchapter-D/part-141.

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Tchobanoglous, George, Franklin L. Burton, H. David Stensel, Metcalf & Eddy., Wastewater engineering : treatment and reuse. (4th ed.). Boston: McGraw-Hill. 2003. ISBN 0-07-041878-0. OCLC 48053912.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposal to expand implementation of onsite wastewater reuse will not increase the cost of construction. The proposal is allowing for onsite wastewater reuse systems as an option, but not mandating installation. Buildings that choose to install a system would experience increased construction costs to install tanks, treatment, and distribution piping. However, buildings can also realize cost savings on water and sewer bills by reusing wastewater onsite. As a result, the building would consume less potable water and send less wastewater to the sewer.

An analysis was conducted to evaluate the amount of wastewater that could be treated and reused onsite in proposed mixed-use development in San Francisco. Using the water utility's rate schedule to estimate the financial savings, the analysis showed installing an onsite wastewater reuse system could result in savings of about $50,000 annually based on reduced potable consumption alone. As the cost of potable water increases, so would such savings.

P157-24 Part II

P158-24

IPC: TABLE 1403.2, 1403.2

Proponents: Michael Cudahy, PPFA Plastic Pipe and Fittings Association, PPFA Plastic Pipe and Fittings Association (mikec@cmservices.com)

2024 International Plumbing Code

Revise as follows:

TABLE 1403.2 DISTRIBUTION PIPE

MATERIAL	STANDARD
Polyethylene (PE) plastic pipe	ASTM F405
Polyvinyl chloride (PVC) plastic pipe	ASTM D2729; CSA B182.1
Polyvinyl chloride (PVC) plastic pipe with a 3.5-inch O.D. and solid cellular core or composite wall	ASTM F1488

For SI: 1 inch = 25.4 mm.

1403.2 Distribution piping.
Distribution piping shall be not less than 3 inches (76 mm) in diameter. Materials shall comply with Table 1403.2. The top of the distribution pipe shall be not less than 8 inches (203 mm) below the original surface. The slope of the distribution pipes shall be not less than 2 inches (51 mm) and not greater than 4 inches (102 mm) per 100 feet (30 480 mm).

Reason: Standard CSA B182.1, which is already in the IPC, contains section 5.1.2 for perforated pipe.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

Adding CSA B182.1 as an optional type of perforated pipe would not alter the costs of construction, but could offer slightly less expense on a project, depending on the local pipe market costs ($0-$100).

Estimated Immediate Cost Impact Justification (methodology and variables):

Adding CSA B182.1 as an optional type of perforated pipe would not alter the costs of construction, but could offer slightly less expense on a project, depending on the local pipe market costs ($0-$100) compared with current options.

Estimated Life Cycle Cost Impact:

None expected over the life of the project ($0).

Estimated Life Cycle Cost Impact Justification (methodology and variables):

None expected over the life of the project ($0).

P158-24

P159-24 Part I

IPC: APPENDIX A, A101, A101.1, TABLE A101.1

Proponents: Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org); Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE MECHANICAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

Delete without substitution:

~~APPENDIX A PLUMBING PERMIT FEE SCHEDULE~~

~~A101~~
~~PLUMBING PERMIT FEE SCHEDULE~~

~~**A101.1 General.**~~
~~See Table A101.1 for an example plumbing permit fee schedule.~~

~~**TABLE A101.1 EXAMPLE OF PERMIT FEE SCHEDULE**~~

Permit Issuance		
1.	For issuing each permit	$ ______
2.	For issuing each supplemental permit	______
Unit Fee Schedule		
1.	For each plumbing fixture or trap or set of fixtures on one trap (including water, drainage piping and backflow protection thereof)	______
2.	For each building sewer and each trailer park sewer	______
3.	Rainwater systems—per drain (inside building)	______
4.	For each cesspool (where permitted)	______
5.	For each private sewage disposal system	______
6.	For each water heater and/or vent	______
7.	For each industrial waste pretreatment interceptor including its trap and vent, excepting kitchen-type grease interceptors functioning as fixture traps	______
8.	For installation, alteration or repair of water-piping and/or water-treating equipment, each	______
9.	For repair or alteration of drainage or vent piping, each fixture	______
10.	For each lawn sprinkler system on any one meter including backflow protection devices therefor	______
11.	For atmospheric-type vacuum breakers not included in Item 2:	
	1 to 5	______
	over 5, each	______
12.	For each backflow protective device other than atmospheric-type vacuum breakers:	
	2 inches (51 mm) and smaller	______
	Over 2 inches (51 mm)	______
Other Inspections and Fees		
1.	Inspections outside of normal business hours (minimum charge 2 hours)	_____ per hour
2.	Reinspection fee assessed under provisions of Section 111.4.3	_____ each
3.	Inspections for which no fee is specifically indicated (minimum charge one-half hour)	_____ per hour
4.	Additional plan review required by changes, additions or revisions to approved plans (minimum charge one-half hour)	_____ per hour

P159-24 Part I

P159-24 Part II

IMC®: APPENDIX B, SECTION B101, B101.1, B101.2, B101.2.1, B101.2.3, B101.2.2, B102.1, B103.1, B104.1, SECTION B104, SECTION B103, SECTION B102

Proponents: Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org); Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Mechanical Code

Delete without substitution:

~~APPENDIX B RECOMMENDED PERMIT FEE SCHEDULE~~

~~SECTION B101~~
~~MECHANICAL WORK, OTHER THAN GAS PIPING SYSTEMS~~

~~**B101.1 Initial fee.** For issuing each permit $___.~~

~~**B101.2 Additional fees.** Where applicable, additional fees shall be in accordance with Sections B101.2.1 through B101.2.3.~~

~~**B101.2.1 Mechanical systems.** Fee for inspecting heating, ventilating, ductwork, air-conditioning, exhaust, venting, *combustion air*, pressure vessel, solar, fuel oil and *refrigeration systems* and *appliance* installations shall be $___ for the first $1,000.00, or fraction thereof, of valuation of the installation plus $___ for each additional $1,000.00 or fraction thereof.~~

~~**B101.2.3 Boilers.** Fee for inspecting boilers (based upon Btu input):~~

~~**B101.2.2 Repairs, alterations and additions.** Fee for inspecting repairs, *alterations* and additions to an existing system shall be $___ plus $___ for each $1,000.00 or fraction thereof.~~

~~**B102.1 General.** If it becomes necessary to make a reinspection of a heating, ventilation, air-conditioning or *refrigeration system*, or boiler installation, the installer of such *equipment* shall pay a reinspection fee of $___.~~

~~**B103.1 General.** When preliminary inspection is requested for purposes of permitting temporary operation of a heating, ventilating, refrigeration, or air-conditioning system, or portion thereof, a fee of $___ shall be paid by the contractor requesting such preliminary inspection. If the system is not *approved* for temporary operation on the first preliminary inspection, the usual reinspection fee shall be charged for each subsequent preliminary inspection for such purpose.~~

~~**B104.1 General.**~~
~~In all *buildings*, except one- and two-family *dwellings*, where self-contained air-conditioning units of less than 2 tons (7.034 kW) are to be installed, the fee charged shall be that for the total cost of all units combined (see Section B101.2.1 for rate).~~

~~SECTION B104~~
~~SELF-CONTAINED UNITS LESS THAN 2 TONS~~

~~SECTION B103~~
~~TEMPORARY OPERATION INSPECTION FEE~~

~~SECTION B102~~

~~FEE FOR REINSPECTION~~

Reason: There were two different proposals to address consistency in the Fees section (ADM 27-19 and ADM 33-19) – the end result was coordination between the 2021 codes for – IBC, IFC, IEBC, IMC, IPC, IPMC, IFGC, ISPSC, IWUIC and IZC. ADM 27-19 removed fees schedules from being inserted at the time of adoption into the IMC, IPC, IPMC, IFGC and ISPSC. If the jurisdiction is on a code for 3 to 6 years, this would prohibit them from adjusting their fees. Adoption of an appendix with fees (IRC) or to be filled in by the jurisdiction (IMC and IPC) would have the same effect. These appendices should be deleted.The BCAC will be submitting a proposal in Group B for IRC Appendix AB (Previously AL) Permit Fees.

This proposal is submitted by the ICC Building Code Action Committee (BCAC) and the ICC Plumbing Mechanical Gas Code Action Committee (PMGCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC webpage.

PMGCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 PMGCAC has held 26 virtual meetings open to any interested party. In addition, there were several virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the PMGCAC website at PMGCAC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is essentially editorial because the intent of ADM27-19 was to remove the fee schedules in the codes that had such schedules.

P159-24 Part II

P160-24 Part I

IPC: APPENDIX E, TABLE E103.3(3)

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Plumbing Code

APPENDIX E SIZING OF WATER PIPING SYSTEM

Revise as follows:

TABLE E103.3(3) TABLE FOR ESTIMATING DEMAND

SUPPLY SYSTEMS PREDOMINANTLY FOR FLUSH TANKS			SUPPLY SYSTEMS PREDOMINANTLY FOR FLUSHOMETER VALVES		
Load	Demand		Load	Demand	
(Water supply fixture units)	(Gallons per minute)	(Cubic feet per minute)	(Water supply fixture units)	(Gallons per minute)	(Cubic feet per minute)
1	3.0	~~0.04104~~ 0.4104	—	—	—
2	5.0	~~0.0684~~ 0.6684	—	—	—
3	6.5	0.86892	—	—	—
4	8.0	1.06944	—	—	—
5	9.4	1.256592	5	15.0	2.0052
6	10.7	1.430376	6	17.4	2.326032
7	11.8	1.577424	7	19.8	2.646364
8	12.8	1.711104	8	22.2	2.967696
9	13.7	1.831416	9	24.6	3.288528
10	14.6	1.951728	10	27.0	3.60936
11	15.4	2.058672	11	27.8	3.716304
12	16.0	2.13888	12	28.6	3.823248
13	16.5	2.20572	13	29.4	3.930192
14	17.0	2.27256	14	30.2	4.037136
15	17.5	2.3394	15	31.0	4.14408
16	18.0	2.90624	16	31.8	4.241024
17	18.4	2.459712	17	32.6	4.357968
18	18.8	2.513184	18	33.4	4.464912
19	19.2	2.566656	19	34.2	4.571856
20	19.6	2.620128	20	35.0	4.6788
25	21.5	2.87412	25	38.0	5.07984
30	23.3	3.114744	30	42.0	5.61356
35	24.9	3.328632	35	44.0	5.88192
40	26.3	3.515784	40	46.0	6.14928
45	27.7	3.702936	45	48.0	6.41664
50	29.1	3.890088	50	50.0	6.684
60	32.0	4.27776	60	54.0	7.21872
70	35.0	4.6788	70	58.0	7.75344
80	38.0	5.07984	80	61.2	8.181216
90	41.0	5.48088	90	64.3	8.595624
100	43.5	5.81508	100	67.5	9.0234
120	48.0	6.41664	120	73.0	9.75864
140	52.5	7.0182	140	77.0	10.29336
160	57.0	7.61976	160	81.0	10.82808
180	61.0	8.15448	180	85.5	11.42964
200	65.0	8.6892	200	90.0	12.0312
225	70.0	9.3576	225	95.5	12.76644
250	75.0	10.026	250	101.0	13.50168
275	80.0	10.6944	275	104.5	13.96956
300	85.0	11.3628	300	108.0	14.43744
400	105.0	14.0364	400	127.0	16.97736
500	124.0	16.57632	500	143.0	19.11624
750	170.0	22.7256	750	177.0	23.66136
1,000	208.0	27.80544	1,000	208.0	27.80544
1,250	239.0	31.94952	1,250	239.0	31.94952
1,500	269.0	35.95992	1,500	269.0	35.95992
1,750	297.0	39.70296	1,750	297.0	39.70296
2,000	325.0	43.446	2,000	325.0	43.446
2,500	380.0	50.7984	2,500	380.0	50.7984
3,000	433.0	57.88344	3,000	433.0	57.88344
4,000	525.0	70.182	4,000	525.0	70.182
5,000	593.0	79.27224	5,000	593.0	79.27224

For SI: 1 inch = 25.4 mm, 1 gallon per minute = 3.785 L/m, 1 cubic foot per minute = 0.28 m^3 per minute.

Reason: This is an editorial change. The conversion from gallons per minute to cubic feet per minute for these two rows has been incorrect for many editions of the code. Most users of this table utilize the “gallon per minute” values, it is best to avoid confusion by having the conversion displayed correctly.

This proposal is submitted by the ICC Plumbing Mechanical Gas Code Action Committee (PMGCAC)

PMGCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 PMGCAC has held 26 virtual meetings open to any interested party. In addition, there were several virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the PMGCAC website at PMGCAC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is a simple cleanup of incorrect values in table.

P160-24 Part I

P160-24 Part II

IRC: APPENDIX CF, TABLE CF103.3(3)

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Residential Code

APPENDIX CF SIZING OF WATER PIPING SYSTEM

Revise as follows:

TABLE CF103.3(3) TABLE FOR ESTIMATING DEMAND

SUPPLY SYSTEMS PREDOMINANTLY FOR FLUSH TANKS			SUPPLY SYSTEMS PREDOMINANTLY FOR FLUSHOMETERS		
Load	Demand		Load	Demand	
(w.s.f.u.)	(gpm)	(cfm)	(w.s.f.u.)	(gpm)	(cfm)
1	3.0	~~0.04104~~ 0.4104	—	—	—
2	5.0	~~0.0684~~ 0.6684	—	—	—
3	6.5	0.86892	—	—	—
4	8.0	1.06944	—	—	—
5	9.4	1.256592	5	15.0	2.0052
6	10.7	1.430376	6	17.4	2.326032
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13	16.5	2.20572	13	29.4	3.930192
14	17.0	2.27256	14	30.2	4.037136
15	17.5	2.3394	15	31.0	4.14408
16	18.0	2.90624	16	31.8	4.241024
17	18.4	2.459712	17	32.6	4.357968
18	18.8	2.513184	18	33.4	4.464912
19	19.2	2.566656	19	34.2	4.571856
20	19.6	2.620128	20	35.0	4.6788
25	21.5	2.87412	25	38.0	5.07984
30	23.3	3.114744	30	42.0	5.61356
35	24.9	3.328632	35	44.0	5.88192
40	26.3	3.515784	40	46.0	6.14928
45	27.7	3.702936	45	48.0	6.41664
50	29.1	3.890088	50	50.0	6.684
60	32.0	4.27776	60	54.0	7.21872
70	35.0	4.6788	70	58.0	7.75344
80	38.0	5.07984	80	61.2	8.181216
90	41.0	5.48088	90	64.3	8.595624
100	43.5	5.81508	100	67.5	9.0234
120	48.0	6.41664	120	73.0	9.75864
140	52.5	7.0182	140	77.0	10.29336
160	57.0	7.61976	160	81.0	10.82808
180	61.0	8.15448	180	85.5	11.42964
200	65.0	8.6892	200	90.0	12.0312
225	70.0	9.3576	225	95.5	12.76644
250	75.0	10.026	250	101.0	13.50168
275	80.0	10.6944	275	104.5	13.96956
300	85.0	11.3628	300	108.0	14.43744
400	105.0	14.0364	400	127.0	16.97736
500	124.0	16.57632	500	143.0	19.11624
750	170.0	22.7256	750	177.0	23.66136
1,000	208.0	27.80544	1,000	208.0	27.80544
1,250	239.0	31.94952	1,250	239.0	31.94952
1,500	269.0	35.95992	1,500	269.0	35.95992
1,750	297.0	39.70296	1,750	297.0	39.70296
2,000	325.0	43.446	2,000	325.0	43.446
2,500	380.0	50.7984	2,500	380.0	50.7984
3,000	433.0	57.88344	3,000	433.0	57.88344

SUPPLY SYSTEMS PREDOMINANTLY FOR FLUSH TANKS			SUPPLY SYSTEMS PREDOMINANTLY FOR FLUSHOMETERS		
Load	Demand		Load	Demand	
(w.s.f.u.)	(gpm)	(cfm)	(w.s.f.u.)	(gpm)	(cfm)
4,000	535.0	70.182	4,000	525.0	70.182
5,000	593.0	79.27224	5,000	593.0	79.27224

For SI: 1 gallon per minute = 3.785 L/m, 1 cubic foot per minute = 0.000471 m^3/s.

Reason: This is an editorial change. The conversion from gallons per minute to cubic feet per minute for these two rows has been incorrect for many editions of the code. Most users of this table utilize the “gallon per minute” values, it is best to avoid confusion by having the conversion displayed correctly.

This proposal is submitted by the ICC Plumbing Mechanical Gas Code Action Committee (PMGCAC)

PMGCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 PMGCAC has held 26 virtual meetings open to any interested party. In addition, there were several virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the PMGCAC website at PMGCAC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is a simple cleanup of incorrect values in table.

P160-24 Part II

P161-24

IPC: APPENDIX G (New), SECTION G101 (New), G101.1 (New), G101.2 (New), G101.3 (New), G101.4 (New), G101.5 (New), G101.6 (New), G102 (New), G102.1 (New), SECTION 202 (New), SECTION G103 (New), G103.1 (New), G103.2 (New), G103.3 (New), SECTION G104 (New), G104.1 (New), G104.2 (New), G104.3 (New), G104.4 (New), G104.5 (New), G104.6 (New), G104.7 (New), SECTION G105 (New), G105.1 (New), G105.2 (New), G105.2.1 (New), G105.3 (New), G105.4 (New), G105.5 (New), G105.6 (New), G105.7 (New), G105.8 (New), G105.9 (New), G105.10 (New), G105.11 (New), G105.12 (New), SECTION G106 (New), G106.1 (New), G106.2 (New)

Proponents: Mathew Lippincott, University of Michigan, self (mlippin@umich.edu); Martin Hammer, Martin Hammer - Architect (mfhammer@pacbell.net); Pat Lando, Recode, Recode (pat@recodenow.org); Ashton Merck, North Carolina State University / STEPS Center, self; Nancy Love, University of Michigan, self (nglove@umich.edu); John Lansing, PAE Consulting Engineers (john.lansing@pae-engineers.com); Abraham Noe-Hays, Rich Earth Institute (abe@richearthinstitute.org); Miriam Hacker, Myself; Mark Buehrer, 2020 ENGINEERING, Inc., 2020 ENGINEERING, Inc. (mark@2020engineering.com); Lucas Crane, Arizona State University, self (lccrane1@asu.edu); Hayley Joyell Smith, PHLUSH (Public Hygiene Lets Us Stay Human), PHLUSH, Board Director (hayley@phlush.org); Kim Nace, Brightwater Tools (kim@brightwatertools.com); A P Robertson, self, self (sandyrob51@gmail.com); Treavor Boyer, Arizona State University / STEPS, self (thboyer@asu.edu)

2024 International Plumbing Code

Add new text as follows:

APPENDIX G URINE DIVERSION SYSTEMS

SECTION G101
GENERAL

G101.1 Scope. This appendix shall govern the materials, design, installation, maintenance and inspection of urine diversion systems, and shall govern the disposal or treatment of *diverted urine* and the output of *urine derived products*.

G101.2 Urine diversion fixture units. Each urine diversion fixture shall be rated as one drainage fixture unit.

G101.3 Tests. The *urine diversion* system shall be tested in accordance with Section 312.

G101.4 Maintenance responsibility. The required maintenance and inspection of *urine diversion* systems shall be the responsibility of the property owner, unless otherwise required by the *code official.*

G101.5 Operation. *Urine diversion* systems shall be operated and maintained in a safe and sanitary condition in accordance with the Section G101.6.

G101.6 Operation and maintenance manual. An operation and maintenance manual shall be provided in hardcopy form and shall be transferred to the new owner or tenant upon transfer of property or tenancy. The manual shall include the following items:

1. Storage capacity for urine, flush water and additives.
2. Design loading of the system and expected inputs.
3. Expected schedule of additives.
4. Sources or provider of necessary additives. Source may be on-site.
5. Comprehensive maintenance schedule, including a pipe cleaning schedule.
6. Cleaning agents and instructions for each.
7. Instructions for all maintenance tasks.
8. If container transfer is used, container transfer plan and container cleaning instructions.

9. Disposal or beneficial use plan containing all of the following, as applicable:
   9.1. Removal schedule and service provider.
   9.2. Instructions for diversion to sewer or private sewage disposal system.
   9.3. Treatment plan and treatment system operations.
   9.4. Plan for licensing, certification, or labeling of *urine derived products.*
   9.5. Land application following a *nutrient management plan.*

G102
DEFINITIONS

G102.1 Scope. The following words and terms shall, for the purposes of this appendix, have the meanings shown herein. Refer to Chapter 2 for general definitions.

Add new definition as follows:

DIVERTED URINE. Urine that is collected separately from fecal matter.

NUTRIENT MANAGEMENT PLAN. A *nutrient management plan* outlines the quantity, timing, locations, methods and other aspects of applying plant nutrients and soil amendments to the land in order to prevent or minimize environmental impacts while maximizing horticultural benefits.

TREATED URINE. *Diverted urine* that has been treated for beneficial use.

URINE DERIVED PRODUCT. A product that is derived from urine, such as an agricultural amendment, fertilizer, or diesel exhaust fluid.

URINE DIVERSION. Collection of *diverted urine* that occurs at the fixture.

URINE DIVERTING WATER CLOSET. A fixture connected to a plumbing system that separates fecal matter and urine into separate piping. (also urine diverting flush toilet)

Add new text as follows:

SECTION G103
MATERIALS

G103.1 General. Material used for *urine diversion* shall be corrosion resistant, such as stainless steel or durable polymers. Concrete piping is prohibited.

G103.2 Identification. All *urine diversion* piping shall be identified.

G103.3 Screening. Where screening is required to prevent the unintentional entry of insects and vermin, screening shall have openings with a maximum size of 3/32 inches (2.5mm). Screening shall be made of materials compatible with the system components in contact with screen materials. Screen materials shall not generate galvanic corrosion of system components.

SECTION G104
DESIGN OF URINE DIVERSION SYSTEM

G104.1 Pipe sizing. Pipe sizes shall be in accordance with the Table 710.1(1) or shall be *approved.*

G104.2 **Change of direction.** Changes in direction of *urine diversion* piping shall be made by a long-sweep 90-degree fitting or other approved fittings of equivalent sweep.

G104.3 **Traps.** Fixtures discharging into *urine diversion* piping shall be trapped in accordance with Section 1002.

G104.4 **Slope of horizontal piping.** *Urine diversion* piping shall be installed at a slope conforming to the fixture manufacturer's guidelines and of not less than ¼-inch per foot (20 mm per meter), or 2 percent toward the point of storage or disposal.

G104.5 **Cleanouts.** A cleanout shall be provided at the upper terminal of each drain line, every 50 feet (15 m), and at any aggregate horizontal change of direction exceeding 135 degrees.

G104.6 **Venting.** *Urine diverting water closets* shall be vented in accordance with Chapter 9. *Urine diverting* commodes shall be vented to a composting toilet system vent in compliance with the International Private Sewage Disposal Code.

> **Exception:** Where the *code official* determines urine storage tank venting or air admittance valves are sufficient to vent fixtures, venting of fixtures shall not be required.

G104.7 **Discharge.** A *urine diversion* system shall be directed to a storage tank or discharged to an approved *sanitary drainage system*.

SECTION G105
URINE STORAGE TANKS

G105.1 **Volume.** Total urine tank storage volume shall be in accordance with Equation G-1. Where treatment by retention in accordance with Section G106.1 is specified, days in use for collection (D) shall be at least 365.

V = (C + (N x (U + F) x O)) x D (Equation G-1)

where:

V = total tank volume
C= water used per fixture per day for cleaning
C = (c + w + t)/7
c = water used per cleaning
w = cleanings per week
t = total urine diversion fixtures

N = number of users

U = urine per person per day (0.4 gallons, 1.5L)

F = flush water per day
F = f x e

f = water volume per flush
e = visits to toilet per day (5.9)

O = occupant fraction

D = days in use for collection

G105.2 Venting. Urine storage tanks shall be vented as required for pressure equalization. When required, vents shall be installed on urine storage tanks and shall extend from the top of the tank. Dedicated urine storage tank vents extending to the outdoors shall terminate no less than 12 inches (300 mm) above grade. The vent terminal shall be directed downward and screened to prevent entry of insects and vermin. Storage tank vents shall be permitted to connect to the plumbing venting system at least 6 inches (150 mm) above the flood level rim of the highest fixture.

G105.2.1 Vent size. Pressure equalization vents that prevent nitrogen loss through the use of restrictions, or of piping or tubing that is less than the minimum pipe diameter required in the plumbing code, shall be *approved*.

G105.3 Traps. Urine storage tanks shall prevent odors and nitrogen loss from the tank inlet by means of a P-trap, mechanical trap, submerged inlet piping, or other *approved* means. Submerged inlet piping shall remain submerged during use and after pumpout.

Exception: Tanks of 5.5 gallons (20 L) or less with connection to a fixture with active venting.

G105.4 Overflow. Where urine storage tank overflows are installed, they shall be connected to the *sanitary drainage system*.

G105.5 Backwater valve. When connected to a public sewer system or private sewage disposal system and where subject to *backflow*, storage tank overflows shall be provided with a *backwater valve* or check valve at the point of connection to the *sanitary drainage system*. The *backwater valve* shall be *accessible* for inspections and maintenance.

G105.6 Water level monitoring and warning. Urine storage tanks shall be provided with a water level monitoring device connected to an alarm system. The alarm system shall provide a visual and auditory warning signal when 80 percent volume is reached.

Exception: Tanks meeting one of the following requirements:

1. Where tank volume does not exceed 5.5 gallons (20 L) and the tank is located within the toilet room, a visible indicator of tank volume shall be provided.
2. Where the tank has no direct connection to urine diversion piping, is filled manually, and has a visible indicator of tank volume.

G105.7 Construction. Urine storage tanks shall be constructed of corrosion resistant materials such as stainless steel or durable polymers.

G105.8 Above grade. Where subject to freezing conditions, above grade storage tanks and associated piping shall be provided with an *approved* means of freeze protection, or fitted with high level alarms that are suitable for detecting a high level condition in the presence of ice.

G105.9 Below grade. Urine storage tanks installed below grade shall be structurally designed to withstand all anticipated earth or other loads. Tank covers shall be capable of supporting an earth load of not less than 300 pounds per square foot (lb/ft^2) (1500 kg/m^2) when the tank is designed for underground installation. Below grade urine tanks installed underground shall be provided with manholes. The manhole opening shall have a diameter of at least 20 inches (500 mm) and located at least 4 inches (100 mm) above the surrounding grade. The surrounding grade shall be sloped away from the manhole. Underground tanks shall be ballasted, anchored, or otherwise secured, to prevent the tank from floating out of the ground when empty. The combined hold-down capacity of the tank and hold down system shall meet or exceed the buoyancy force of the tank.

G105.10 Marking. Where openings are provided to allow a person to enter the tank, the openings shall be marked with the following words: "DANGER—CONFINED SPACE." The letters shall be not less than 0.5 inch (12.7 mm) in height and shall be of a color in contrast with the background on which they are applied.

G105.11 Openings. All openings shall be covered and secured to prevent tampering. Openings shall be screened or covered to prevent insect and vermin entry and be protected against unauthorized human entry.

G105.12 Transfer. Where urine is transferred between tanks, cleaning of tanks and provisions for limiting user exposure shall be according to the operation and maintenance manual.

SECTION G106
TREATMENT, DISPOSAL AND BENEFICIAL USE

G106.1 Approved treatment methods.

1. Retention of diverted urine without addition for six months before usage. Two or more holding tanks shall be required for retention.
2. Heat sanitization with one of the following methods:
   2.1. Heat treatment for not less than 15 seconds and not greater than 30 minutes at a temperature calculated using Equation G-2.

   $$D = 131{,}700{,}000/10^{0.14T} \quad \text{(Equation G-2)}$$

   where:
   D = treatment duration (days)

   T = temperature (degrees Celsius)

   2.2. Heat treatment for not less than 30 minutes at a temperature of at least 122°F (50°C) for a period calculated using Equation G-3.

   $$D = 50{,}070{,}000/10^{0.14T} \quad \text{(Equation G-3)}$$

   where:
   D = treatment duration (days)

   T = temperature (degrees Celsius)

3. Other *approved* method.

G106.2 Disposal and beneficial use. *Urine diversion* systems shall have a plan for disposal or shall have a plan for beneficial use with one of the following methods. The plan shall be recorded in the operation and maintenance manual.

1. **Disposal.** Urine shall be removed by one of the following methods:
   1.1. An *approved* service provider.

   1.2. Discharge to a public sewer system or *private* sewage disposal system.

   1.3. Discharge to a nonliquid treatment system in compliance with the International Private Sewage Disposal Code.

2. **Urine derived products.** Urine shall be processed into u*rine derived products* for commercial product licensing, certification, and labeling as required by the authority having jurisdiction.
3. **Land application.** Treated urine complying with Section 105 shall be land applied following an *approved nutrient management plan* if required by the authority having jurisdiction.

Reason: Urine diversion captures urine at toilet room fixtures and directs it to collection tanks, enabling the conversion of what is currently a polluting waste into a resource for agricultural or other uses. Urine diversion has been extensively employed and researched for more than 40 years, largely in an international development context, and is now being deployed as a nutrient recovery technology at building and municipal scales. Clear code guidance is needed to enable consistent and strict public health protections, provide reliable and maintainable plumbing, and encourage proper growth of an emerging industry. This proposed appendix has the following features:

- Contains clear and enforceable standards.
- Mandates documentation on all aspects of system operation and maintenance.
- Ensures urine sanitization through onsite treatment or professional disposal.

- Controls onsite land application through nutrient management requirements.

Urine diversion has emerged as a leading technology for nutrient recovery, because 70-80% of the nitrogen and 50-65% of the phosphorus in residential wastewater come from urine alone. To meet nutrient discharge limits (without which algae blooms and other environmental harm can occur in public waterways), wastewater treatment plants must remove extremely dilute nutrients from wastewater streams using processes that are capital and energy intensive and generate potent greenhouse gasses.[1] Although nutrient recovery is a major goal of current wastewater treatment, only 11% of nitrogen and 21% of phosphorus are recovered from wastewater in the US.[2] Urine diversion has the potential to cut the energy demands and greenhouse gas emissions of water treatment by approximately a third to a half.[3]

The cost of nutrient removal from wastewater is increasingly constraining sewer districts, thereby limiting development.[4] To increase the supply of housing without increasing nutrient discharges, many cities are exploring urine diversion. For example, in 2020, the OCAPI program, a collaboration between Toulouse and Paris water authorities, installed urine diversion in a 1000-person district of Paris, France to pilot municipal-scale urine diversion and protect the Seine River.[5] In the US, the PAE Building in Portland, Oregon has a urine diversion system licensed by the Oregon Departments of Environmental Quality and Agriculture to produce commercial fertilizer directly from diverted urine.[6] The University of Michigan Department of Civil & Environmental Engineering was recently invited by the New York Department of Environmental Protection to evaluate if adding urine diversion to new buildings in New York City could enable development in an area whose treatment plant is at capacity.[7]

This proposed appendix to the IPC is based on the Recode Model Code, which incorporates the latest urine diversion research and practice from around the globe. The Recode Model Code was created in 2015 through a consensus process with a national team of U.S. experts, and was incorporated into IAPMO's 2017 Water Efficiency and Sanitation Standard (WE Stand), which was revised in 2020 and 2023. The latest Recode Model Code incorporates refinements from the WE Stand process, as well as insights derived from international codes, such as the Dutch ISSO NTR 3216 standard.

This Urine Diversion Systems proposal was created in parallel with a Composting Toilet Systems proposal for the International Private Sewage Disposal Code, which adds the Recode Model Code's clear design, installation, and inspection guidance for composting toilet systems. (1) Ahn, J. H.; Kim, S.; Park, H.; Rahm, B.; Pagilla, K; Chandran, K. N2O Emissions from Activated Sludge Processes, 2008-2009: Results of a National Monitoring Survey in the United States. Environ. Sci. Technol. 2010, 44 (12), 4505-4511. https://doi.org/10.1021/es903845y

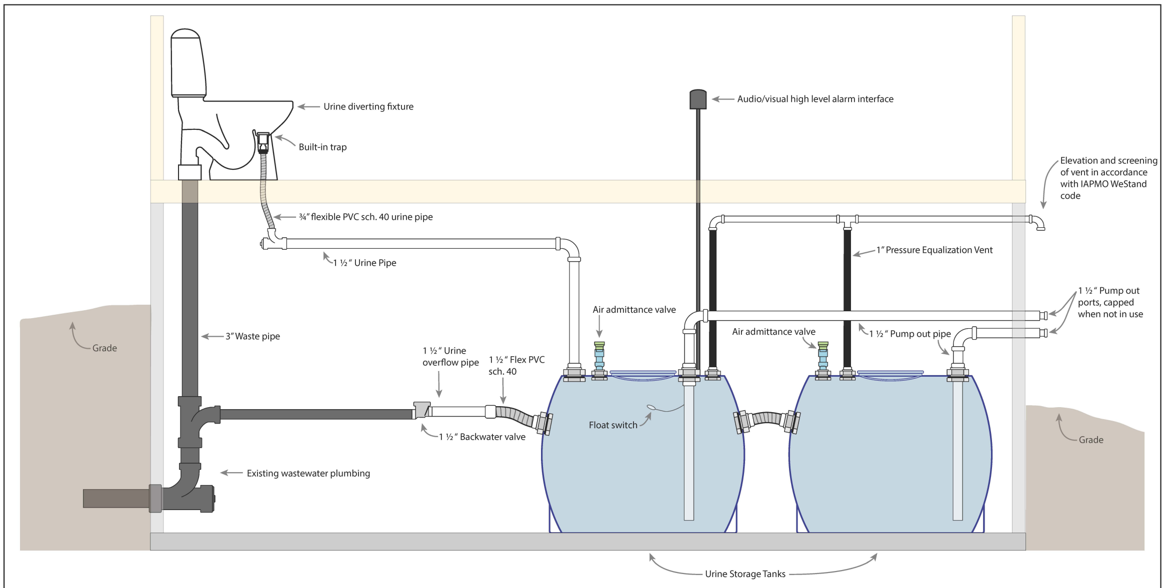
(2) Rauch-Williams, T.; Marshall, M.; Davis, D. Baseline Data to Establish the Current Amount of Resource Recovery from WRRs; Technical Report WSEC-2018-TR-003; Water Environment Federation: Alexandria, VA, 2018. https://watereuse.org/wp-content/uploads/2018/10/WRRFBaselineDataFinalReportWEF.pdf

(3)Hilton, S. P.; Keoleian, G.A.; Daigger, G.T.; Zhou, B.; Love, N. G. Life Cycle Assessment of Urine Diversion and Conversion to Fertilizer Products at the City Scale. Environ. Sci. Technol. 2021, 55 (1), 593-603. https://doi.org/10.1021/acs.est.0c04195

(4) Boyer, T.H.; Saetta, D.; Opportunities for Building-Scale Urine Diversion and Challenges for Implementation. Accounts of Chemical Research, 25 Mar 2019, 52(4):886-895. https://doi.org/10.1021/acs.accounts.8b00614

(5) Fabien Esculier, F.; Keynote. Rich Earth Summit, Brattleboro, VT, 2023. https://www.richearthsummit.org/2023recordings

(6) Lando, P.; Munoz, P. The Urine-to-Fertilizer System at the PAE Living Building. Rich Earth Summit, Brattleboro, VT, 2023. https://www.richearthsummit.org/2023recordings(7) Li, L. Advancing Urine Separation for Sustainable Food, Energy, and Water Systems. Dissertation, University of Michigan, 2023.



Notes:

- Urine pump-out pipes slope backward toward the storage tank. Pump-out to be performed using vacuum suction, using gasketed cam-lock connection between pump-out pipe and service provider's collection hose. Fitting on pump-out pipe to be capped with gasketed cam-lock connector after pump-out.
- Storage tanks sized to exceed 14 day storage capacity.
- A high-level alarm will report when storage tanks are at 75% capacity. In configurations with multiple connected tanks, the float alarm will be on the tank that receives urine from the urine collection plumbing.
- All horizontal pipe runs between fixture and storage tank: ½" : 12" slope
- Rigid pipe sch. 40 ABS or PVC unless noted
- Cleanouts or sweep fittings at corners or where appropriate
- Relative pipe elevations shown in the schematic will be recognized in installation
- Pipe connections to tank are made using bulkhead fittings or manufacturer-installed fittings.

Title:

Configuration A: Gravity flow to storage tank, overflow from storage tank
Also showing ganged tank arrangement

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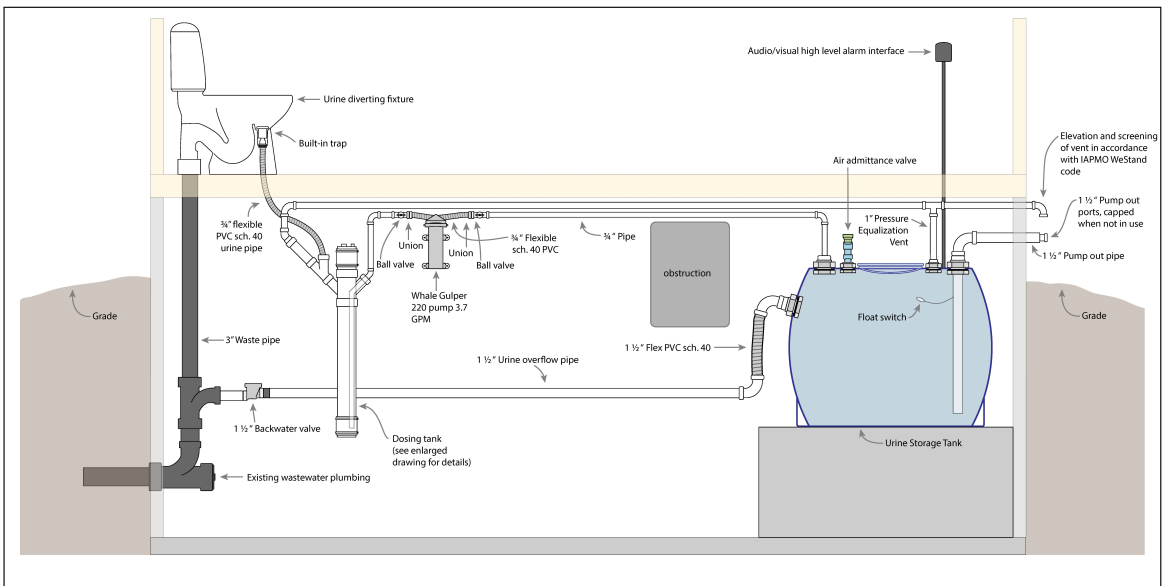
STATE OF MAINE DANIEL B. MARKS NO. 13585 LICENSED PROFESSIONAL ENGINEER

Sheet: *Configuration A*
Date: *7/15/2020*
Version: *1.0*



Notes:

- Urine pump-out pipes slope backward toward the storage tank. Pump-out to be performed using vacuum suction, using gasketed cam-lock connection between pump-out pipe and service provider's collection hose. Fitting on pump-out pipe to be capped with gasketed cam-lock connector after pump-out.
- Storage tanks sized to exceed 14 day storage capacity.
- A high-level alarm will report when storage tanks are at 75% capacity. In configurations with multiple connected tanks, the float alarm will be on the tank that receives urine from the urine collection plumbing.

- All horizontal pipe runs between fixture and dosing tank: ½" : 12" slope

- Rigid pipe sch. 40 ABS or PVC unless noted
- Cleanouts or sweep fittings at corners or where appropriate
- Relative pipe elevations shown in the schematic will be recognized in installation
- Pipe connections to tank are made using bulkhead fittings or manufacturer-installed fittings.

Title:

Configuration B: Pumped flow to storage tank, overflow from storage tank

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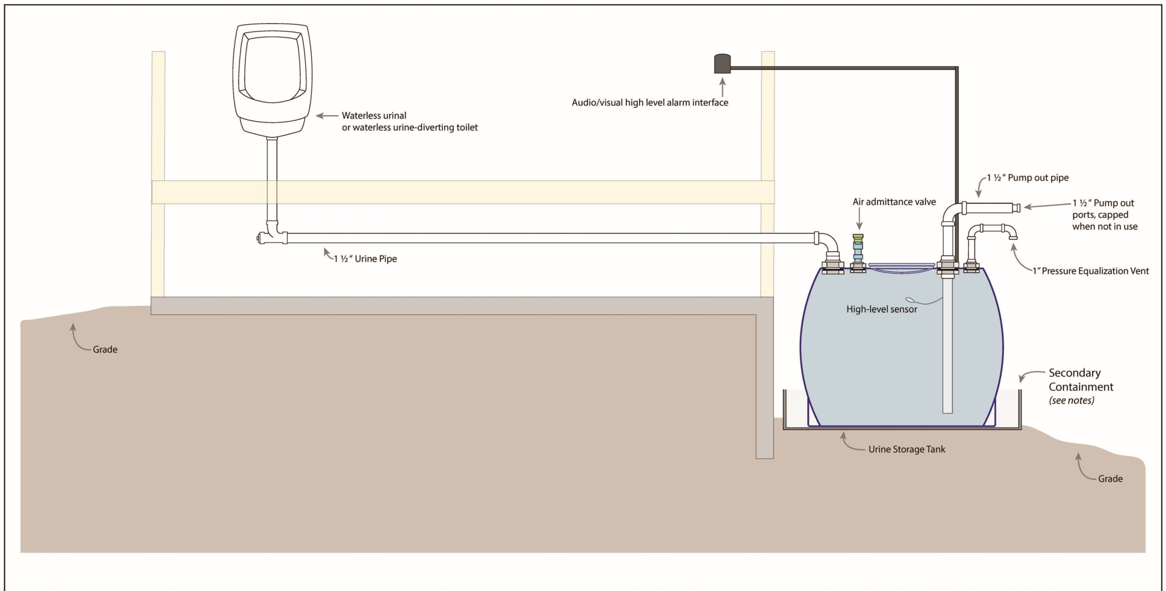
STATE OF MAINE DANIEL B. MARKS NO. 13585 LICENSED PROFESSIONAL ENGINEER

Sheet: *Configuration B*
Date: *7/15/2020*
Version: *1.0*



Notes:

- Urine pump-out pipes slope backward toward the storage tank. Pump-out to be performed using vacuum suction, using gasketed cam-lock connection between pump-out pipe and service provider's collection hose. Fitting on pump-out pipe to be capped with gasketed cam-lock connector after pump-out.
- Storage tanks sized to exceed 14 day storage capacity. Storage tanks located outside of a structure will have secondary containment equal to at last one week of storage capacity.
- A high-level alarm will report when storage tanks are at 75% capacity. In **configurations with multiple connected tanks, the alarm will be on the tank that** receives urine from the urine collection plumbing.
- **All horizontal pipe runs between fixture and storage tank: ½" : 12" slope**
- Rigid pipe sch. 40 ABS or PVC unless noted
- **Cleanouts or sweep fittings at corners or where appropriate**
- Relative pipe elevations shown in the schematic will be recognized in installation
- **Pipe connections to tank are made using bulkhead fittings or manufacturer-installed fittings.**
- **Plumbed storage tanks will be located on a concrete pad, flat undisturbed ground,** or other solid weight-bearing surface.

Title:

Configuration D: Gravity flow to storage tank, no overflow

Also showing outdoor tank

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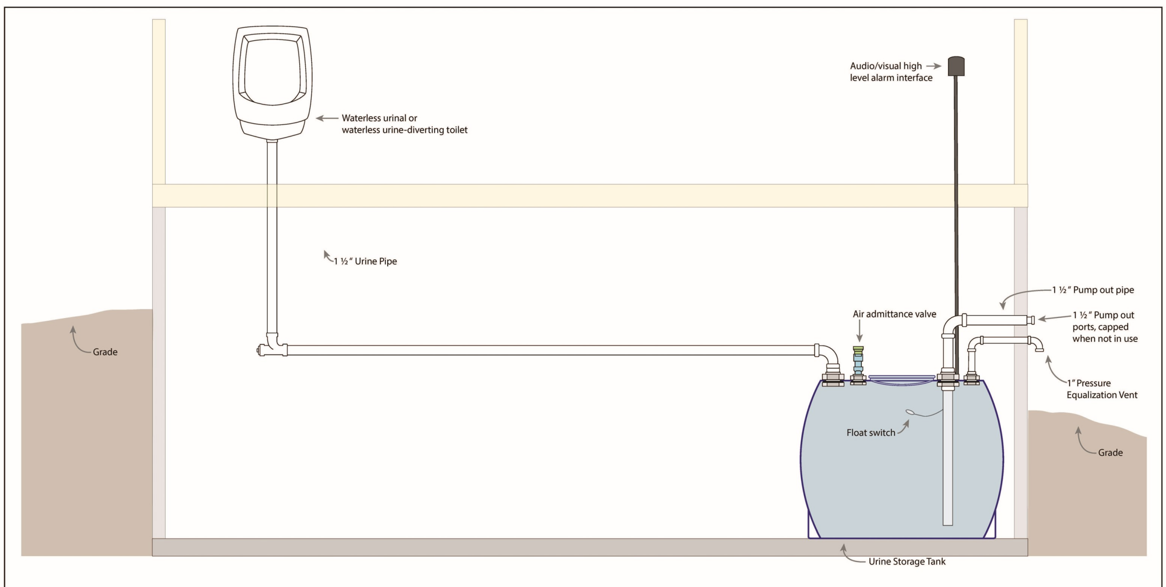
Sheet: *Configuration D (outdoor)*

Date: *3/14/2022*

Version: *1.1*



Notes:

- Urine pump-out pipes slope backward toward the storage tank. Pump-out to be performed using vacuum suction, using gasketed cam-lock connection between pump-out pipe and service provider's collection hose. Fitting on pump-out pipe to be capped with gasketed cam-lock connector after pump-out.
- Storage tanks sized to exceed 14 day storage capacity. Storage tanks located outside of a structure will have secondary containment equal to at least 7 days of storage capacity.
- A high-level alarm will report when storage tanks are at 75% capacity. In **configurations with multiple connected tanks, the float alarm will be on the tank** that receives urine from the urine collection plumbing.
- **All horizontal pipe runs between fixture and storage tank: ½" : 12" slope**
- Rigid pipe sch. 40 ABS or PVC unless noted
- **Cleanouts or sweep fittings at corners or where appropriate**
- Relative pipe elevations shown in the schematic will be recognized in installation
- **Pipe connections to tank are made using bulkhead fittings or manufacturer-installed fittings.**
- **Plumbed storage tanks will be located on a concrete pad, flat undisturbed ground,** or other solid weight-bearing surface.

Title:

Configuration D: Gravity flow to storage tank, no overflow

showing indoor tank

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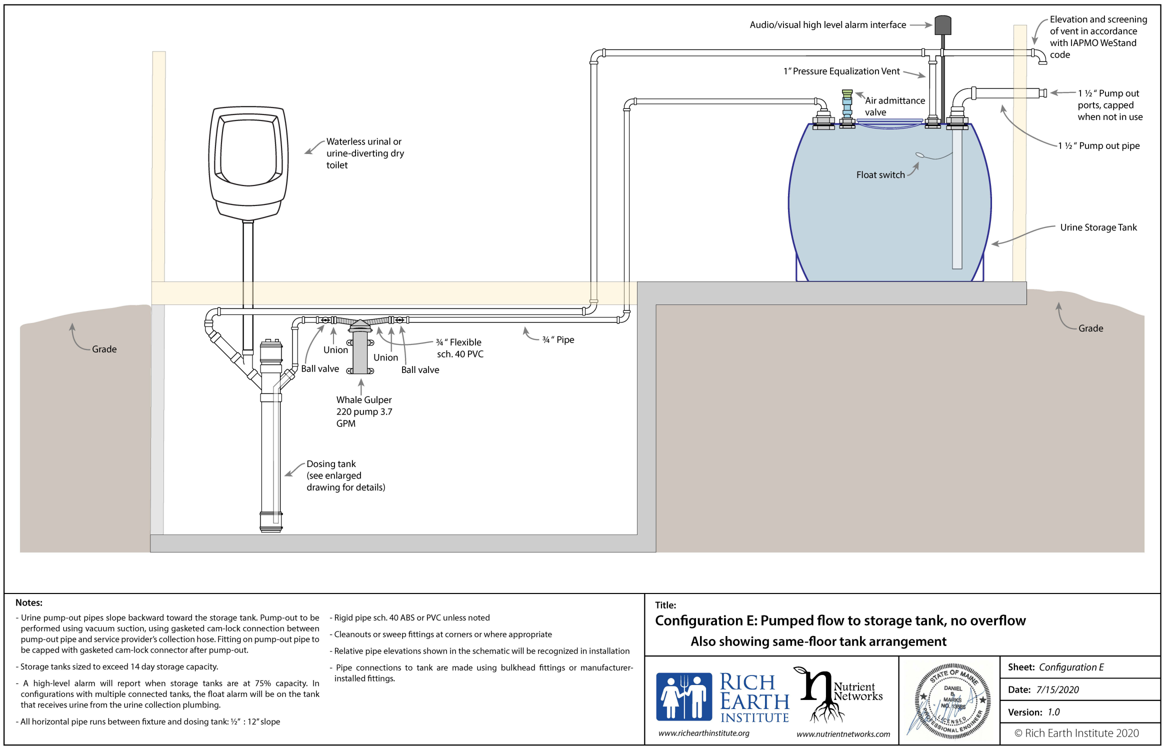
Sheet: *Configuration D (indoor)*

Date: *3/14/2022*

Version: *1.0*



Bibliography: G104.4 Slope of horizontal piping:

Per the requirements of K.3.4 *NTR 3216*, ISSO 2023. An ideal slope may be higher than 2 percent; "at least 2% (ideally 3%)," per Section 3.1 of the *Urine Diversion System with LAUFEN Save! WC Installation Guide* Version No. 01, LAUFEN, 2022.

G105.1 Volume:

Equation based on the volume calculator of Appendix K, *NTR 3216*, ISSO 2023.

Quantity of urine based on 550L per year, a number widely used in European guidance, including von Münch and Winker's *Technology Review of Urine Diversion Components,* Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH 2011. Originally from Jönsson et. al *Composition of Urine, Faeces, Greywater, and Biowaste for Utilisation in the URWARE Model*, Mistra Programme for Urban Water, 2006.

G106.1 Approved treatment methods:

Method 1, retention, per Table 5.3, *Guidelines for the Safe Use of Wastewater, Excreta and Greywater: Volume 1: Policy and Regulatory Aspects*, WHO, 2006.

Method 2, heat sanitization, per *Technical Support Document for Reduction of Pathogens and Vector Attraction in Sewage Sludge,* EPA, 1992 (EPA 822/R-93-004).

Cost Impact: Increase

Estimated Immediate Cost Impact:

Utilization of this appendix will increase the cost of initial construction by requiring additional system components and labor. In new construction, urine diversion system materials are estimated to cost an additional $940.00 per water closet, with system installation requiring an additional 8 hours of labor, for an estimated labor cost of $400.00 per installation. Jurisdictions may also require additional permitting fees, estimated to be $270.

Estimated Immediate Cost Impact Justification (methodology and variables):

Costs are estimated based on the latest (2023) cost of residential installation of a single water closet system by the Rich Earth Institute's staff in Vermont, USA. Only tank, piping, fittings, and float alarm are included in material fees, as the price of a urine diverting water closet is estimated to be equivalent to a standard water closet. While systems with multiple water closets may see lower costs per water closet due to shared tanks, piping, and float alarm, such savings are not included in the estimate. Please see Attached file Rich-Earth-UD-Options.pdf for schematic diagrams of typical installations.

Tank (including shipping): $670
Water closet: $300
Pipe and fittings: $120
Float alarm: $150
Labor (8 hours @ $50/hour): $400
Permit filing fee: $270
Wastewater design fee: $400
SUBTOTAL: $2310

P161-24

P162-24 Part I

IPC: APPENDIX G (New), SECTION G101 (New), G101.1 (New), G101.2 (New), SECTION G201 (New), G201.1 (New), SECTION 202 (New), SECTION G301 (New), G301.1 (New), G301.2 (New), G301.3 (New), G301.3.1 (New), G301.3.2 (New), G301.3.3 (New), G301.3.4 (New), G301.3.5 (New), G301.3.6 (New), G301.3.7 (New), G301.4 (New), G301.4.1 (New), G301.4.2 (New), G301.5 (New), G301.5.1 (New), G301.5.2 (New), G301.5.3 (New), G301.5.4 (New), G301.5.5 (New), G301.5.6 (New), G301.5.7 (New), G301.5.8 (New), G301.5.9 (New), G301.5.10 (New), G301.6 (New), G301.6.1 (New), G301.6.2 (New), G301.6.3 (New), G301.6.4 (New), G301.6.4.1 (New), G301.6.5 (New), TABLE G301.6.5 (New), SECTION G401 (New), G401.1 (New), TABLE G401.1 (New), G401.2 (New), G401.2.1 (New), G401.2.2 (New), G401.3 (New), TABLE G401.3 (New), G401.4 (New), SECTION G501 (New), G501.1 (New), G501.2 (New), G501.2.1 (New), G501.2.1.1 (New), G501.2.1.1.1 (New), G501.2.1.2 (New), G501.2.2 (New), G501.2.2.1 (New), 501.2.2.1.1 (New), G501.2.2.1.2 (New), G501.2.2.1.3 (New), G501.2.2.1.3.1 (New), G501.2.2.1.3.2 (New), G501.2.2.1.3.2.1 (New), G501.2.2.1.3.2.1.2 (New), G501.2.2.1.3.3 (New), G501.2.2.1.3.4 (New), G501.2.2.1.3.5 (New), G501.2.2.2 (New), G501.2.2.2.1 (New), G501.2.2.2.2 (New), G501.2.2.2.3 (New), G501.2.2.2.3.1 (New), G501.2.2.2.3.2 (New), G501.2.2.2.4 (New), G501.2.2.2.5 (New), G501.2.2.2.6 (New), G501.2.2.3 (New), G501.2.3 (New), G501.2.3.1 (New), G501.2.3.2 (New), G501.2.3.4 (New), G501.2.3.5 (New), G501.2.3.6 (New), G501.2.4 (New), G501.2.4.1 (New), G501.2.4.1.1 (New), G501.2.4.1.2 (New), G501.2.4.1.3 (New), G501.2.4.2 (New), G501.2.4.2.1 (New), G501.2.4.2.2 (New), G501.2.4.2.3 (New), G501.2.4.3 (New), G501.2.4.3.1 (New), G501.2.4.3.2 (New), G501.2.4.3.3 (New), G501.3 (New), G501.3.1 (New), G501.3.1.1 (New), G501.3.1.2 (New), G501.3.1.3 (New), G501.3.1.4 (New), G501.3.1.5 (New), G501.3.2 (New), SECTION G601 (New), G601.1 (New), TABLE G601.1 (New)

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Plumbing Code

Add new text as follows:

APPENDIX G Calculation and Labeling of the Water Use Performance of One- and Two-Family Dwellings

SECTION G101 GENERAL

G101.1 Purpose. The provisions of this appendix establish a uniform methodology for evaluating, rating and labeling the water use performance of one and two-family dwellings.

G101.2 Scope. This appendix shall provide a uniform methodology for evaluating, rating and labeling the indoor and outdoor water use performance of one- and two-family dwellings. Such evaluations, rating and labeling shall be in accordance with this appendix and RESNET/ICC-850.

SECTION G201 DEFINITIONS

G201.1 Definitions. The following terms and acronyms have specific meanings as used in this Appendix. In the event that definitions given here differ from definitions given elsewhere, the definitions given here shall govern.

Add new definition as follows:

APPROVED RATING PROVIDER.
An approved entity responsible for the certification of home water efficiency raters working under its auspices and who is responsible for the quality assurance of such Certified Raters and for the quality assurance of water efficiency ratings produced by such home water efficiency raters.

APPROVED SOFTWARE RATING TOOL.
A computerized procedure that is approved for the purpose of conducting home water efficiency ratings and calculating the annual water

consumption, annual water costs and a Water Rating Index for a home.

AUTOMATIC IRRIGATION SYSTEM.
An irrigation system that is initiated by a clock timer, irrigation controller, or other method that does not require human intervention to initiate an irrigation event.

BEDROOM.
A room or space 70 square feet of floor area or greater, with egress window and closet, used or intended to be used for sleeping. A “den,” “library,” “home office” with a closet, egress window, and 70 square feet of floor area or greater or other similar rooms shall count as a Bedroom, but living rooms and foyers shall not.

IRRIGATED AREA.
The portion of a lot that receives supplemental water for irrigation.

LOT SIZE.
The area of a single parcel of land on which the Rated Home is located.

OTHER WATER USE.
Water use associated with leaks, minor draws, and other end uses not specified in the Reference Home or Rated Home.

OUTDOOR WATER USE.
Water use that occurs outside of the exterior walls of a dwelling unit.

RATED HOME.
The specific real property that is evaluated using the water use performance rating procedures specified by this Appendix.

REFERENCE HOME.
A hypothetical home configured in accordance with the specifications set forth in Section G301.3 of this code and the basis of comparison for the purpose of calculating the Water Rating Index of a Rated Home.

RESIDENTIAL IRRIGATION CAPACITY INDEX (RICI).
The intensity with which an automatic irrigation system applies water calculated in accordance with Section G301.6.3.

WATER RATING INDEX (WRI).
An integer representing the relative water use of a Rated Home as compared with the water use of the Reference Home and where an Index value of 100 represents the water use of the Reference Home and each integer reduction represents a one percent improvement in water use efficiency.

Add new text as follows:

SECTION G301
HOME WATER RATING CALCULATION PROCEDURE

G301.1 Determining the Water Rating Index. The Water Rating Index (WRI) shall be determined in accordance with Sections G301.2 through G301.6. The Reference Home shall be configured in accordance with Sections G301.3 and G301.4, and the Rated Home shall be configured in accordance with Section G301.5 and G301.6 .

G301.2 Calculating the Water Rating Index. . A Water Rating Index shall be calculated as follows:

$$WRI = \frac{\text{indoor and outdoor daily water use for the Rated Home}}{\text{indoor and outdoor daily water use for the Reference Home}} \times 100$$ **Equation G301.2-1**

G301.3 Determining the Daily Indoor Water Use for the Reference Home. The indoor daily water use for the Reference Home shall be calculated as follows:
refingpd = refFgpd + refWgpd + refDWgpd + refCWgpd +

refTgpd + refSofgpd + refOther

(Equation G301.3-1)

Where:

refFgpd = daily fixture water use for the Reference Home

refWgpd = daily water use wasted from hot water outlets for the Reference Home

refDWgpd = daily dishwasher water use for the Reference Home

refCWgpd = daily clothes washer water use for the Reference Home

refTgpd = daily toilet water use for the Reference Home

refSofgpd = daily water softener water use for the Reference Home

refOther = daily total other/unidentified water use for the Reference Home

G301.3.1 Determining Daily Reference Home Fixture Water Use. Reference Home daily fixture water use shall be calculated as follows:
refFgpd = 14.6 + 10 × *Nbr* **(Equation G301.3.1-1)**

Where:

Nbr = number of bedrooms in the Rated Home

G301.3.2 Determining Daily Reference Home Hot Water Waste. Reference Home daily hot water waste shall be calculated as follows:
refWgpd = 9.8 × *Nbr*0.43 **(Equation G301.3.2-1)**

Where:

Nbr = number of bedrooms

G301.3.3 Determining Daily Reference Home Dishwasher Water Use. Reference Home dishwasher water use shall be calculated as follows:
refDWgpd = $\frac{(88.4 + 34.9 \times Nbr) \times 8.16}{365}$

(Equation G301.3.3-1)

Which simplifies to:

$refWgpd = 1.97 + 0.7802 \times Nbr$

Where:

Nbr = number of bedrooms

$(88.4 + 34.9 \times Nbr)$ = best fit regression equation for dishwasher cycles per year using data from the 2005 Residential Energy Consumption Survey

8.16 = gallons per cycle from the DOE Technical Support Document from the NAECA standard in effect in 2006

This value is determined in accordance with ANSI/RESNET/ICC 301 Addendum A.

G301.3.4 **Determining Daily Reference Home Clothes Washer Water Use.** Reference Home daily clothes washer water use shall be calculated as follows:

$refCWgpd = \frac{(3.0 \times 11.4 \times ACY)}{365}$ **(Equation G301.3.4-1)**

Where:

3.0 = reference washer capacity ($CAPw$) in ft3

11.4 = reference integrated water factor (IWF) in (gal/cyc) per ft3

ACY = Adjusted Cycles per Year = $(164 + 46.5 \times Nbr)$

Nbr = number of bedrooms

G301.3.5 **Determining Daily Reference Home Toilet Water Use.** Reference Home daily toilet water use shall be calculated as follows:

$refTgpd = refFPO \times refGPF \times Occ$ **(Equation G301.3.5-1)**

Where:

$RefFPO$ = the Reference Home flushes per person per day = 5.05

$RefGPF$ = the Reference Home gallons per flush for toilets = 1.6

Occ = the number of occupants = $1.09 + 0.54 \times Nbr$

Nbr = number of bedrooms

G301.3.6 **Determining Daily Reference Home Water Softener Use.** Where the Rated Home has a water softener and the water hardness at the Rated Home location is greater than or equal to 180 milligrams/liter, the Reference Home water softener daily water use shall be calculated as follows:

$refSofgpd = \frac{\text{grains of hardness}}{\text{gallon of water}}$ × sum of indoor water uses in the

Reference Home × $\frac{\text{5 gallons used}}{\text{1,000 grains removed}}$ **(Equation G301.3.6-1)**

Where the Rated Home does not meet these conditions, the *refSofgpd* = 0.

G301.3.7 Determining Daily Reference Home Other Water Use. Reference Home daily other water use shall be determined as follows:

refOther = 5.93 × *Nbr* **(Equation G301.3.7-1)**

Where:

Nbr = the number of bedrooms in the Rated Home

G301.4 Determining the Reference Home Outdoor Water Use. The reference home outdoor annual water use (in thousands of gallons per year) shall be calculated using the following two equations:

If the rated home has a netET of less than 12 inches/year OR the rated home has an automatic irrigation system, use Equation G301.4-1.

$\left[\frac{Exp(A)}{1+Exp(A)}\right]$ × 1.18086 × [2.0341 × *netET*0.7154 × *Ref_Irr_Area*0.6227 + 0.5756 × *ind_Pool* × *netET]*

(Equation G301.4-1)

If the rated home has a netET of greater than 12 inches/year AND the rated home does NOT have an automatic irrigation system, use Equation G301.4-2.

[$\left[\frac{Exp(B)}{1+Exp(B)}\right]$ × 1.22257 × [1.4233 + 0.6311 × *netET* + 0.9376 × *Ref_Irr_Area*]]+ *ref_Pool*(Equation G301.4-2)

Either equation shall be constrained as follows:

IF

Rat_Irr_Area < *Ref_Irr_Area*

THEN

Ref_Out = Equation G301.4-1 or G301.4-2

$\frac{\text{Equation 1 (Using Rat\_Irr\_Area and ind\_Pool = 0)}}{\text{Equation 1 (with Ref\_Irr\_Area and ind\_Pool = 0)}}$

AND

Outdoor Reference Home Annual Water

Use shall never be lower than Equation G301.4-2

Where:

Exp(A) = exponent of [1.4416 + 0.5069 × (*Irr_Area*/1,000)]

Exp(B) = exponent of [0.6911 + 0.00301 × *netET* × (*Irr_Area*/1,000)]

Ref_Irr_Area = the size of the irrigated area in the Reference Home, calculated in accordance with Section G301.4.1

Rat_Irr_Area = the size of the irrigated area in the Rated Home

NetET = the annual historic sum of mean reference evapotranspiration minus the mean precipitation for all months that evapotranspiration exceeds precipitation

ind_Pool = indicator representing the presence or absence of a swimming pool in the Rated Home

ref_Pool = Equation G301.4-1 (using *ind_Pool* = 1) – Equation G301.4-1 (using *ind_Pool* = 0)

G301.4.1 Determining Outdoor Daily Water Use for the Reference Home. Reference Home daily outdoor water use shall be determined by multiplying the result of either Equation G301.4-1 or Equation G301.4-2, as appropriate, by 1,000 and dividing the product by 365.

G301.4.2 Determining Irrigated Area for the Reference Home. Reference Home Irrigated Area shall be calculated as follows:
Where the lot size of the Rated Home is less than 7,000 ft2, the Irrigated Area of the Reference Home shall be calculated as follows:

Ref_Irr_Area = *Lot_Area* × (0.002479 × *Lot_Area*0.6157) **(**Equation G301.4.2-1)

Where the Lot Size of the Rated Home is greater than or equal to 7,000 ft2, the Irrigated Area of the Reference Home shall be calculated as follows:

Ref_Irr_Area = *Lot_Area* × 0.577 **(Equation G301.4.2-2)**

Where:

Ref_Irr_Area = the size of the landscape that receives supplemental water in the Reference Home

Lot_Area = the size of the lot on which the Rated Home is being constructed

G301.5 Determining Daily Indoor Water Use of the Rated Home. The daily Indoor Water Use of the Rated Home shall be calculated as follows:
Indoorgpd = *Showergpd* + *KitchFgpd* + *LavFgpd* + *Wastegpd* + *CWgpd* + *DWgpd* + *Toiletsgpd* + *Softgpd* + *Other* + *EPgpd* **(Equation G301.5-1)**

Where:

Showergpd = daily shower water use for the Rated Home

KitchFgpd = daily kitchen faucet water use for the Rated Home

LavFgpd = daily lavatory water use for the Rated Home

Wastegpd = daily water use wasted for the Rated Home

CWgpd = daily clothes washer water use for the Rated Home

DWgpd = daily dishwasher water use for the Rated Home

Toiletsgpd = daily toilet water use for the Rated Home

Softgpd = daily water softener water use for the Rated Home

Othergpd = daily other/unidentified water use for the Rated Home

EPgpd = daily excess pressure adjustment

G301.5.1 Determining Daily Shower Water Use for the Rated Home. Rated Home daily shower water use shall be calculated as follows:

Showergpd = *FixtureTot* × *showerpc* × *SHeff* **(Equation G301.5.1-1)**

Where:*FixtureTot* = determined in accordance with ANSI/RESNET/ICC 301, Addendum A = $\frac{adjFmix}{Fmix} \times refFgpd$

Shower_pc = percent of fixture water use consumed by showers = 54%

SHeff = the ratio of the average rated flow rate of showerheads to the reference home flow rate $= \frac{\text{average flow rate of showerheads in the Rated Hame}}{2.5}$

G301.5.2 Determining Daily Kitchen Faucet Water Use for the Rated Home. Rated Home daily kitchen faucet water use shall be calculated as follows:
KitchFgpd = *FixtureTot* × *faucetpc* × *KitchFeff* × *kitch* **(Equation 301.5.2-1)**

Where:

FixtureTot = determined in accordance with ANSI/RESNET/ICC 301 Addendum A =

$\frac{adjFmix}{Fmix}$ × *refFgpd*

faucetpc = percent of fixture water use consumed by faucets = 46%

KitchFeff = the ratio of the average rated flow rate of kitchen faucets to the Reference Home flow rate

$= \frac{\text{average flow rate of kitchen faucets in the Rated Hame}}{2.2}$

Kitch = the percentage of faucet use that is attributed to kitchen faucets = 69%

G301.5.3 Determining Daily Lavatory Faucet Water Use for the Rated Home. Rated Home daily lavatory faucet use shall be calculated as follows:*LavFgpd* = FixtureTot × faucetpc × LavFeff × Lav (Equation G301.5.3-1)
Where:

Lav = the percentage of faucet use that is attributed to lavatory faucets= 31%

FixtureTot = determined in accordance with ANSI/RESNET/ICC 301 Addendum A =

$\frac{adjFmix}{Fmix}$ × *refFgpd*

faucet pc = percent of fixture water use consumed by faucets = 46%

LavFeff = the ratio of the average rated flow rate of lavatory faucets to the Water Rating Reference Home flow rate = 1 for standard faucets and 0.95 for high-efficiency faucets

G301.5.4 Determining Daily Hot Water Waste for the Rated Home. Rated Home daily hot water waste shall be calculated as follows: *Wastegpd* = *Feff* × (*oWgpd* + *sWgpd* × *WDeff*) **(Equation G301.5.4-1)**

Where:

Feff = fixture efficiency of showerheads, kitchen faucets, and lavatory faucets weighted by contribution to total fixture use = daily standard operating condition hot water wasted quantity as determined by ANSI/RESNET/ICC 301 Addendum A

sWgpd = daily structural hot water wasted quantity as determined by ANSI/RESNET/ICC 301 Addendum A

WDeff = distribution system water use effectiveness from Table 4.2.2.5.2.11(3) of ANSI/RESNET/ICC 301 Addendum A

This value is determined in accordance with ANSI/RESNET/ICC 301 Addendum A.

G301.5.5 Determining Daily Clothes Washer Water Use for the Rated Home. Rated Home daily clothes washer water use shall be calculated as follows:

$$CW_{gpd} = \frac{CAPw \times IWF \times ACY}{365}$$

(Equation G301.5.5-1)

Where:

CAPw = washer capacity in cubic feet = the manufacturer's data or the CEC database or the EPA Energy Star® website

IWF = Integrated Water Factor from manufacturer's data [(gal/cyc)/ft3]

ACY = Adjusted cycles per year

Determining ACY:

ACY = (164 + 46.5 × *Nbr*)

$$\times \frac{(3.0 \times 2.08 + 1.59)}{(CAPw \times 2.08 + 1.59)}$$

Where:*CAPw* = the capacity of the clothes washer in ft3

(164 + 46.5 × *Nbr*) = standard cycles per year based on 2005 Residential Energy Consumption Survey data

$\frac{(3.0 \times 2.08 + 1.59)}{(CAPw \times 2.08 + 1.59)}$ = best fit regression equation to adjust the standard cycles per year to account for occupancy and size of clothes washer; based on 2005 Residential Energy Consumption Survey data

G301.5.6 Determining Daily Dishwasher Water Use for the Rated Home. Rated Home daily dishwasher water use shall be calculated as follows:
DWgpd = [(88.4 + 34.9 × *Nbr*) × (12/*dWcap*) × gal/cycle/365 **(Equation G301.5.6-1)**

Where:

Nbr = number of bedrooms in the Rated Home

DWcap = capacity of the dishwasher in the Rated Home (in place settings) as included in the manufacturer's data (88.4 + 34.9 × *Nbr*) = best fit regression equation for dishwasher cycles per year using data from the 2005 Residential Energy Consumption Survey gal/cycle can be entered either directly or as listed on:

a. The ENERGY STAR product finder database.
b. The California Energy Commission (CEC) Modernized Appliance Efficiency Database.
c. The Department of Energy (DOE) Compliance Certification Management System (CCMS).

OR gal/cycle can be calculated from the Energy Guide label as follows (developed using the equations from 10 CFR 430, Subpart B, Appendix C and values on the Energy Guide label) to isolate the energy used by the appliance from the energy used in water heating):
gal/cycle = h2o_kWh × elec_h2o

h2o_kWh = LER-Appl_kWh

LER = Labeled Energy Rating in kWh per year per the dishwasher Energy Guide label

Appl_kWh = dishwasher appliance annual electric energy use = (GHWC × gas_h2o/$_therm-LER × $_kWh × elec_h2o/per_kWh) / ($_kWh × gas_h2o/$_therm-elec_h2o)

Where:

$_kWh = the cost of one kWh per the dishwasher Energy Guide label

$_therm = the cost of one therm per the dishwasher Energy Guide label

GHWC = Gas Hot Water Cost per the dishwasher Energy Guide label

elec_h2o = gallons of hot water use per cycle per unit of annual electricity use in gal × y/kWh × cyc = 1/(80 × 0.0024 × 208) = 0.02504

gas_h2o = gallons of hot water use per cycle per unit of annual gas use in gal × y/therm × cyc = 1/(80 × 8.2/0.75 × 208/100,000) = 0.5497

80 = the average hot water heater temperature rise per 10 CFR 430, Subpart B, Appendix C

0.0024 = specific heat of water in kWh/gal × F per 10 CFR 430, Subpart B, Appendix C

8.2 = specific heat of water in Btu/gal × F per 10 CFR 430, Subpart B, Appendix C

0.75 = recovery efficiency of gas hot water heater per 10 CFR 430, Subpart B, Appendix C

208 = cycles per year

This value is determined in accordance with ANSI/RESNET/ICC 301 Addendum A.

G301.5.7 Determining Daily Toilet Water Use for the Rated Home. Rated Home daily toilet water use shall be calculated as follows:

$Toiletgpd = refFPO \times gpf \times Occ$

Where:

RefFPO = the reference flushes per person per day = 5.05

gpf = the average gallons per flush of all toilets installed in the Rated Home; for tank-type dual-flush toilets, use the effective flush volume per flush based on EPA Water Sense specification for Tank-Type Toilets

Occ = the number of predicted occupants in the Rated Home = 1.09 + 0.54 × *Nbr*

Nbr = the number of bedrooms in the Rated Home

G301.5.8 Determining Daily Water Softener Water Use for the Rated Home. Rated Home daily water softener water use shall be calculated as follows:

$Softgpd = \frac{\text{grains of hardness}}{\text{gallon of water}}$ × [sum of softened water

uses in the Rated Home] × [gallons used per 1,000 grains of hardness]

(Equation G301.5.8-1)

Where:

softened water = water conditioned by a water softener

G301.5.9 Determining Daily Other Water Use for the Rated Home. Rated Home daily other water use shall be calculated as follows: $Othergpd = 5.93 \times Nbr$ **(Equation G301.5.9-1)**

Where:

Nbr = the number of bedrooms in the rated home

G301.5.10 Determining Daily Excess Pressure Adjustment Water Use for the Rated Home. Where a Rated Home does not have a pressure-reducing valve or pressure tank, additional water use attributed to excess water pressure shall be calculated as follows: $EPgpd = \text{MAX}\{[(Showergpd + (0.5 \times (LavFgpd + KitchFgpd + Othergpd))) \times 0.006 \times (PR - 90)], 0\}$ **(Equation G301.5.10-1)**

Where:

PR = static water pressure (in psi) measured at the indoor fixture outlet on the lowest floor and (if more than one) closest to the water service entry to the house

Shower and lavatory faucets controlled by integral or accessory pressure-compensating devices shall be permitted to be excluded from this equation.

G301.6 Determining Outdoor Water Use for the Rated Home. The Rated Home outdoor water use shall be calculated as follows: Where the Rated Home has an automatic irrigation system, outdoor water use shall be calculated as follows:

$\left[\frac{Exp(A)}{1 + Exp(A)}\right] \times 1.18086 \times [2.0341 \times netET0.7154 \times Rat\_Irr\_Area0.6227 + 0.5756 \times ind\_Pool \times netET]$ **(Equation G301.6-1)** Where the Rated Home does not have an automatic irrigation system, outdoor water use shall be calculated as follows:

$[\left[\frac{Exp(B)}{1 + Exp(B)}\right] \times 1.22257 \times [1.4233 + 0.6311 \times netET + 0.9376 \times Rat\_Irr\_Area]] + Pool\_use$ **(Equation G301.6-2)**

The outdoor water use for the Rated Home shall never be less than the result of the following calculation:

$\left[\frac{Exp(B)}{1+Exp(B)}\right]$ × 1.22257 × [1.4233 + 0.6311 × *netET* + 0.9376 × *Rat_Irr_Area*] **(Equation G301.6-3)**

Where:

Exp(A) = exponent of [1.4416 + 0.5069 × (*Rat_Irr_Area*/1,000)]

Exp(B) = exponent of [0.6911 + 0.00301 × netET * (*Rat_Irr_Area*/1,000)]

Rat_Irr_Area = the size of the landscape that might receive supplemental water in the Rated Home

NetET = the annual historic sum of mean reference evapotranspiration minus the mean precipitation for all months that evapotranspiration exceeds precipitation

ind_Pool = indicator representing the presence or absence of a swimming pool

Pool_use = Equation G301.6-1 (using *ind_Pool* = 1) – Equation G301.6-1 (using *ind_Pool* = 0)

G301.6.1 Determining Outdoor Daily Water Use for the Rated Home. Rated Home daily outdoor water use shall be determined by multiplying the result of either Equation G301.6-1 or Equation G301.6-2, as appropriate, as such result may be further modified pursuant to Sections G301.6.1 through G301.6.4, by 1,000 and dividing the product by 365.

G301.6.2 Weather-based Controllers. Sensor- and weather- based irrigation controllers that are certified by the US EPA WaterSense program shall decrease the portion of predicted Rated Home outdoor water use associated with irrigation (less the water use associated with pools) by 15% in homes that have automatic irrigation system.

G301.6.3 Commissioning of an Automatic Irrigation System. In Rated Homes with an automatic irrigation system, where documentation is provided, the water use associated with irrigation shall be decreased by 5% where a certified professional, as identified by a WaterSense labeled certification, has inspected the irrigation system according to the protocols identified in ASABE S626 and verified as follows:

1. Average distribution uniformity of at least 65% on turf areas.
2. Sprinklers are operating at the manufacturer's recommended water pressure +/- 10%.
3. The system operates without leaks
4. The system prevents runoff and overspray from leaving the property (checked during the audit).
5. Two seasonal water schedules (initial grow-in period and established landscape) are posted at the controller.

G301.6.4 Residential Irrigation Capacity Index (RICI). In a Rated Home with an automatic irrigation system, where documentation is provided, a RICI shall be calculated as follows:

$RICI_{rat} = \frac{\text{sum of flow (gpm) of all irrigation valves}}{\text{square feet irrigated area}} \times 1{,}000$ **(Equation G301.6.4-1)**

G301.6.4.1 Applying RICI. A Rated Home, where documentation for a RICI is provided, may adjust the volume of water use associated with irrigation (less the water use associated with pools) in the outdoor water use of the Rated Home by 10% for every point from a baseline RICI (RICI_ref) of 5.

G301.6.5 Applying Adjustments to the Outdoor Water Use of Rated Homes. Because the Water Rating Index model includes a number of percent adjustments for the outdoor water use of the Rated Home, the order of application becomes important. The correct order in which to apply these adjustments is as indicated in Table G301.6.5.

TABLE G301.6.5 APPLYING ADJUSTMENTS TO OUTDOOR WATER USE OF THE RATED HOME

STEP	SECTION	DETERMINED BY
1	G301.6.2 —Weather-based Controllers	Shall be determined by the presence or absence of a smart controller in the installed portion of the landscape.
2	G301.6.3 — Commissioning of an Automatic Irrigation System	Shall be determined by the presence or absence of commissioning in the installed portion of the landscape.
3	CI301.6.4 —Residential Irrigation Capacity Index (RICI)	Shall be calculated in accordance with Section G301.6.4 and adjusted in partially finished landscapes to be calculated as: $RICI\_rat = \frac{\text{sum of flow (gpm) of all irrigation valves } + (0.005 \times \text{predicted } Back\_irr)}{\text{square feet irrigated area}} \times 1{,}000$ (Predicted *Back_irr* is defined in Section G401.5 .)

SECTION G401
MINIMUM RATED FEATURES

G401.1 N/A MINIMUM RATED FEATURES TABLE. The estimated annual indoor and outdoor water use shall be determined using the minimum rated features set forth in Table G401.1.

TABLE G401.1 MINIMUM RATED FEATURES

Building Element	Minimum Rated Feature
Toilet	Flush volume for each toilet as measured on-site or from manufacturer's data.
Shower/Bath	As imprinted on the product, stated by manufacturer in product documentation, or tested via flow rate test in the field.
Bathroom Faucet	As imprinted on the product, stated by manufacturer in product documentation, or tested via flow rate test in the field.
Kitchen Faucet	As imprinted on the product, stated by manufacturer in product documentation, or tested via flow rate test in the field.
Clothes Washer	Washer capacity (cubic feet) from manufacturer's data or the CEC Appliance Efficiency Database or the EPA ENERGY STAR website for all clothes washers located within the Rated Home.
Dishwasher	Capacity of the dishwasher (in place settings) as included in the manufacturer's data, labeled energy factor (cycles/kWh) for all dishwashers located within the Rated Home.
Water Softener	Gallons of water used per 1,000 grains of hardness removed.
Hot Water Distribution	Insulation *R*-value of pipe insulation, type of recirculation system, length of pipe.
Outdoor Water Use	Irrigation system type (automatic or manual), lot size, irrigated area (square feet).
Pool/Spa	Indicate presence or absence of a pool or spa.
Service Water Pressure	Service pressure of water being supplied to the home, as established by the setting of an installed pressure-reducing valve OR the setting of an installed pressure tank OR written documentation from the water supplier that service pressure to the site is 90 psi OR an on-site static pressure test.

G401.2 Data Sources. Data required for the calculation of indoor and outdoor daily water use in the Rated and Reference Homes shall be determined by the location of the Rated Home and using data as set forth in Sections G401.2.1 and G401.2.2.

G401.2.1 Net Evapotranspiration. Data for net evapotranspiration shall be determined for the location of the Rated Home using the World Water and Climate Atlas.

G401.2.2 Hardness of Water. Data for the hardness of water shall be determined by the location of the Rated Home and one of the following:

1. US Geological Survey Concentrations of Hardness as Calcium Carbonate Map.
2. Data provided by the local water supplier.
3. A hardness test of water collected in the home using an EPA-approved method for determination of hardness.

G401.3 Default Values. Values that are not available in accordance with Table G401.1 or are absent from the home at the time of the rating shall use default values in accordance with Table G401.3. Values for building elements that are not specified in Table G401.3 are required for a rating to be issued.

TABLE G401.3 DEFAULT VALUES

Building Element	Default
Water Softeners	Can be entered as 0 if they are absent from a Rated Home. If they are present and no documentation is available, they may be assumed to use 5 gallons/1,000 grains removed for cation water softeners if information is unavailable.
Clothes Washer	Same as Reference Home.
Dishwasher	Determined by ANSI/RESNET/ICC 301. A Rated Home without either a dishwasher or an undercounter cavity for placement of a dishwasher shall be assigned a Daily Dishwasher Water Use of 0.
Hot Water Distribution	Determined by ANSI/RESNET/ICC 301 Addendum A.
Outdoor Water Use	Must be done in accordance with Section G301.4.

G401.4 Incomplete Outdoor Area. To receive a rating, a home must (at a minimum) have the front yard landscape completed. Homes that do not have landscaping completed in the back yard shall be determined in accordance with Section G301.6 with the portion of landscaping that is done determining the presence or absence of an automatic irrigation system. The following steps shall be followed in determining irrigated area in this instance:
Rater must determine a line between the front and back area (*Front_area* + *Back_area* must = *Total_available_area*)

Lot_Area – Pad Footprint = *Total_available_area*

(Back_area/*Total_available_area*) × *Ref_Irr_Area* = *Predicted Back_irr*

Irr_Area = *Predicted Back_irr* + *Front_irr*

Where:

Pad Footprint = the portion of the lot area covered by the dwelling unit and any attached or detached garage

Total_available_area = the portion of the lot excluding the pad of the house that is available for landscaping or other design features (hardscape, softscape, etc.)

Front_area = the area (ft2) of the total available area that is located primarily in front of the house

Back_area = the area (ft2) of the total available area that is located primarily behind the house

Front_irr = the area located primarily in front of the house that receives supplemental water for irrigation at the time of the rating

Predicted Back_irr = the portion of the area located primarily behind the house that can be predicted to receive supplemental water for irrigation in the future

SECTION G501
CERTIFICATION AND LABELING

G501.1 STANDARD FOR CERTIFICATION AND LABELING. This section establishes minimum uniform standards for certifying and labeling home water use performance using the Water Rating Index. These include minimum requirements of the home water use rating process, standard methods for estimating water use, minimum reporting requirements, and specification of the types of ratings that are performed in accordance with this code.

G501.2 Rating Requirements. .

G501.2.1 General. The rating for a home shall be determined in accordance with Sections G501.2.1.1 through G501.2.1. 2 .

G501.2.1.1 EXISTING HOMES. For an existing home, required data shall be collected on-site.

G501.2.1.1.1 NEW HOMES. For a new, to-be-built home, the procedures of Section G401 shall be used to collect required data.

G501.2.1.2 ESTIMATED ANNUAL WATER CONSUMPTION. The collected data shall be used to estimate the annual water consumption for indoor and outdoor water use for both the Rated Home and the Reference Home as specified by Section G301.

G501.2.2 Cost Savings Estimates. Where determined, cost savings estimates for water and wastewater (sanitary sewer) service for the Rated Home shall be calculated in accordance with Sections G501.2.2.1 through G501.2.2.1.3 .

G501.2.2.1 Water Cost Savings.

501.2.2.1.1 Water Prices. Water cost savings for homes receiving potable water service from a water supplier shall be based on the schedule of rates and charges adopted by the water supplier serving the Rated Home.

G501.2.2.1.2 Relevant Rates and Charges. Water cost savings shall be calculated from the volumetric portion of the schedule of rates and charges, sometimes referred to as the commodity charge. Fixed or flat charges that do not vary with the volume of water delivered to the home, sometimes referred to as the meter charge or service charge, shall not contribute to the cost savings estimate.

G501.2.2.1.3 Water Cost Savings Calculations. .

G501.2.2.1.3.1 Average Billed Indoor Volume of the Reference Home. Convert the total annual volume of indoor water use by the Reference Home to an increment of indoor use during a water billing period by dividing the annual indoor volume by the number of bills per year generated by the water supplier (e.g., for monthly billing divide by 12 and for quarterly billing divide by 4). Convert the units of consumption of the Reference Home as necessary to match the units of the rate schedule (e.g., 1,000 gallons, 100 cubic feet) to yield the average billed indoor volume of the Reference Home.

G501.2.2.1.3.2 Determine Outdoor Water Use for a Billing Period. Convert the total annual volume of outdoor water use in the Reference Home to an increment of outdoor use during a water billing period using one of two methods, based on prevailing practice at the location of the Rated Home.

G501.2.2.1.3.2.1 Peak Season Irrigation. Divide the annual outdoor volume by the number of bills generated by the water supplier during the irrigation season (e.g., for a 6-month irrigation season with monthly billing, divide by 6; for a 6-month irrigation season with quarterly billing, divide by 2). Convert the units of consumption of the Reference Home as necessary to match the units of the rate schedule (e.g., 1,000 gallons, 100 cubic feet) to yield the average billed outdoor volume of the Reference Home.

G501.2.2.1.3.2.1.2 Year-Round Irrigation. Divide the annual outdoor volume by the number of bills generated by the water supplier during a full year (e.g., for monthly billing, divide by 12 and for quarterly billing, divide by 4). Convert the units of consumption of the Reference Home as necessary to match the units of the rate schedule (e.g., 1,000 gallons, 100 cubic feet) to yield the average billed outdoor volume of the Reference Home.

G501.2.2.1.3.3 Combine Indoor and Outdoor Water Use Charges. For each billing period in a year, calculate the billed water volume by combining the average billed indoor volume with any average billed outdoor volume applicable to such billing period. Note that where peak season irrigation has been calculated, the billed water volume for the billing period outside of the irrigation season will consist entirely of the average billed indoor volume. Apply the volumetric portion of the rate schedule to the billed volume for each billing period, accounting for any rate blocks or seasonal variations in the rate schedule, to produce the billed volume charge (in dollars) for each billing period. Combine the billed volume charge for each billing period to yield the annual water volume charge of the Reference Home.

G501.2.2.1.3.4 Determine Water Use Cost for the Rated Home. Repeat the process described in Sections G501.2.2.1.3 through G501.2.2.1.3.3 for the Rated Home to calculate the annual water volume charge of the Rated Home.

G501.2.2.1.3.5 Total Estimated Water Cost Savings. Estimated water cost savings shall be the difference between the estimated annual water volume charge of the Reference Home and the estimated annual water volume charge of the Rated Home.

G501.2.2.2 Sanitary Sewer Service Cost Saving. .

G501.2.2.2.1 Sewer Service Prices. Sanitary sewer service cost savings for homes with a permanent connection to sanitary collection and treatment works shall be based on the schedule of rates and charges adopted by the sanitary sewer service provider serving the Rated Home. Note that collection and treatment of sanitary discharges may be performed by separate entities, and that billing to the Rated Home by such entities may be combined or separate.

G501.2.2.2.2 Relevant Rates and Charges. Sanitary sewer service cost savings shall be calculated from the volumetric portion of the schedule of rates and charges. Fixed or flat charges that do not vary with the volume of water delivered to the home shall not contribute to the cost savings estimate.

G501.2.2.2.3 Sewer Cost Savings Calculations. .

G501.2.2.2.3.1 Average Billed Indoor Volume of the Reference Home. Convert the total annual volume of indoor water use by the Reference Home to an increment of indoor use during a sewer billing period by dividing the annual indoor volume by the number of bills per year generated by the sewer service provider (e.g., for monthly billing, divide by 12 and for semi-annual billing, divide by 2). Convert the units of consumption of the Reference Home as necessary to match the units of the rate schedule (e.g., 1,000 gallons, 100 cubic feet) to yield the average billed indoor volume of the Reference Home.

G501.2.2.2.3.2 Annual Sewer Volume Charge for the Reference Home. Apply the volumetric portion of the sewer rate schedule to the average billed indoor volume for each billing period, accounting for any rate blocks or seasonal variations in the rate schedule, to produce the billed volume charge (in dollars) for each billing period. Combine the billed volume charge for each billing period to yield the annual sewer volume charge of the Reference Home.

G501.2.2.2.4 Determine Annual Sewer charge for the Rated Home. Repeat the process described in Section CI501.2.2.2.3 for the

Rated Home to calculate the annual sewer volume charge of the Rated Home.

G501.2.2.2.5 Estimated Sewer Cost Savings. Estimated sewer cost savings shall be the difference between the estimated annual sewer volume charge of the Reference Home and the estimated annual sewer volume charge of the Rated Home.

G501.2.2.2.6 Combined Presentation of Cost Savings. Estimated water cost savings and estimated sewer cost savings may be presented as a total estimated cost savings when designated as "water and sewer" savings.

G501.2.2.3 Other Cost Savings. Performance attributes of the Rated Home may influence other types of charges, depending on the fee structure in the jurisdiction of the Rated Home. While less common, these savings may be significant. Any determinations for cost savings associated with the following charges shall be submitted for individual review and approval by the body providing quality assurance for the rating service provider of the Rated Home.

1. Water service connection charges, also known as tap fees.
2. Sanitary sewer service connection charges, also known as capacity charges.
3. Stormwater fees.

G501.2.3 Reports. All reports generated by an Approved Software Rating Tool shall, at a minimum, contain the information specified by Sections G501.2.3.1 through G501.2.3.6

G501.2.3.1 Location. The property location, including city, state, zip code and either the street address or the Community Name and Plan Name for the Rating.

G501.2.3.2 Name of rater. The name of the certified rater conducting the Rating.

G501.2.3 Name of provider. The name of the Approved Rating Provider under whose auspices the rater is certified.

G501.2.3.4 DATE. The date the Rating was conducted.

G501.2.3.5 TOOL NAME AND VERSION. The name and version number of the Approved Software Rating Tool used to determine the Rating.

G501.2.3.6 DISCLOSURE. The following statement in not less than 10-point font: "The Home Water Rating Standard Disclosure for this home is available from the Rating Provider." At a minimum, this statement shall also include the Rating Provider's mailing address and phone number.

G501.2.4 Rating Types. There shall be three Rating Types in accordance with Sections G501.2.4.1 through G501.2.4.3.

G501.2.4.1 Confirmed Rating. A Rating Type that encompasses one individual dwelling and is conducted in accordance with Sections G501.2.4.1.1 through G501.2.4.1.3.

G501.2.4.1.1 Field verified. All Minimum Rated Features of the Rated Home shall be field-verified through inspection and testing in accordance with Section G401.

G501.2.4.1.2 Entry into tool. All field-verified Minimum Rated Features of the Rated Home shall be entered into the Approved Software Rating Tool that generates the home water rating. The home water rating shall report the Water Rating Index that comports with these inputs.

G501.2.4.1.3 Quality Assurance. Confirmed Ratings shall be subjected to Quality Assurance requirements equivalent to Section 900 of the Mortgage Industry National Home Energy Rating Systems Standard.

G501.2.4.2 Sampled Ratings. A Rating Type that encompasses a set of dwellings and is conducted in accordance with Sections G501.2.4.2.1 through G501.2.4.2.3.

G501.2.4.2.1 Set of rated homes. For the set of Rated Homes, all Minimum Rated Features shall be field verified through inspection and testing of a single home in the set, or distributed across multiple homes in the set, in accordance with the requirements equivalent to Section 600 of the Mortgage Industry National Home Energy Rating Systems Standard.

G501.2.4.2.2 Worst case analysis. The threshold specifications from the Worst-Case Analysis for the Minimum Rated Features of the set of Rated Homes shall be entered into the Approved Software Rating Tool that generates the home water use rating. The home water use rating shall report the Water Rating Index that comports with these inputs.

G501.2.4.2.3 QUALITY ASSURANCE. Sampled Ratings shall be subjected to Quality Assurance requirements equivalent to Section 900 of the Mortgage Industry National Home Energy Rating Systems Standard.

G501.2.4.3 Projected Ratings. A Rating Type that encompasses one individual dwelling and is conducted in accordance with Sections G501.2.4.3.1 through G501.2.4.3.3.

G501.2.4.3.1 Minimum rated features. All Minimum Rated Features of the Rated Home shall be determined from architectural drawings, threshold specifications, and the planned location for a new home or from a site audit and threshold specifications for an existing home that is to be improved.

G501.2.4.3.2 Unknown values. Unknown values shall be determined in accordance with Section G401.3.

G501.2.4.3.3 Text required. The Projected Rating Report shall contain the following text in not less than 14-point font at the top of the first page of the report: "Projected Rating Based on Plans—Field Confirmation Required."

G501.3 Innovative Design Requests. .

G501.3.1 Petition. Water Rating providers can petition for adjustment to the Water Rating Index for a Rated Home with features or technologies not addressed by Approved Software Rating Tools or this Standard. Innovative Design Requests (IDRs) shall be submitted to an Approved IDR authority and shall include, at a minimum, the following:

G501.3.1.1 Features required. A Rating generated from an Approved Software Rating Tool for the Rated Home without feature(s) that cannot be modeled in the software tool.

G501.3.1.2 Features not included. Written description of feature(s) not included in the Rating generated from software.

G501.3.1.3 Manufacturer's specifications. Manufacturer's technical and/or performance specifications for feature(s) not included in the Rating generated from the Approved Software Rating Tool.

G501.3.1.4 Estimated water use impact. Calculations or simulation results estimating the water use impact of feature(s) not included in the Rating generated from an Approved Software Rating Tool and documentation to support the calculation methodology and/or describe the modeling approach used.

G501.3.1.5 Estimated adjustment. Estimated adjustment to the Water Rating Index. Calculations shall follow the procedures of Sections G301.1 and G301.2.

G501.3.2 Approval. IDRs shall be approved on a case by case basis. The Approved IDR review authority shall accept or reject the IDR as submitted, or request additional information. The Approved IDR review authority shall assign a unique identifier to each IDR and maintain a database of IDRs. If the IDR is approved, the Water Rating provider is authorized to issue a supplemental report that adjusts the Water Rating Index, as approved.

SECTION G601
REFERENCE STANDARD

G601.1 General. See Table G601.1 for standards that are referenced in various section of this appendix. Standards are listed by the standard identification with the effective date, the standard title, and the section or sections of this appendix that reference this standard.

TABLE G601.1 REFERENCED STANDARDS

STANDARD ACRONYM	STANDARD NAME	SECTIONS HEREIN REFERENCED
ANSI/RESNET/ICC-301-2022	Standard for the Calculation and Labeling of the Energy Performance of Dwelling and Sleeping Units using an Energy Rating Index.	
RESNET/ICC-850-2020	Calculation and Labeling of the Water Use Performance of One-and Two-Family Dwellings Using the Water Rating Index	
ANSI/ASABE S626 SEP2016 (R2020)	Landscape Irrigation System Uniformity and Application Rate Testing	
--	CEC appliance database	
--	EPA Energy Star Website	
--	ENERGY STAR product finder database	
--	California Energy Commission (CEC) Modernized Appliance Efficiency Database	
--	Department of Energy (DOE) Compliance Certification Management System (CCMS).	
--	EPA Water Sense specification for Tank-Type Toilets	
--	US Geological Survey Concentrations of Hardness as Calcium Carbonate Map	
--	Mortgage Industry National Home Energy Rating Systems Standard.	

Staff Analysis: A review of the standards proposed for inclusion in the code,
ANSI/RESNET/ICC-301-2022 *Standard for the Calculation and Labeling of the Energy Performance of Dwelling and Sleeping Units using an Energy Rating Index.*
RESNET/ICC-850-2020 *Calculation and Labeling of the Water Use Performance of One-and Two-Family Dwellings Using the Water Rating Index*
ANSI/ASABE S626 SEP2016 (R2020) *Landscape Irrigation System Uniformity and Application Rate Testing*
CEC appliance database
EPA Energy Star Website
ENERGY STAR product finder database
California Energy Commission (CEC) Modernized Appliance Efficiency Database
Department of Energy (DOE) Compliance Certification Management System (CCMS).
EPA Water Sense specification for Tank-Type Toilets
US Geological Survey Concentrations of Hardness as Calcium Carbonate Map
Mortgage Industry National Home Energy Rating Systems Standard.
, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: In response to water resources becoming increasingly strained throughout the country and water prices rising fast due to aging infrastructure and water utility rate structures, ANSI/RESNET/ICC 850-2020 was developed to provide a consistent, uniform methodology for evaluating, quantifying, and labeling the water use performance of one- and two-family dwellings and to serve as the basis for RESNET's residential water efficiency rating system (known as $HERS_{H2O}$®).

Drought, new development and aging water infrastructure can all put a strain on local water resources. In some instances this has caused local officials to put a moratorium on new permits for fear the water utility could not meet the increased demand, as described in a New York Times article. ANSI/RESNET/ICC 850 provides a much-needed resource for states, municipalities and builders to not only evaluate a home's water efficiency but to estimate their annual water use. This estimate of annual water use can serve as an important tool for anticipating the water needs of new development.

For user convenience and to provide a resource for builders to measure the water efficiency of the homes they build, ANSI/RESNET/ICC 850 should be added in its entirety as a new appendix in both the International Plumbing Code and International Residential Code since both are adopted for use in residential construction.

This proposal is submitted by the ICC Plumbing Mechanical Gas Code Action Committee (PMGCAC)

PMGCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 PMGCAC has held 26 virtual meetings open to any interested party. In addition, there were several virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the PMGCAC website at PMGCAC.

Bibliography: RESNET's Water Efficiency Rating System HERS$_{H2O}$® - https://www.resnet.us/about/hersh2o/

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposed language is being recommended for inclusion into the code(s) as a voluntary appendix.

P162-24 Part I

P162-24 Part II

IRC: APPENDIX CI (New), SECTION CI101 (New), CI101.1 (New), CI101.2 (New), CI201 (New), CI201.1 (New), SECTION 202 (New), SECTION CI301 (New), CI301.1 (New), CI301.2 (New), CI301.3 (New), CI301.3.1 (New), CI301.3.2 (New), CI301.3.3 (New), CI301.3.4 (New), CI301.3.5 (New), CI301.3.6 (New), CI301.3.7 (New), CI301.4 (New), CI301.4.1 (New), CI301.4.2 (New), CI301.5 (New), CI301.5.1 (New), CI301.5.2 (New), CI301.5.3 (New), CI301.5.4 (New), CI301.5.5 (New), CI301.5.6 (New), CI301.5.7 (New), CI301.5.8 (New), CI301.5.9 (New), CI301.5.10 (New), CI301.6 (New), CI301.6.1 (New), CI301.6.2 (New), CI301.6.3 (New), CI301.6.4 (New), CI301.6.4.1 (New), CI301.6.5 (New), TABLE CI301.6.5 (New), SECTION CI401 (New), CI401.1 (New), TABLE CI401.1 (New), CI401.2 (New), CI401.2.1 (New), CI401.2.2 (New), CI401.3 (New), TABLE CI401.3 (New), CI401.4 (New), CI501 (New), CI501.1 (New), CI501.2 (New), CI501.2.1 (New), CI501.2.1.1 (New), CI501.2.1.1.1 (New), CI501.2.1.2 (New), CI501.2.2 (New), CI501.2.2.1 (New), CI501.2.2.1.1 (New), CI501.2.2.1.2 (New), CI501.2.2.1.3 (New), CI501.2.2.1.3.1 (New), CI501.2.2.1.3.2 (New), CI501.2.2.1.3.2.1 (New), CI501.2.2.1.3.2.1.2 (New), CI501.2.2.1.3.3 (New), CI501.2.2.1.3.4 (New), CI501.2.2.1.3.5 (New), CI501.2.2.2 (New), CI501.2.2.2.1 (New), CI501.2.2.2.2 (New), CI501.2.2.2.3 (New), CI501.2.2.2.3.1 (New), CI501.2.2.2.3.2 (New), CI501.2.2.2.4 (New), CI501.2.2.2.5 (New), CI501.2.2.2.6 (New), CI501.2.2.3 (New), CI501.2.3 (New), CI501.2.3.1 (New), CI501.2.3.2 (New), CI501.2.3.4 (New), CI501.2.3.5 (New), CI501.2.3.6 (New), CI501.2.4 (New), CI501.2.4.1 (New), CI501.2.4.1.1 (New), CI501.2.4.1.2 (New), CI501.2.4.1.3 (New), CI501.2.4.2 (New), CI501.2.4.2.1 (New), CI501.2.4.2.2 (New), CI501.2.4.2.3 (New), CI501.2.4.3 (New), CI501.2.4.3.1 (New), CI501.2.4.3.2 (New), CI501.2.4.3.3 (New), CI501.3 (New), CI501.3.1 (New), CI501.3.1.1 (New), CI501.3.1.2 (New), CI501.3.1.3 (New), CI501.3.1.4 (New), CI501.3.1.5 (New), CI501.3.2 (New), CI601 (New), CI601.1 (New), TABLE CI601.1 (New)

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Residential Code

Add new text as follows:

APPENDIX CI Calculation and Labeling of the Water Use Performance of One- and Two-Family Dwellings

SECTION CI101
GENERAL

CI101.1 Purpose. The provisions of this appendix establish a uniform methodology for evaluating, rating and labeling the water use performance of one and two-family dwellings.

CI101.2 Scope. This appendix shall provide a uniform methodology for evaluating, rating and labeling the indoor and outdoor water use performance of one- and two-family dwellings. Such evaluations, rating and labeling shall be in accordance with this appendix and RESNET/ICC-850.

Add new definition as follows:

CI201
DEFINITIONS

Add new text as follows:

CI201.1 Definitions. The following terms and acronyms have specific meanings as used in this Appendix. In the event that definitions given here differ from definitions given elsewhere, the definitions given here shall govern.

Add new definition as follows:

Approved Rating Provider.
An approved entity responsible for the certification of home water efficiency raters working under its auspices and who is responsible for the quality assurance of such Certified Raters and for the quality assurance of water efficiency ratings produced by such home water

efficiency raters.

Approved Software Rating Tool.
A computerized procedure that is approved for the purpose of conducting home water efficiency ratings and calculating the annual water consumption, annual water costs and a Water Rating Index for a home.

Automatic Irrigation System.
An irrigation system that is initiated by a clock timer, irrigation controller, or other method that does not require human intervention to initiate an irrigation event.

Bedroom.
A room or space 70 square feet of floor area or greater, with egress window and closet, used or intended to be used for sleeping. A “den,” “library,” “home office” with a closet, egress window, and 70 square feet of floor area or greater or other similar rooms shall count as a Bedroom, but living rooms and foyers shall not.

Irrigated Area.
The portion of a lot that receives supplemental water for irrigation.

Lot Size.
The area of a single parcel of land on which the Rated Home is located.

Other Water Use.
Water use associated with leaks, minor draws, and other end uses not specified in the Reference Home or Rated Home.

Outdoor Water Use. Water use that occurs outside of the exterior walls of a dwelling unit.

Rated Home.
The specific real property that is evaluated using the water use performance rating procedures specified by this Appendix.

Reference Home. A hypothetical home configured in accordance with the specifications set forth in Section CI301.3of this code andthe basis of comparison for the purpose of calculating the Water Rating Index of a Rated Home.

Residential Irrigation Capacity Index (RICI). The intensity with which an automatic irrigation system applies water calculated in accordance with Section **CI301.6.3.**

Water Rating Index (WRI). An integer representing the relative water use of a Rated Home as compared with the water use of the Reference Home and where an Index value of 100 represents the water use of the Reference Home and each integer reduction represents a one percent improvement in water use efficiency.

Add new text as follows:

SECTION CI301
HOME WATER RATING CALCULATION PROCEDURES

CI301.1 Determining the Water Rating Index. The Water Rating Index (WRI) shall be determined in accordance with Sections CI301.2 through CI301.6. The Reference Home shall be configured in accordance with Sections CI301.3 and CI301.4, and the Rated Home shall be configured in accordance with Section CI301.5 and CI301.6 .

CI301.2 Determining the Daily Indoor Water Use for the Reference Home. The indoor daily water use for the Reference Home shall be calculated as follows:

$$WRI = \frac{\text{indoor and outdoor daily water use for the Rated Home}}{\text{indoor and outdoor daily water use for the Reference Home}} \times 100$$

(Equation CI301.2-1)

CI301.3 Determining the Daily Indoor Water Use for the Reference Home.. The indoor daily water use for the Reference Home shall be calculated as follows:

refingpd = refFgpd + refWgpd + refDWgpd + refCWgpd +refTgpd + refSofgpd + refOther(Equation CI301.3-1)

where: $refF_{gpd}$ = daily fixture water use for the Reference Home

refWgpd = daily water use wasted from hot water outlets for the Reference Home

refDWgpd = daily dishwasher water use for the Reference Home

refCWgpd = daily clothes washer water use for the Reference Home

refTgpd = daily toilet water use for the Reference Home

refSofgpd = daily water softener water use for the Reference Home

refOther = daily total other/unidentified water use for the Reference Home

CI301.3.1 Determining Daily Reference Home Fixture Water Use. Reference Home daily fixture water use shall be calculated as follows:

$refFgpd = 14.6 + 10 \times Nbr$ **(Equation CI301.3.1-1)**

where:

Nbr = number of bedrooms in the Rated Home

CI301.3.2 Determining Daily Reference Home Hot Water Waste. Reference Home daily hot water waste shall be calculated as follows:

$refWgpd = 9.8 \times Nbr^{0.43}$ **(Equation CI301.3.2-1)**

where:

Nbr = number of bedrooms

CI301.3.3 Determining Daily Reference Home Dishwasher Water Use. Reference Home dishwasher water use shall be calculated as follows:

$$refDWgpd = \frac{(88.4 + 34.9 \times Nbr) \times 8.16}{365}$$ **(Equation CI301.3.3-1)**

Which simplifies to:

$refWgpd = 1.97 + 0.7802 \times Nbr$

Where:

Nbr = number of bedrooms

($88.4 + 34.9 \times Nbr$) = best fit regression equation for dishwasher cycles per year using data from the 2005 Residential Energy Consumption Survey

8.16 = gallons per cycle from the DOE Technical Support Document from the NAECA standard in effect in 2006

This value is determined in accordance with ANSI/RESNET/ICC 301 Addendum A.

CI301.3.4 Determining Daily Reference Home Clothes Washer Water Use. Reference Home daily clothes washer water use shall be calculated as follows:

$$refCWgpd = \frac{(3.0 \times 11.4 \times ACY)}{365}$$ **(Equation CI301.3.4-1)**

Where:

3.0 = reference washer capacity (*CAPw*) in ft3

11.4 = reference integrated water factor (IWF) in (gal/cyc) per ft3

ACY = Adjusted Cycles per Year = (164 + 46.5 × *Nbr*)

Nbr = number of bedrooms

CI301.3.5 Determining Daily Reference Home Toilet Water Use.

refTgpd= *refFPO* × *refGPF* × *Occ* **(Equation CI301.3.5-1)**

where:

refFPO = the Reference Home flushes per person per day = 5.05

refGPF = the Reference Home gallons per flush for toilets = 1.6

Occ = the number of occupants = 1.09 + 0.54 ×*Nbr*

Nbr = number of bedrooms

CI301.3.6 Determining Daily Reference Home Water Softener Use.. Where the Rated Home has a water softener and the water hardness at the Rated Home location is greater than or equal to 180 milligrams/liter, the Reference Home water softener daily water use shall be calculated as follows:

$$refSofgpd = \frac{\text{grains of hardness}}{\text{gallon of water}} \times \text{sum of indoor water uses in the Reference Home} \times \frac{\text{5 gallons used}}{\text{1,000 grains removed}}$$

Where the Rated Home does not meet these conditions, the *refSofgpd* = 0. **(Equation CI301.3.6-1)**

CI301.3.7 Determining Daily Reference Home Other Water Use. . Reference Home daily other water use shall be determined as follows:

refOther = 5.93 × *Nbr* **(Equation CI301.3.7-1)**

where:

Nbr = the number of bedrooms in the Rated Home

CI301.4 Determining the Reference Home Outdoor Water Use. The reference home outdoor annual water use (in thousands of gallons per year) shall be calculated using the following two equations:

If the rated home has a netET of less than 12 inches/year OR the rated home has an automatic irrigation system, use Equation **CI301.4-1**.

(Equation CI301.4-1)

$$\left[\frac{Exp(A)}{1 + Exp(A)}\right] \times 1.18086 \times [2.0341 \times netET0.7154 \times Ref\_Irr\_Area0.6227 + 0.5756 \times ind\_Pool \times netET]$$

If the rated home has a netET of greater than 12 inches/year AND the rated home does NOT have an automatic irrigation system, use

Equation CI301.4-2. $\left[\dfrac{Exp(B)}{1+Exp(B)}\right]$ × 1.22257 × [1.4233 + 0.6311 × *netET* +

0.9376 × *Ref_Irr_Area*]]+ *ref_Pool* (Equation **CI301.4-2**)*Either equation shall be constrained as follows:*

IF

Rat_Irr_Area < *Ref_Irr_Area* ***THEN*** *Ref_Out* = Equation **CI301.4-1** or **CI301.4-2**

$$\frac{\text{Equation 1 (Using Rat\_Irr\_Area and ind\_Pool = 0)}}{\text{Equation 1 (with Ref\_Irr\_Area and ind\_Pool = 0)}}$$ (Equation **CI301.4-3**)

AND

Outdoor Reference Home Annual Water
Use shall never be lower than Equation **CI301.4-2**

Where:

Exp(A) = exponent of [1.4416 + 0.5069 × (*Irr_Area*/1,000)]

Exp(B) = exponent of [0.6911 + 0.00301 × *netET* × (*Irr_Area*/1,000)]

Ref_Irr_Area = the size of the irrigated area in the Reference Home, calculated in accordance with Section **CI301.4.1**

Rat_Irr_Area = the size of the irrigated area in the Rated Home

netET = the annual historic sum of mean reference evapotranspiration minus the mean precipitation for all months that evapotranspiration exceeds precipitation

ind_Pool = indicator representing the presence or absence of a swimming pool in the Rated Home

ref_Pool = Equation **CI301.4-1** (using *ind_Pool* = 1) – Equation **CI301.4-1** (using *ind_Pool* = 0)

-

CI301.4.1 Determining Outdoor Daily Water Use for the Reference Home. . Reference Home daily outdoor water use shall be determined by multiplying the result of either Equation **CI301.4-1** or Equation **CI301.4-2**, as appropriate, by 1,000 and dividing the product by 365.

CI301.4.2 Determining Irrigated Area for the Reference Home. Reference Home Irrigated Area shall be calculated as follows: Where the lot size of the Rated Home is less than 7,000 ft2, the Irrigated Area of the Reference Home shall be calculated as follows:

Ref_Irr_Area = *Lot_Area* × (0.002479 × *Lot_Area*0.6157) **(Equation CI301.4.2-1)**

wherethe Lot Size of the Rated Home is greater than or equal to 7,000 ft2, the Irrigated Area of the Reference Home shall be calculated as follows:

Ref_Irr_Area = *Lot_Area* × 0.577Equation **CI301.4.2-2**)

Where:

Ref_Irr_Area = the size of the landscape that receives supplemental water in the Reference Home

Lot_Area = the size of the lot on which the Rated Home is being constructed

CI301.5 Determining Daily Indoor Water Use of the Rated Home.. The daily Indoor Water Use of the Rated Home shall be calculated as follows:

$$Indoorgpd = Showergpd + KitchFgpd + LavFgpd + Wastegpd + CWgpd + DWgpd + Toiletsgpd + Softgpd + Other + EPgpd$$

where: **(Equation CI301.5-1)**

Where:

Showergpd = daily shower water use for the Rated Home

KitchFgpd = daily kitchen faucet water use for the Rated Home

LavFgpd = daily lavatory water use for the Rated Home

Wastegpd = daily water use wasted for the Rated Home

CWgpd = daily clothes washer water use for the Rated Home

DWgpd = daily dishwasher water use for the Rated Home

Toiletsgpd = daily toilet water use for the Rated Home

Softgpd = daily water softener water use for the Rated Home

Othergpd = daily other/unidentified water use for the Rated Home

EPgpd = daily excess pressure adjustment

CI301.5.1 Determining Daily Shower Water Use for the Rated Home. Rated Home daily shower water use shall be calculated as follows:

$$Showergpd = FixtureTot \times showerpc \times SHeff$$ **(Equation CI301.5.1-1)**

where:

FixtureTot = determined in accordance with ANSI/RESNET/ICC 301, Addendum A =

$$\frac{adjFmix}{Fmix} \times refFgpd$$

Shower_pc = percent of fixture water use consumed by showers = 54%

SHeff = the ratio of the average rated flow rate of showerheads to the reference home flow rate

$$= \frac{\text{average flow rate of showerheads in the Rated Hame}}{2.5}$$

CI301.5.2 Determining Daily Kitchen Faucet Water Use for the Rated Home. Rated Home daily kitchen faucet water use shall be calculated as follows:

$$KitchFgpd = FixtureTot \times faucetpc \times KitchFeff \times kitch$$ **(Equation CI301.5.2-1**

where:

FixtureTot = determined in accordance with ANSI/RESNET/ICC 301 Addendum A = $\frac{adjFmix}{Fmix}$ × *refFgpdfaucetpc*

= percent of fixture water use consumed by faucets = 46%

KitchFeff = the ratio of the average rated flow rate of kitchen faucets to the Reference Home flow rate

average flow rate of kitchen faucets in rated home

2.2

Kitch = the percentage of faucet use that is attributed to kitchen faucets = 69%

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CI301.5.3 **Determining Daily Lavatory Faucet Water Use for the Rated Home. .** Rated Home daily lavatory faucet use shall be calculated as follows:

LavFgpd = FixtureTot × faucetpc × LavFeff × Lav **(Equation CI301.5.3-1)**

where:

Lav = the percentage of faucet use that is attributed to lavatory faucets= 31%*FixtureTot* = determined in accordance with ANSI/RESNET/ICC 301 Addendum A =

$\frac{adjFmix}{Fmix}$ x *refFgpdfaucet_pc* = percent of fixture water use consumed by faucets = 46%

LavFeff = the ratio of the average rated flow rate of lavatory faucets to the Water Rating Reference Home flow rate = 1 for standard faucets and 0.95 for high-efficiency faucets

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CI301.5.4 **Determining Daily Hot Water Waste for the Rated Home.** Rated Home daily hot water waste shall be calculated as follows:

Wastegpd = *Feff* × (*oWgpd* + *sWgpd* × *WDeff*) **(Equation CI301.5.4-1)**

where:

Feff = fixture efficiency of showerheads, kitchen faucets, and lavatory faucets weighted by contribution to total fixture use (by volume)

oWgpd = daily standard operating condition hot water wasted quantity as determined by ANSI/RESNET/ICC 301 Addendum A

sWgpd = daily structural hot water wasted quantity as determined by ANSI/RESNET/ICC 301 Addendum A

WDeff = distribution system water use effectiveness from Table 4.2.2.5.2.11(3) of ANSI/RESNET/ICC 301 Addendum A

This value is determined in accordance with ANSI/RESNET/ICC 301 Addendum A.

CI301.5.5 **Determining Daily Clothes Washer Water Use for the Rated Home.** Rated Home daily clothes washer water use shall be calculated as follows:

(Equation CI301.5.5-1)

$$CW_{gpd} = \frac{CAPw \times IWF \times ACY}{365}$$

where:

CAPw = washer capacity in cubic feet = the manufacturer's data or the CEC database or the EPA Energy Star® website

IWF = Integrated Water Factor from manufacturer's data [(gal/cyc)/ft3]

ACY = Adjusted cycles per year

Determining ACY:

ACY = (164 + 46.5 × *Nbr*)

$$\times \frac{(3.0 \times 2.08 + 1.59)}{(CAPw \times 2.08 + 1.59)} =$$

best fit regression equation to adjust the standard cycles per year to account for occupancy and size of clothes washer; based on 2005 Residential Energy Consumption Survey data

Where:

CAPw = the capacity of the clothes washer in ft3(164 + 46.5 × *Nbr*) = standard cycles per year based on 2005 Residential Energy Consumption Survey data

$$\frac{(3.0 \times 2.08 + 1.59)}{(CAPw \times 2.08 + 1.59)}$$

CI301.5.6 Determining Daily Dishwasher Water Use for the Rated Home. . Rated Home daily dishwasher water use shall be calculated as follows:

DWgpd = [(88.4 + 34.9 × *Nbr*) × (12/*dWcap*) × gal/cycle/365 **(Equation CI301.5.6-1)**

where:

Nbr = number of bedrooms in the Rated Home

dWcap = capacity of the dishwasher in the Rated Home (in place settings) as included in the manufacturer's data (88.4 + 34.9 × *Nbr*) = best fit regression equation for dishwasher cycles per year using data from the 2005 Residential Energy Consumption Survey gal/cycle can be entered either directly or as listed on:

a. The ENERGY STAR product finder database.

b. The California Energy Commission (CEC) Modernized Appliance Efficiency Database.

c. The Department of Energy (DOE) Compliance Certification Management System (CCMS).

OR gal/cycle can be calculated from the Energy Guide label as follows (developed using the equations from 10 CFR 430, Subpart B, Appendix C and values on the Energy Guide label) to isolate the energy used by the appliance from the energy used in water heating):gal/cycle = h2o_kWh × elec_h2o

h2o_kWh = LER-Appl_kWh

LER = Labeled Energy Rating in kWh per year per the dishwasher Energy Guide label

Appl_kWh = dishwasher appliance annual electric energy use = (GHWC × gas_h2o/$_therm-LER × $_kWh × elec_h2o/per_kWh) / ($_kWh × gas_h2o/$_therm-elec_h2o)

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Where:

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$_kWh = the cost of one kWh per the dishwasher Energy Guide label

$_therm = the cost of one therm per the dishwasher Energy Guide label

GHWC = Gas Hot Water Cost per the dishwasher Energy Guide label

elec_h2o = gallons of hot water use per cycle per unit of annual electricity use in gal × y/kWh × cyc = 1/(80 × 0.0024 × 208) = 0.02504gas_h2o = gallons of hot water use per cycle per unit of annual gas use in gal × y/therm × cyc = 1/(80 × 8.2/0.75 × 208/100,000) = 0.5497

80 = the average hot water heater temperature rise per 10 CFR 430, Subpart B, Appendix C

0.0024 = specific heat of water in kWh/gal × F per 10 CFR 430, Subpart B, Appendix C

8.2 = specific heat of water in Btu/gal × F per 10 CFR 430, Subpart B, Appendix C

0.75 = recovery efficiency of gas hot water heater per 10 CFR 430, Subpart B, Appendix C

208 = cycles per year

This value is determined in accordance with ANSI/RESNET/ICC 301 Addendum A.

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CI301.5.7 Determining Daily Toilet Water Use for the Rated Home. Rated Home daily toilet water use shall be calculated as follows:
Toiletgpd = refFPO × gpf × Occ

Where:

refFPO = the reference flushes per person per day = 5.05

gpf = the average gallons per flush of all toilets installed in the Rated Home; for tank-type dual-flush toilets, use the effective flush volume per flush based on EPA Water Sense specification for Tank-Type Toilets

Occ = the number of predicted occupants in the Rated Home = 1.09 + 0.54 × *Nbr*

Nbr = the number of bedrooms in the Rated Home

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CI301.5.8 **Determining Daily Water Softener Water Use for the Rated Home.** .

Rated Home daily water softener water use shall be calculated as follows:*Softgpd* = $\frac{\text{grains of hardness}}{\text{gallon of water}}$ × [sum of softened water uses in the Rated Home] × [gallons used per 1,000 grains of hardness]

where: **(Equation CI301.5.8-1)**

softened water = water conditioned by a water softener

CI301.5.9 **Determining Daily Other Water Use for the Rated Home.** . Rated Home daily other water use shall be calculated as follows:

Othergpd = 5.93 × *Nbr* **(Equation CI301.5.9-1)**

where:

Where:

Nbr = the number of bedrooms in the rated home

CI301.5.10 **Determining Daily Excess Pressure Adjustment Water Use for the Rated Home.**. Where a Rated Home does not have a pressure-reducing valve or pressure tank, additional water use attributed to excess water pressure shall be calculated as follows:

EPgpd = MAX {[(*Showergpd* + (0.5 × (*LavFgpd* + *KitchFgpd* + *Othergpd*))) × 0.006 × (*PR* – 90)],0} **(Equation CI301.5.10-1)**

where:

Where:

PR = static water pressure (in psi) measured at the indoor fixture outlet on the lowest floor and (if more than one) closest to the water service entry to the house

Shower and lavatory faucets controlled by integral or accessory pressure-compensating devices shall be permitted to be excluded from this equation.

CI301.6 **Determining Outdoor Water Use for the Rated Home.** The Rated Home outdoor water use shall be calculated as follows: Where the Rated Home has an automatic irrigation system, outdoor water use shall be calculated as follows:

(Equation CI301.6-1)

$\left[\frac{Exp(A)}{1 + Exp(A)}\right]$ × 1.18086 × [2.0341 × netET0.7154 × *Rat_Irr_Area*0.6227 + 0.5756 × *ind_Pool* × *netET*]

Where the Rated Home does not have an automatic irrigation system, outdoor water use shall be calculated as follows: $\left[\frac{Exp(B)}{1 + Exp(B)}\right]$ × 1.22257 × [1.4233 + 0.6311 × *netET* + 0.9376 × *Rat_Irr_Area*]] + *Pool_use*

(Equation **CI301.6-2**)

The outdoor water use for the Rated Home shall never be less than the result of the following calculation:

$\left[\frac{Exp(B)}{1 + Exp(B)}\right]$ × 1.22257 × [1.4233 + 0.6311 × *netET* + 0.9376 × *Rat_Irr_Area*]

(Equation **CI301.6-3**)

Where:

Exp(A) = exponent of [1.4416 + 0.5069 × (*Rat_Irr_Area*/1,000)]

Exp(B) = exponent of [0.6911 + 0.00301 × netET * (*Rat_Irr_Area*/1,000)]

Rat_Irr_Area = the size of the landscape that might receive supplemental water in the Rated Home

netET = the annual historic sum of mean reference evapotranspiration minus the mean precipitation for all months that evapotranspiration exceeds precipitation

ind_Pool = indicator representing the presence or absence of a swimming pool

Pool_use = Equation **CI301.6-1** (using *ind_Pool* = 1) – Equation **CI301.6-1** (using *ind_Pool* = 0)

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CI301.6.1 Determining Outdoor Daily Water Use for the Rated Home. Rated Home daily outdoor water use shall be determined by multiplying the result of either Equation CI301.6-1 or Equation CI301.6-2 as appropriate, as such result may be further modified pursuant to Sections CI301.6.1 through CI301.6.4 , by 1,000 and dividing the product by 365.

CI301.6.2 Weather-based Controllers. . Sensor- and weather- based irrigation controllers that are certified by the US EPA WaterSense program shall decrease the portion of predicted Rated Home outdoor water use associated with irrigation, less the water use associated with pools, by 15% in homes that have automatic irrigation system.

CI301.6.3 Commissioning of an Automatic Irrigation System. In Rated Homes with an automatic irrigation system, where documentation is provided, the water use associated with irrigation shall be decreased by 5% where a certified professional, as identified by a WaterSense labeled certification, has inspected the irrigation system according to the protocols identified in ASABE S626 and verified as follows:

1. Average distribution uniformity of at least 65% on turf areas.
2. Sprinklers are operating at the manufacturer's recommended water pressure +/- 10%.
3. The system operates without leaks
4. The system prevents runoff and overspray from leaving the property (checked during the audit).
5. Two seasonal water schedules (initial grow-in period and established landscape) are posted at the controller.

CI301.6.4 Residential Irrigation Capacity Index (RICI). In a Rated Home with an automatic irrigation system, where documentation is provided, a RICI shall be calculated as follows:

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(Equation CI301.6.4-1

$$RICI_{rat} = \frac{\text{sum of flow (gpm) of all irrigation valves}}{\text{square feet irrigated area}} \times 1{,}000$$

CI301.6.4.1 Applying RICI. . A Rated Home, where documentation for a RICI is provided, may adjust the volume of water use associated with irrigation (less the water use associated with pools) in the outdoor water use of the Rated Home by 10% for every point from a baseline RICI (RICI_ref) of 5.

CI301.6.5 Applying Adjustments to the Outdoor Water Use of Rated Homes. . Because the Water Rating Index model includes a number of percent adjustments for the outdoor water use of the Rated Home, the order of application becomes important. The correct order in which to apply these adjustments is as indicated in Table **CI301.6.5.**

TABLE CI301.6.5 APPLYING ADJUSTMENTS TO OUTDOOR WATER USE OF THE RATED HOME

STEP	SECTION	DETERMINED BY
1	**CI301.6.2** —Weather-based Controllers	Shall be determined by the presence or absence of a smart controller in the installed portion of the landscape.
2	**CI301.6.3** — Commissioning of an Automatic Irrigation System	Shall be determined by the presence or absence of commissioning in the installed portion of the landscape.
3	**CI301.6.4**—Residential Irrigation Capacity Index (RICI)	Shall be calculated in accordance with Section **CI301.6.4** and adjusted in partially finished landscapes to be calculated as: *RICI_rat* $= \frac{\text{sum of flow (gpm) of all irrigation valves } + (0.005 \times \text{predicted } Back\_irr)}{\text{square feet irrigated area}} \times 1{,}000$ (Predicted *Back_irr* is defined in Section **CI401.5**)

SECTION CI401
MINIMUM RATED FEATURES

CI401.1 MINIMUM RATED FEATURES TABLE. The estimated annual indoor and outdoor water use shall be determined using the minimum rated features set forth in Table **CI401.1**

TABLE CI401.1 MINIMUM RATED FEATURES

Building Element	Minimum Rated Feature
Toilet	Flush volume for each toilet as measured on-site or from manufacturer’s data.
Shower/Bath	As imprinted on the product, stated by manufacturer in product documentation, or tested via flow rate test in the field.
Bathroom Faucet	As imprinted on the product, stated by manufacturer in product documentation, or tested via flow rate test in the field.
Kitchen Faucet	As imprinted on the product, stated by manufacturer in product documentation, or tested via flow rate test in the field.
Clothes Washer	Washer capacity (cubic feet) from manufacturer’s data or the CEC Appliance Efficiency Database or the EPA ENERGY STAR website for all clothes washers located within the Rated Home.
Dishwasher	Capacity of the dishwasher (in place settings) as included in the manufacturer’s data, labeled energy factor (cycles/kWh) for all dishwashers located within the Rated Home.
Water Softener	Gallons of water used per 1,000 grains of hardness removed.
Hot Water Distribution	Insulation *R*-value of pipe insulation, type of recirculation system, length of pipe.
Outdoor Water Use	Irrigation system type (automatic or manual), lot size, irrigated area (square feet).
Pool/Spa	Indicate presence or absence of a pool or spa.
Service Water Pressure	Service pressure of water being supplied to the home, as established by the setting of an installed pressure-reducing valve OR the setting of an installed pressure tank OR written documentation from the water supplier that service pressure to the site is 90 psi OR an on-site static pressure test.

CI401.2 Data Sources. Data required for the calculation of indoor and outdoor daily water use in the Rated and Reference Homes shall be determined by the location of the Rated Home and using data as set forth in Sections **CI401.2**.1 and **CI401.2**.2.

CI401.2.1 Net Evapotranspiration. Data for net evapotranspiration shall be determined for the location of the Rated Home using the World Water and Climate Atlas.

CI401.2.2 Hardness of Water. Data for the hardness of water shall be determined by the location of the Rated Home and one of the following:

1. US Geological Survey Concentrations of Hardness as Calcium Carbonate Map.
2. Data provided by the local water supplier.

3. A hardness test of water collected in the home using an EPA-approved method for determination of hardness.

CI401.3 Default Values. Values that are not available in accordance with Table CI401.1 5.0 or are absent from the home at the time of the rating shall use default values in accordance with Table **CI401.3** . Values for building elements that are not specified in Table **CI401.3** are required for a rating to be issued.

TABLE CI401.3 DEFAULT VALUES

Building Element	Default
Water Softeners	Can be entered as 0 if they are absent from a Rated Home. If they are present and no documentation is available, they may be assumed to use 5 gallons/1,000 grains removed for cation water softeners if information is unavailable.
Clothes Washer	Same as Reference Home.
Dishwasher	Determined by ANSI/RESNET/ICC 301. A Rated Home without either a dishwasher or an undercounter cavity for placement of a dishwasher shall be assigned a Daily Dishwasher Water Use of 0.
Hot Water Distribution	Determined by ANSI/RESNET/ICC 301 Addendum A.
Outdoor Water Use	Must be done in accordance with Section CI301.4

CI401.4 Incomplete Outdoor Area. To receive a rating, a home must (at a minimum) have the front yard landscape completed. Homes that do not have landscaping completed in the back yard shall be determined in accordance with Section **CI301.6** with the portion of landscaping that is done determining the presence or absence of an automatic irrigation system. The following steps shall be followed in determining irrigated area in this instance:

Rater must determine a line between the front and back area (*Front_area* + *Back_area* must = *Total_available_area*)

Lot_Area – Pad Footprint = *Total_available_area*

(Back_area/*Total_available_area*) × *Ref_Irr_Area* = *Predicted Back_irr*

Irr_Area = *Predicted Back_irr* + *Front_irr*

Where:

Pad Footprint = the portion of the lot area covered by the dwelling unit and any attached or detached garage

Total_available_area = the portion of the lot excluding the pad of the house that is available for landscaping or other design features (hardscape, softscape, etc.)

Front_area = the area (ft2) of the total available area that is located primarily in front of the house

Back_area = the area (ft2) of the total available area that is located primarily behind the house

Front_irr = the area located primarily in front of the house that receives supplemental water for irrigation at the time of the rating

Predicted Back_irr = the portion of the area located primarily behind the house that can be predicted to receive supplemental water for irrigation in the future

CI501
CERTIFICATION AND LABELING

CI501.1 STANDARD FOR CERTIFICATION AND LABELING. This section establishes minimum uniform standards for certifying and labeling home water use performance using the Water Rating Index. These include minimum requirements of the home water use rating process, standard methods for estimating water use, minimum reporting requirements, and specification of the types of ratings that are performed in accordance with this code.

CI501.2 Rating Requirements. .

CI501.2.1 General. The rating for a home shall be determined in accordance with Sections CI501.2.1.1through CI501.2.1. 2.

CI501.2.1.1 EXISTING HOMES. For an existing home, required data shall be collected on-site.

CI501.2.1.1.1 NEW HOMES. For a new, to-be-built home, the procedures of Section CI401 shall be used to collect required data.

CI501.2.1.2 ESTIMATED ANNUAL WATER CONSUMPTION. The collected data shall be used to estimate the annual water consumption for indoor and outdoor water use for both the Rated Home and the Reference Home as specified by Section CI301

CI501.2.2 Cost Savings Estimates. Where determined, cost savings estimates for water and wastewater (sanitary sewer) service for the Rated Home shall be calculated in accordance with Sections CI501.2.2.1 through CI501.2.2.1.3

CI501.2.2.1 Water Cost Savings. .

CI501.2.2.1.1 Water Prices. Water cost savings for homes receiving potable water service from a water supplier shall be based on the schedule of rates and charges adopted by the water supplier serving the Rated Home.

CI501.2.2.1.2 Relevant Rates and Charges. Water cost savings shall be calculated from the volumetric portion of the schedule of rates and charges, sometimes referred to as the commodity charge. Fixed or flat charges that do not vary with the volume of water delivered to the home, sometimes referred to as the meter charge or service charge, shall not contribute to the cost savings estimate.

CI501.2.2.1.3 Water Cost Savings Calculations. .

CI501.2.2.1.3.1 Average Billed Indoor Volume of the Reference Home. Convert the total annual volume of indoor water use by the Reference Home to an increment of indoor use during a water billing period by dividing the annual indoor volume by the number of bills per year generated by the water supplier (e.g., for monthly billing divide by 12 and for quarterly billing divide by 4). Convert the units of consumption of the Reference Home as necessary to match the units of the rate schedule (e.g., 1,000 gallons, 100 cubic feet) to yield the average billed indoor volume of the Reference Home.

CI501.2.2.1.3.2 Determine Outdoor Water Use for a Billing Period. Convert the total annual volume of outdoor water use in the Reference Home to an increment of outdoor use during a water billing period using one of two methods, based on prevailing practice at the location of the Rated Home.

CI501.2.2.1.3.2.1 Peak Season Irrigation. Divide the annual outdoor volume by the number of bills generated by the water supplier during the irrigation season (e.g., for a 6-month irrigation season with monthly billing, divide by 6; for a 6-month irrigation season with quarterly billing, divide by 2). Convert the units of consumption of the Reference Home as necessary to match the units of the rate schedule (e.g., 1,000 gallons, 100 cubic feet) to yield the average billed outdoor volume of the Reference Home.

CI501.2.2.1.3.2.1.2 Year-Round Irrigation. Divide the annual outdoor volume by the number of bills generated by the water supplier during a full year (e.g., for monthly billing, divide by 12 and for quarterly billing, divide by 4). Convert the units of consumption of the Reference Home as necessary to match the units of the rate schedule (e.g., 1,000 gallons, 100 cubic feet) to yield the average billed outdoor volume of the Reference Home.

CI501.2.2.1.3.3 Combine Indoor and Outdoor Water Use Charges. For each billing period in a year, calculate the billed water volume by combining the average billed indoor volume with any average billed outdoor volume applicable to such billing period. Note that where peak season irrigation has been calculated, the billed water volume for the billing period outside of the irrigation season will consist entirely of the average billed indoor volume. Apply the volumetric portion of the rate schedule to the billed volume for each billing period, accounting for any rate blocks or seasonal variations in the rate schedule, to produce the billed volume charge (in dollars) for each billing period. Combine the billed volume charge for each billing period to yield the annual water volume charge of the Reference Home.

CI501.2.2.1.3.4 Determine Water Use Cost for the Rated Home. Repeat the process described in Sections CI501.2.2.1.3 through CI501.2.2.1.3.3 for the Rated Home to calculate the annual water volume charge of the Rated Home.

CI501.2.2.1.3.5 Total Estimated Water Cost Savings. Estimated water cost savings shall be the difference between the estimated annual water volume charge of the Reference Home and the estimated annual water volume charge of the Rated Home.

CI501.2.2.2 Sanitary Sewer Service Cost Savings. .

CI501.2.2.2.1 Sewer Service Prices. Sanitary sewer service cost savings for homes with a permanent connection to sanitary collection and treatment works shall be based on the schedule of rates and charges adopted by the sanitary sewer service provider serving the Rated Home. Note that collection and treatment of sanitary discharges may be performed by separate entities, and that billing to the Rated Home by such entities may be combined or separate.

CI501.2.2.2.2 Relevant Rates and Charges. Sanitary sewer service cost savings shall be calculated from the volumetric portion of the schedule of rates and charges. Fixed or flat charges that do not vary with the volume of water delivered to the home shall not contribute to the cost savings estimate.

CI501.2.2.2.3 Sewer Cost Savings Calculations. .

CI501.2.2.2.3.1 Average Billed Indoor Volume of the Reference Home. Convert the total annual volume of indoor water use by the Reference Home to an increment of indoor use during a sewer billing period by dividing the annual indoor volume by the number of bills per year generated by the sewer service provider (e.g., for monthly billing, divide by 12 and for semi-annual billing, divide by 2). Convert the units of consumption of the Reference Home as necessary to match the units of the rate schedule (e.g., 1,000 gallons, 100 cubic feet) to yield the average billed indoor volume of the Reference Home.

CI501.2.2.2.3.2 Annual Sewer Volume Charge for the Reference Home. Apply the volumetric portion of the sewer rate schedule to the average billed indoor volume for each billing period, accounting for any rate blocks or seasonal variations in the rate schedule, to produce the billed volume charge (in dollars) for each billing period. Combine the billed volume charge for each billing period to yield the annual sewer volume charge of the Reference Home.

CI501.2.2.2.4 Determine Annual Sewer charge for the Rated Home. . Repeat the process described in Section CI501.2.2.2.3 for the Rated Home to calculate the annual sewer volume charge of the Rated Home.

CI501.2.2.2.5 Estimated Sewer Cost Savings. . Estimated sewer cost savings shall be the difference between the estimated annual sewer volume charge of the Reference Home and the estimated annual sewer volume charge of the Rated Home.

CI501.2.2.2.6 Combined Presentation of Cost Savings. . Estimated water cost savings and estimated sewer cost savings may be presented as a total estimated cost savings when designated as “water and sewer” savings.

CI501.2.2.3 Other Cost Savings. Performance attributes of the Rated Home may influence other types of charges, depending on the fee structure in the jurisdiction of the Rated Home. While less common, these savings may be significant. Any determinations for cost savings associated with the following charges shall be submitted for individual review and approval by the body providing quality assurance for the rating service provider of the Rated Home.

1. Water service connection charges, also known as tap fees.
2. Sanitary sewer service connection charges, also known as capacity charges.
3. Stormwater fees.

CI501.2.3 Reports. All reports generated by an Approved Software Rating Tool shall, at a minimum, contain the information specified by Sections CI501.2.3.1 through CI501.2.3.6.

CI501.2.3.1 LOCATION. The property location, including city, state, zip code and either the street address or the Community Name and Plan Name for the Rating.

CI501.2.3.2 NAME OF RATER. The name of the certified rater conducting the Rating.

CI501.2.3.2 NAME OF Provider. The name of the Approved Rating Provider under whose auspices the rater is certified.

CI501.2.3.4 DATE. The date the Rating was conducted.

CI501.2.3.5 TOOL NAME AND VERSION. The name and version number of the Approved Software Rating Tool used to determine the Rating.

CI501.2.3.6 DISCLOSURE. The following statement in not less than 10-point font: “The Home Water Rating Standard Disclosure for this home is available from the Rating Provider.” At a minimum, this statement shall also include the Rating Provider’s mailing address and phone number.

CI501.2.4 Rating Types. . There shall be three Rating Types in accordance with Sections CI501.2.4.1through CI501.2.4.3.

CI501.2.4.1 Confirmed Rating. . A Rating Type that encompasses one individual dwelling and is conducted in accordance with Sections CI501.2.4.1.1 through CI501.2.4.1.3 .

CI501.2.4.1.1 Field verified. All Minimum Rated Features of the Rated Home shall be field-verified through inspection and testing in accordance with Section CI401 .

CI501.2.4.1.2 Entry into tool. All field-verified Minimum Rated Features of the Rated Home shall be entered into the Approved Software Rating Tool that generates the home water rating. The home water rating shall report the Water Rating Index that comports with these inputs.

CI501.2.4.1.3 Quality Assurance. Confirmed Ratings shall be subjected to Quality Assurance requirements equivalent to Section 900 of the Mortgage Industry National Home Energy Rating Systems Standard.

CI501.2.4.2 Sampled Ratings. . A Rating Type that encompasses a set of dwellings and is conducted in accordance with Sections CI501.2.4.2.1 through CI501.2.4.2.3.

CI501.2.4.2.1 Set of rated homes. For the set of Rated Homes, all Minimum Rated Features shall be field verified through inspection and testing of a single home in the set, or distributed across multiple homes in the set, in accordance with the requirements equivalent to Section 600 of the Mortgage Industry National Home Energy Rating Systems Standard.

CI501.2.4.2.2 Worst case analysis. The threshold specifications from the Worst-Case Analysis for the Minimum Rated Features of the set of Rated Homes shall be entered into the Approved Software Rating Tool that generates the home water use rating. The home water use rating shall report the Water Rating Index that comports with these inputs.

CI501.2.4.2.3 QUALITY ASSURANCE. Sampled Ratings shall be subjected to Quality Assurance requirements equivalent to Section 900 of the Mortgage Industry National Home Energy Rating Systems Standard.

CI501.2.4.3 Projected Ratings. . A Rating Type that encompasses one individual dwelling and is conducted in accordance with Sections CI501.2.4.3.1 through CI501.2.4.3.3 .

CI501.2.4.3.1 Minimum rated features. All Minimum Rated Features of the Rated Home shall be determined from architectural drawings, threshold specifications, and the planned location for a new home or from a site audit and threshold specifications for an existing home that is to be improved.

CI501.2.4.3.2 Unknown values. Unknown values shall be determined in accordance with Section CI401.3 5.2.

CI501.2.4.3.3 Text required. The Projected Rating Report shall contain the following text in not less than 14-point font at the top of the first page of the report: "Projected Rating Based on Plans—Field Confirmation Required."

CI501.3 Innovative Design Requests. .

CI501.3.1 Petition. Water Rating providers can petition for adjustment to the Water Rating Index for a Rated Home with features or technologies not addressed by Approved Software Rating Tools or this Standard. Innovative Design Requests (IDRs) shall be submitted to an Approved IDR authority and shall include, at a minimum, the following:

CI501.3.1.1 Features required. A Rating generated from an Approved Software Rating Tool for the Rated Home without feature(s) that cannot be modeled in the software tool.

CI501.3.1.2 Features not included. Written description of feature(s) not included in the Rating generated from software.

CI501.3.1.3 Manufacturer's specifications. Manufacturer's technical and/or performance specifications for feature(s) not included in the Rating generated from the Approved Software Rating Tool.

CI501.3.1.4 Estimated water use impact. Calculations or simulation results estimating the water use impact of feature(s) not included in the Rating generated from an Approved Software Rating Tool and documentation to support the calculation methodology and/or describe the modeling approach used.

CI501.3.1.5 Estimated adjustment. Estimated adjustment to the Water Rating Index. Calculations shall follow the procedures of Sections CI301.1 and CI301.2 .

CI501.3.2 Approval.. IDRs shall be approved on a case by case basis. The Approved IDR review authority shall accept or reject the IDR as submitted, or request additional information. The Approved IDR review authority shall assign a unique identifier to each IDR and maintain a database of IDRs. If the IDR is approved, the Water Rating provider is authorized to issue a supplemental report that adjusts the Water Rating Index, as approved.

CI601
REFERENCE STANDARDS

CI601.1 General. See Table CI601.1 for standards that are referenced in various section of this appendix. Standards are listed by the standard identification with the effective date, the standard title, and the section or sections of this appendix that reference this standard.

TABLE CI601.1 REFERENCED STANDARDS

STANDARD ACRONYM	STANDARD NAME	SECTIONS HEREIN REFERENCED
ANSI/RESNET/ICC-301-2022	Standard for the Calculation and Labeling of the Energy Performance of Dwelling and Sleeping Units using an Energy Rating Index.	

RESNET/ICC-850-2020	Calculation and Labeling of the Water Use Performance of One-and Two-Family Dwellings Using the Water Rating Index	
ANSI/ASABE S626 SEP2016 (R2020)	Landscape Irrigation System Uniformity and Application Rate Testing	
--	CEC appliance database	
--	EPA Energy Star Website	
--	ENERGY STAR product finder database	
--	California Energy Commission (CEC) Modernized Appliance Efficiency Database	
--	Department of Energy (DOE) Compliance Certification Management System (CCMS).	
--	EPA Water Sense specification for Tank-Type Toilets	
--	US Geological Survey Concentrations of Hardness as Calcium Carbonate Map	
--	Mortgage Industry National Home Energy Rating Systems Standard.	

Staff Analysis: A review of the standards proposed for inclusion in the code,

ANSI/RESNET/ICC-301-2022 *Standard for the Calculation and Labeling of the Energy Performance of Dwelling and Sleeping Units using an Energy Rating Index.*

RESNET/ICC-850-2020 *Calculation and Labeling of the Water Use Performance of One-and Two-Family Dwellings Using the Water Rating Index*

ANSI/ASABE S626 SEP2016 (R2020) *Landscape Irrigation System Uniformity and Application Rate Testing*

CEC appliance database

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California Energy Commission (CEC) Modernized Appliance Efficiency Database

Department of Energy (DOE) Compliance Certification Management System (CCMS).

EPA Water Sense specification for Tank-Type Toilets

US Geological Survey Concentrations of Hardness as Calcium Carbonate Map

Mortgage Industry National Home Energy Rating Systems Standard.

, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: In response to water resources becoming increasingly strained throughout the country and water prices rising fast due to aging infrastructure and water utility rate structures, ANSI/RESNET/ICC 850-2020 was developed to provide a consistent, uniform methodology for evaluating, quantifying, and labeling the water use performance of one- and two-family dwellings and to serve as the basis for RESNET's residential water efficiency rating system (known as $HERS_{H2O}$®).

Drought, new development and aging water infrastructure can all put a strain on local water resources. In some instances this has caused local officials to put a moratorium on new permits for fear the water utility could not meet the increased demand, as described in a New York Times article. ANSI/RESNET/ICC 850 provides a much-needed resource for states, municipalities and builders to not only evaluate a home's water efficiency but to estimate their annual water use. This estimate of annual water use can serve as an important tool for anticipating the water needs of new development.

For user convenience and to provide a resource for builders to measure the water efficiency of the homes they build, ANSI/RESNET/ICC 850 should be added in its entirety as a new appendix in both the International Plumbing Code and International Residential Code since both are adopted for use in residential construction.

This proposal is submitted by the ICC Plumbing Mechanical Gas Code Action Committee (PMGCAC) PMGCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 PMGCAC has held 26 virtual meetings open to any interested party. In addition, there were several virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the PMGCAC website at PMGCAC.

Bibliography: RESNET's Water Efficiency Rating System HERS$_{H2O}$® - https://www.resnet.us/about/hersh2o/

Cost Impact: Increase

Estimated Immediate Cost Impact:

$50 to $300 per home

Estimated Immediate Cost Impact Justification (methodology and variables):

This cost comes from a small survey of what third party home rating firms currently charge for completing the water efficiency rating for various sizes of typical homes. Larger homes may cost more than small homes and builders with more homes may receive volume discounts. The costs also vary based on geographic location of the home rating companies.

Estimated Life Cycle Cost Impact:

N/A

Estimated Life Cycle Cost Impact Justification (methodology and variables):

N/A

P162-24 Part II

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IPC: APPENDIX G (New), SECTION G101 (New), A101 (New), A101.1 (New), SECTION G102 (New), 303.1 (New), SECTION G103 (New), 303.2 (New), 303.3 (New), 303.4 (New), 303.5 (New), G103.5 (New), G103.6 (New), G103.7 (New), SECTION G104 (New), G104.1 (New), SECTION G105 (New), G105.1 (New), G106 (New), G106.1 (New), TABLE G106.1 (New)

Proponents: Edward R. Osann, Natural Resources Defense Council, Natural Resources Defense Council (eosann@nrdc.org); Sun Kim, SGK Consulting (iso30500toilet@gmail.com); CJ Lagan, LIXIL (cj.lagan@lixil.com); ALBERT ROBERT (BoB) RUBIN, NCSU, ncsu (rubin@ncsu.edu)

2024 International Plumbing Code

Add new text as follows:

APPENDIX G NONSEWERED SANITATION SYSTEMS

SECTION G101 GENERAL

G101.1 Applicability. The provisions of this chapter shall apply to the installation of nonsewered sanitation systems.

G101.2 System requirements.
Nonsewered sanitation systems shall comply with ANSI/CAN/IAPMO/ISO 30500.

SECTION G102 DEFINITIONS

G102.1 General. For purposes of this chapter, the following definitions shall apply:

CONDITIONED SPACE. An area, room, or space normally occupied and being heated or cooled for human habitation by any equipment.

NONSEWERED SANITATION SYSTEM. A prefabricated integrated sewage treatment unit that is not connected to a public sewer or private sewage disposal system.

SECTION G103 INSTALLATION

G103.1 General.
The installation of nonsewered sanitation systems shall be in accordance with the manufacturer's installation instructions and with Sections G103.2 through G103.7.

G103.2 Operating conditions.
A nonsewered sanitation system in either a conditioned or unconditioned space shall be installed where the ambient temperature, ambient humidity and altitude (*atmospheric pressure*) are in accordance with the manufacturer's installation instructions or product listing.

G103.3 Clearances for servicing and maintenance.
A nonsewered sanitation system shall be located to permit access and sufficient clearance for service and maintenance. Unless otherwise specified by the manufacturer's installation instructions, not less than 30 inches (762 mm) in depth, width and height of working space shall be provided at any access panel.

G103.4 Backflow prevention.

A domestic water supply connection to a nonsewered sanitation system shall be protected in accordance with Section 608 of this code.

G103.5 Effluent storage. Any container or vessel for the storage of effluent discharged from a nonsewered sanitation system and not integral to such system shall be installed in accordance with Section 1301.9.

G103.6 Systems employing combustion. A nonsewered sanitation system employing combustion shall comply with the *International Mechanical Code* .

G103.7 Connection to plumbing system not required. A nonsewered sanitation system is not required to be connected to the sanitary drainage system of the *building* or premises.

SECTION G104 MANUAL REQUIRED

G104.1 Operation and maintenance manual. Nonsewered sanitation systems shall have an operation and maintenance manual provided by the manufacturer.

SECTION G105 SYSTEM OUTPUT

G105.1 General. The use or disposal of all substances exiting the nonsewered sanitation system shall be determined by the authority having jurisdiction.

G106 REFERENCE STANDARDS

G106.1 General. See Table G106.1 for standards that are referenced in various sections of this appendix. Standards are listed by the standard identification with the effective date, the standard title and the section or sections of this appendix that reference the standard.

TABLE G106.1 REFERENCE STANDARDS

STANDARD ACRONYM	STANDARD NAME	SECTIONS HEREIN REFERENCED
ANSI/CAN/IAPMO/ISO 30500-2019	*Non-sewered sanitation systems — Prefabricated integrated treatment units — General safety and performance requirements for design and testing*	G101.2

Staff Analysis: A review of the standard proposed for inclusion in the code, CAN/IAPMO/ISO 30500:2019 *Non-Sewered Sanitation Systems-Prefabricated Integrated Treatment Units-General Safety and performance Requirements for Design and Testing*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: This proposal covers the essential considerations that a building official must assess when a nonsewered sanitation system (NSSS) as defined herein is installed in a building. **It is identical to language adopted as Appendix CG in the 2024 IRC.** Because the early entries of NSSSs into the marketplace are likely to be multi-user systems for installation in multifamily and commercial buildings covered by the IPC, this proposal will be useful to adopting jurisdictions.

Designed for operation without a sewer connection and, in many cases, without a dedicated water supply, NSSSs are anticipated to meet critical public health needs in areas with limited water and wastewater infrastructure, water supply constraints, and/or unfavorable soils for traditional on-site disposal methods. In the U.S., over 20% of the population relies on an on-site wastewater system. And even today, a portion of our population does not have access to fully functioning sanitation, largely due to lack of affordable infrastructure or to challenging site conditions. In 2011, the Bill & Melinda Gates Foundation launched the "Reinvent the Toilet Challenge" to bring new technology to bear to achieve sustainable sanitation solutions. The target is a factory-built device that provides complete and effective treatment of human sanitary waste, unconnected to any sewer or drainage network and with minimal inputs of energy and water. Eight teams received Foundation support to develop prototypes for lab testing, field trials, and commercialization. Among these initial devices, three broad pathways for treatment technology have emerged -- electro-chemical, biological, and combustion -- and in some cases, combinations of these in the same device. Manufacturers have been involved in these efforts, and LIXIL (owner of the American Standard brand) and other companies are working to develop compliant systems for both domestic and international installations. It is the general preference of manufacturers to design and market systems that are compliant with published codes and standards, rather than one-off compliance reviews by individual jurisdictions.To facilitate commercialization of hi-tech toilets and their acceptance by state and national regulatory bodies, an ISO standard was adopted in 2018 to establish the key performance attributes of NSSSs. Standard 30500, *Non-sewered sanitation systems - Prefabricated integrated treatment units - General safety and performance requirements for design and testing*, sets performance requirements for solid and liquid outputs, odor, noise, air emissions, materials, safety, marking, and ergonomics, together with relevant test procedures for measuring the attainment of these requirements. This ISO standard was adopted in identical form as a U.S. and Canadian national standard in 2019, designated as ANSI/CAN/IAPMO/ISO 30500:2019.This proposal addresses the considerations that must be taken into account by building officials regarding the placement and installation of NSSSs in buildings. The proposal would permit (but not require) the installation of a NSSS listed to the ISO standard, and provide an exception to the general requirement in the IPC that sanitation devices be connected to the building drainage system. Certain key protections, such as backflow prevention, proper ventilation of combustion-based units, and proper siting of storage tanks (if any) external to the unit are each specified in the proposal. Considerations of the use and disposal of outputs of the system are specifically referred to an AHJ, which most likely will be a health department.

Criteria for the functioning of the unit for its intended purpose are established by the ISO standard and do not need to be repeated in plumbing code language. It should be noted that the ISO standard was developed by an international group of scientists, engineers, and regulators to assure the highest levels of treatment would apply to all outputs (air, water, and solids) from the device. The performance-based standards allow a variety of technologies to be applied, so long as key metrics are achieved. The microbiological reduction requirements for solid and liquid waste are based on the quantitative microbial risk assessment (QMRA) method recognized by the World Health Organization for this purpose. The requirements of the standard mimic the highest quality standards imposed by regulatory agencies on waste-derived materials destined for reuse. The standard's test procedures are rigorous (both lab and field tests are required), and the proposal allows only NSSSs listed to the standard to be approved for installation under this appendix.

With "Reinvented Toilets" meeting the 30500 standard now on the cusp of commercialization, the arrival of such toilets at job sites across the country can reasonably be expected by the time this code update is published and adopted by states and localities, e.g., 2028. Clear code language will accelerate the availability of safe sanitation for people who lack it today. While much is still unknown about the cost, maintenance, and reliability of NSSSs, or even the business model for their installation and servicing, forward-looking communities and jurisdictions with acute sanitation needs or water supply constraints will want to be prepared for the safe installation and use of this promising new technology as it enters the market. **Section 311 of the 2024 IPC already allows ISO 30500-compliant systems to be used for toilets for construction workers.** This proposal lays out the necessary groundwork for code officials to inspect and approve their installation within buildings, set out in an appendix available for voluntary adoption by state and local code bodies.

Cost Impact: Increase

Estimated Immediate Cost Impact:

$0. This voluntary appendix sets basic requirements for the installation of NSSSs in buildings, but as with the IPSDC, it does not *require* their installation in *any* building. A project developer will only incur the costs of an NSSS if he/she elects to do so.

Estimated Immediate Cost Impact Justification (methodology and variables):

A nonsewered sanitation system (NSSS) can be expected to cost more than a traditional flush toilet. However, NSSSs may be more cost competitive in applications that would otherwise require a traditional on-site treatment system, i.e., septic tank and drain field, and may become the system of choice where soil conditions or space constraints preclude the traditional approach. Section 1101 of the 2024 IPSDC requires residential on-site treatment systems to comply with *either* NSF 40 *or* ISO 30500, allowing the project applicant to make the choice based on price and other relevant factors.

Nonsewered sanitation systems (NSSSs) have yet to enter the US market, so reliable cost data is not available for analysis. But it is reasonable to assume that the cost of purchasing and installing a sanitation system providing complete on-site treatment of human waste will be more than the cost of a conventional toilet discharging to a sanitary sewer. At a meeting of the ISO Project Committee 305's working group in South Africa in June 2023, a European NSSS developer stated plans to bring a household-scale NSSS to market for $1,000 by early 2025, but there is no way to evaluate this claim in advance of market entry.

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2024 GROUP A – PROPOSED CHANGES TO THE INTERNATIONAL PLUMBING CODE

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TENTATIVE ORDER OF DISCUSSION
2021 PROPOSED CHANGES TO THE
INTERNATIONAL PLUMBING CODE

The following is the tentative order in which the proposed changes to the code will be discussed at the public hearings. Proposed changes which impact the same subject have been grouped to permit consideration in consecutive changes.

Proposed change numbers that are indented are those which are being heard out of numerical order. Indentation does not necessarily indicate that one change is related to another. Proposed changes may be grouped for purposes of discussion at the hearing at the discretion of the chair. Note that some P code change proposals may not be included on this list, as they are being heard by another committee.

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IPSDC: CHAPTER 2, SECTION 202, SECTION 202 (New), CHAPTER 13, SECTION 1301, 1301.1, 1301.2, 1301.3 (New), 1301.4 (New), 1301.5 (New), SECTION 1302 (New), 1302.1 (New), 1302.2 (New), 1302.3 (New), 1302.3.1 (New), 1302.3.2 (New), 1302.3.3 (New), 1302.3.4 (New), 1302.3.4.1 (New), 1302.4 (New), 1302.4.1 (New), 1302.4.2 (New), 1302.4.3 (New), 1302.4.4 (New), 1302.4.5 (New), 1302.4.6 (New), 1302.4.7 (New), 1302.4.8 (New), 1302.4.9 (New), 1302.4.10 (New), 1302.4.11 (New), 1302.4.11.1 (New), 1302.4.11.2 (New), 1302.4.11.3 (New), 1302.4.11.4 (New), 1302.4.11.5 (New), 1302.4.11.6 (New), 1302.4.11.7 (New), 1302.5 (New), 1302.5.1 (New), 1302.5.2 (New), 1302.5.3 (New), 1302.6 (New)

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2024 International Private Sewage Disposal Code

CHAPTER 2 DEFINITIONS

SECTION 202
GENERAL DEFINITIONS

Add new definition as follows:

COMMODE. A fixture without connection to a *sanitary drainage system* used for collecting, containing, or transporting excreta to a *compost processor*. (also dry toilet, urine diverting dry toilet, vacuum flush toilet, foam flush toilet).

COMPOST ADDITIVES. Any material such as sawdust, wood shavings, and other compostable material added to maintain operational conditions within the *composting toilet system*.

COMPOSTING TOILET SYSTEM. A system designed to safely collect and process *excreta* and *compost additives* into *humus* through aerobic decomposition.

COMPOST PROCESSOR. The site of aerobic decomposition transforming *excreta* and *compost additives* into *humus*.

DIVERTED URINE. Urine that is collected separately from fecal matter.

EXCRETA. Includes but is not limited to urine, feces, menses, and other human body emissions, as well as toilet paper and biodegradable cleaning products.

HUMUS. The biologically decomposed, soil-like output of the compost processor.

LEACHATE. Liquid drained from a compost processor.

SECONDARY COMPOSTING. Additional retention and continued decomposition of humus removed from compost processors in order to meet the required retention time.

URINE DIVERSION. Collection of *diverted urine* that occurs at the fixture.

URINE DIVERTING COMMODE. A commode that separates urine from other *excreta* and directs urine to a *urine diversion* system that is in accordance with the International Plumbing Code.

Revise as follows:

CHAPTER 13 ~~NONLIQUID SATURATED TREATMENT SYSTEMS~~ COMPOSTING TOILET SYSTEMS

SECTION 1301
GENERAL

Revise as follows:

1301.1 Scope.
The provisions of this chapter shall govern ~~nonliquid saturated treament systems~~ *composting toilet systems*.

1301.2 ~~Nonliquid saturated treatment systems~~ Maintenance responsibility.
~~The regulations for materials, design, construction and performance shall comply with NSF 41.~~The required maintenance and inspection of *composting toilet systems* shall be the responsibility of the property owner, unless otherwise required by the code official.

Add new text as follows:

1301.3 Operation. *Composting toilet systems* shall be operated and maintained in a safe and sanitary condition in accordance with the Section 1301.4.

1301.4 Operation and maintenance manual. An operation and maintenance manual shall be supplied in hardcopy with all systems. The manual shall be transferred to the new owner or tenant upon transfer of property or tenancy. The manual shall include the following items:

1. Schedule for addition of necessary *compost additives*.
2. Source or provider of necessary *compost additives*. Source may be on-site.
3. Schedule for all regular maintenance tasks.
4. Instructions for all regular maintenance tasks.
5. Expected input of and capacity for *excreta* and *compost additives* to compost toilet system specifying loading of *commode*(s) and *compost processor*(s).
6. Treatment period and expected schedule for removing *humus* from *composting processors* and *secondary composting*, where used.
7. Plan for container transfer and cleaning where transfer is used.
8. Plan for on-site disposal of *humus* or professional removal.
9. Plan for managing *leachate*.
10. For *composting toilet systems* not tested to NSF 41, a plan for microbial testing in accordance with Section 1302.5.2.

1301.5 Approved systems. Composting toilets and *composting toilet systems* shall comply with NSF 41 or shall be in accordance with Section 1302.

SECTION 1302
COMPOSTING TOILET SYSTEM DESIGN

1302.1 Approval. *Composting toilet systems* complying with this section shall be permitted for residential, commercial, and institutional applications.

1302.2 System records. The property owner is responsible for retaining test result records in accordance with the Section 1302.5.2 and making such records available to the *code official* upon request. Upon transfer of property or tenancy, all test records shall be transferred to the owner or tenant, and *humus* shall be re-tested after its first treatment period and a record retained by the property owner.

1302.3 System materials and components. All components expected to contact *excreta* or *leachate* shall be constructed of corrosion-resistant material such as stainless steel or durable polymers. Concrete in contact with *excreta* or *leachate* shall meet requirements of Section 1302.3.3.

1302.3.1 Pipes and fixtures. Pipe, pipe fittings, traps, fixtures, material, and devices used in *composting toilet systems* that are expected to contact *leachate* or *diverted urine* shall be listed by an approved agency or a third-party certification agency in accordance with Section 505 or the International Plumbing Code, unless otherwise approved by the *code official*. Products and materials shall be identified.

1302.3.2 Screening. Where screening is required to prevent the unintentional entry of insects and vermin, screening shall have openings with a maximum size of 3/32 inch (2.5mm). Screening shall be made of materials compatible with the system components in contact with screen materials. Screen materials shall not generate galvanic corrosion of system components.

1302.3.3 Concrete construction. Concrete construction shall be reinforced, watertight, and able to withstand loading in compliance with Section 1302.3.3. Where drainage is required, the *compost processor* floor shall be sloped not less than ¼-inch per foot (20mm per meter), or 2 percent. The flange of each sub-drain shall be set level.

1302.3.4 Commodes. *Commodes* shall be designed to support users of a weight not less than 300 pounds (136 kg). *Commodes* shall transport *excreta* into the *compost processor* or contain *excreta* for transfer as designed and in accordance with the operation and maintenance manual.

1302.3.4.1 Urine diversion. *Urine diversion* piping shall be connected to a *urine diversion* system in accordance with the International Plumbing Code.

1302.4 Compost processors. *Compost processors* shall maintain unsaturated aerobic composting conditions within the compost mass through the drainage, absorption or desiccation of *leachate*; and aeration of the *compost processor*.

1302.4.1 Openings. All openings shall be covered and secured to prevent tampering. Openings shall be screened or covered to prevent insect and vermin infiltration and be protected against unauthorized human entry.

1302.4.2 Transfer. Where unfinished *excreta* or *diverted urine* is transferred between *compost processors* or from *commode* to *compost processor*, transfer and cleaning of containers and provisions for limiting user exposure shall be in accordance with the operation and maintenance manual.

1302.4.3 Watertightness. *Compost processors* shall be constructed of watertight material in accordance with Section 1302.3.

1302.4.4 Insects and vermin. *Compost processors* shall be protected to prevent the unintentional entry of insects and vermin. No unsecured opening other than vents, drainage, or *commode* may exceed 1/2 inch (12.7 mm) in the least dimension.

1302.4.5 Sizing. *Compost processors* shall be sized to accommodate the maximum daily adult usage as specified by the manufacturer's or designer's published ratings. *Compost processors* shall be sized to hold at least 10 gallons (38L) of material per person per year while allowing for the removal of the *humus*.

1302.4.6 Treatment period. The *compost processor* or processors shall be sized to compost *excreta* for a treatment period with a minimum of one year of biologically active conditions. Biologically active conditions shall be maintained at or above a daily average of 42°F (6°C).

Exception: Systems with shorter treatment periods shall be permitted where either:

1. *Humus* from the compost processor has been tested in accordance with Section 1302.5.2 and transferred to *secondary composting* in accordance with Section 1302.4.7.
2. *Humus* is removed off site for processing or disposal at an approved facility.

1302.4.7 Secondary composting. *Humus* transferred to *secondary composting* shall first be tested in accordance with Section 1302.5.2. *Secondary composting* shall be labeled and protected from human contact in a well maintained compost bin or other facility designated for the exclusive purpose of containing *humus* removed from the *compost processor*. Contact with precipitation and surface waters shall be prohibited.

1302.4.8 Venting. Negative pressure between the *commode* and *compost processor* shall be provided where the *compost processor* is connected directly to the *commode* without a trap.

1302.4.9 Vent terminals. Vent stacks shall terminate to the exterior of the building in compliance with the requirements of the International Plumbing Code.

1302.4.10 Leachate. *Leachate* shall be collected for removal or recirculation within the *compost processor*, evaporated or drained to an approved sanitary drainage system or other location approved by the *code official*.

1302.4.11 Leachate storage tanks. *Leachate* storage tanks shall be constructed of corrosion resistant materials.

1302.4.11.1 Venting. *Leachate* storage tanks shall be vented as required for pressure equalization. When required, vents shall be installed on leachate storage tanks and shall extend from the top of the tank. Storage tank vents shall be permitted to connect to the plumbing venting system at least 6 inches (150mm) above the flood level rim of the highest fixture. Vents extending to the outdoors shall terminate no less than 12 inches (300mm) above grade. The vent terminal shall be directed downward and covered screening to prevent the unintentional entry of insects and vermin.

1302.4.11.2 Vent size. Pressure equalization vents that prevent nitrogen loss by the use of restrictions, or of piping or tubing that is less than the minimum pipe diameter required by Section 1302.3.1, shall be approved by the *code official.*

1302.4.11.3 Overflow. Where storage tank overflows are installed, they shall be connected to the sanitary drainage system.

1302.4.11.4 Backwater prevention. Storage tank overflows shall be provided with a backwater valve or check valve at any point of connection to a sanitary drainage system or *private sewage disposal system* subject to backflow. The backwater valve shall be accessible for inspections and maintenance.

1302.4.11.5 Above grade. Where subject to freezing conditions, storage tanks shall be provided with an adequate means of freeze protection. Above grade leachate storage tank shall be provided with a high-water sensing device and alarm system. The alarm shall report when 80 percent volume is reached.

1302.4.11.6 Below grade. *Leachate* storage tanks installed below grade shall be structurally designed to withstand all anticipated earth or other loads. Tank covers shall be capable of supporting an earth load of not less than 300 pounds per square foot (lb/ft2) (150 kg/m2) when the tank is designed for underground installation. Below grade *leachate* tanks installed underground shall be provided with manholes. The manhole opening shall be at least 20 inches (500 mm) in diameter and located at least 4 inches (100 mm) above the surrounding grade. The surrounding grade shall be sloped away from the manhole. Underground tanks shall be ballasted, anchored, or otherwise secured, to prevent the tank from floating out of the ground when empty. The combined hold-down capacity of the tank and hold down system shall meet or exceed the buoyancy force of the tank. Below grade *leachate* storage tank shall be provided with a high-water sensing device and alarm system.

1302.4.11.7 Marking. Where openings are provided to allow a person to enter the tank, the opening shall be marked with the following words: “DANGER—CONFINED SPACE.” The letters shall be not less than 0.5 inch (12.7 mm) in height and shall be of a color in contrast with the background on which they are applied.

1302.5 Testing. Prior to permit issuance, *composting toilet systems* shall be tested for watertightness in accordance with Section 1302.5.1. Humus from the first treatment period shall be tested after the first treatment period in accordance with Section 1302.5.2.

1302.5.1 Compost processors. *Compost processors* shall be tested for watertightness by filling the system to the maximum designed liquid storage capacity of the unit for a duration of 24 hours.

1302.5.2 Humus. The owner or owner's agent of the *composting toilet system* shall verify compliance with the operation and maintenance manual after the first treatment period and before removal of *humus* from the *compost processor*. A sample of the *humus* from the first treatment period shall be submitted to a certified laboratory. Where multiple *compost processors* are used, the *humus* sample shall be removed from the last *compost processor*. The sample shall be tested in accordance with NSF 41. *Humus* shall not have a moisture content exceeding 75 percent by weight, and the most probable number (MPN) fecal coliform assay shall not exceed 200 MPN per gram (dry weight basis).

1302.5.3 Testing following repairs and alterations. If the *code official* determines that new tests are required following repairs or alterations, tests shall be conducted at the owner's expense and in accordance with Section 1302.5.

1302.6 Humus removal. *Humus* shall be removed in accordance with the operation and maintenance manual. *Humus* from the *compost processor* shall be permitted to be used around ornamental shrubs, flowers, trees, or fruit trees and shall be mixed with soil or mulch and covered with at least 3 inches (76mm) of cover material. Depositing *humus* from any *composting toilet system* around any edible vegetable or vegetation shall be prohibited.

Reason: This proposal offers two paths to composting toilet system approval: either following NSF 41 (as currently provided for in Chapter 13), or with a system inspected and tested to requirements or standards that are as strict or stricter than NSF 41 (through this proposal's new provisions). Integration of the provisions of this proposal into the IPSDC will promote time-tested, safe practices by placing clear requirements for each system component directly into the code. Under the path added by this proposal, each system installation is verified for watertightness, mandated to have a 1-year treatment period to ensure pathogen destruction, tested for proper operation, and required to document and preserve operation and maintenance information. System features that NSF 41 leaves to individual manufacturers or jurisdictions, including venting, screening for insects and vermin, leachate management, and disposal of the outputs of compost processors away from human contact, are subject to clear and enforceable requirements under this proposal.

This proposal is intended to promote the growth of a domestic component supply industry for composting toilet systems that will enable the design of systems appropriate to the scale of the installation. Because NSF 41 treats composting toilet systems as manufactured products rather than systems assembled from a variety of components, the size of composting chambers is limited. For instance, the Bullitt Center in Seattle required multiple Phoenix composting chambers, and load balancing the various chambers created maintenance headaches that were pivotal to removal of the composting toilet system.[1] Under the requirements of this proposal, larger composting chambers could be assembled on-site and tested for watertightness and treatment efficacy, potentially simplifying system design and long-term maintenance. Such site-built composting chambers have become a common feature of large-scale projects in the Netherlands and elsewhere.[2]

Urine diversion can improve the function and reduce the labor and compost additives needed to control odor in a composting toilet system. The use of urine diversion with composting toilets was a core recommendation of the Bullitt Center team. Urine diversion is connected by this proposal's Section 1302.3.4.1 to the IPC and through a parallel Urine Diversion Systems proposal for the IPC. The language in this proposal is based on the Recode Model Code, which incorporates the latest best practices from around the globe. The Recode Model Code was created in 2015 through a consensus process with a national team of U.S. experts, and was incorporated into IAPMO'S 2017 Water Efficiency and Sanitation Standard (WE Stand), which was revised in 2020 and 2023. The latest Recode Model Code incorporates refinements from the WE Stand process and lessons learned by designers and installers in the interim.

Additionally, a change in the title of Chapter 13 is proposed from "Non-Liquid Saturated Treatment Systems" because that term is not standard in either the industry or its literature, and appears only in NSF 41. The proposed title "Composting Toilet Systems" emphasizes the entire system, rather than a single product, and is a common term used in industry literature and by NSF 41 tested manufacturers such as 'Sun Mar' and 'Advanced Composting Systems'.

(1) *The Bullitt Center Composting Toilet System A White Paper on Lessons Learned*, Bullit Foundation, Seattle, WA, 2021.

(2) Lansing, J. *Designing for Source Separation – the Key to a Regenerative Building*. Rich Earth Summit, Brattleboro, VT, 2023.

Bibliography: 1302.4.6 Treatment period.

One year is approximately twice as long as the survival time of *Ascaris* (Roundworm) eggs under active composting, per Table 6-2 of Biosolids Applied to Land. *Ascaris* are used as an indicator species for long-lived and hard-shelled pathogens.

National Research Council. 2002. *Biosolids Applied to Land*. Washington, DC: The National Academies Press. https://doi.org/10.17226/10426

1302.5.2 Humus.

Bacteriological testing requirements are per NSF 41.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

- **CT-equipment-cost.pdf**
  https://www.cdpaccess.com/proposal/10314/30802/documentation/147968/attachments/download/4627/

Justification for no cost impact:

Composting toilet systems tested to NSF 41 and those not tested to NSF 41 are comparably priced for similar feature sets and capacities. Under this proposal, systems not tested to NSF 41 will also require a fecal coliform test, which will add $30-60 to those systems; however, the equipment costs will remain comparable.

Composting toilet systems designed for full-time residential use by one to six users and with the most basic dry commode are available in sufficient variety to compare equipment prices of NSF 41 tested systems and those not tested to NSF 41. For NSF 41 tested systems meeting the above criteria, market prices range from $639 to $7700. Systems meeting the same criteria that are not tested to NSF 41 range in price from $1280 to $4745. Please see the attached table for equipment prices as of January 2024.

For engineered systems built on-site and meeting similar criteria, Nutrient Networks estimates system costs of $400 to $6000 before installation.

PSD1-24

PSD2-24

IPSDC: 1101.2, NSF Chapter 14 (New)

Proponents: Jeremy Brown, NSF International, NSF International (brown@nsf.org)

2024 International Private Sewage Disposal Code

Revise as follows:

1101.2 Residential wastewater treatment systems.
The regulations for materials, design, construction and performance shall comply with NSF 40 or IAPMO/ISO 30500. Where nitrogen reduction is required, the materials, design, construction and performance shall comply with NSF 245 or IAPMO/ISO 30500.

Add new standard(s) as follows:

NSF

NSF International
789 N. Dixboro Road
Ann Arbor, MI 48105

245-2023	Residential Wastewater Treatment Systems - Nitrogen Reduction

Staff Analysis: A review of the standard proposed for inclusion in the code, NSF 245-2023 *Residential Wastewater Treatment Systems - Nitrogen Reduction*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: Nitrogen reduction is required by some AHJ's when treating effluent water quality requirements. Excess nitrogen can cause surface water algae blooms. This code change does not require nitrogen reduction in all installations, but does provide requirements when nitrogen reduction is required. NSF/ANSI 245 is the American National Standard for Nitrogen reduction. There are at least 12 states that require NSF/ANSI 245 in there regulations. There are 179 systems and 17 manufacturers listed by NSF to NSF/ANSI 245. A copy of NSF/ANSI 245 may be obtained for free by emailing brown@nsf.org.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

First, this proposal does not require nitrogen reduction. Where authorities do require nitrogen reduction, it references the ISO and American National Standards. As the majority of products on the market already have certification, this code change is not expected to add additional cost.

PSD2-24

2024 GROUP A – PROPOSED CHANGES TO THE INTERNATIONAL RESIDENTIAL CODE – PLUMBING/ MECHANICAL

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TENTATIVE ORDER OF DISCUSSION
2024 PROPOSED CHANGES TO THE
INTERNATIONAL RESIDENTIAL CODE – MECHANICAL

The following is the tentative order in which the proposed changes to the code will be discussed at the public hearings. Proposed changes which impact the same subject have been grouped to permit consideration in consecutive changes.

Proposed change numbers that are indented are those which are being heard out of numerical order. Indentation does not necessarily indicate that one change is related to another. Proposed changes may be grouped for purposes of discussion at the hearing at the discretion of the chair. Note that some RM code change proposals may not be included on this list, as they are being heard by another committee.

- E1-24 Part V

RM1-24
RM2-24
RM3-24

- M54-24 Part II

RM4-24

- M59-24 Part II
- M57-24 Part II
- M38-24 Part II

RM5-24
RM6-24
RM7-24

- M47-24 Part II

RM8-24
RM9-24

- M52-24 Part II
- M44-24 Part II

RM10-24

- M60-24 Part III

RM1-24

IRC: M1305.1.2, M1305.1.2.2 (New)

Proponents: David Crawford Bixby, Air Conditioning Contractors of America (ACCA), ACCA (david.bixby@acca.org)

2024 International Residential Code

M1305.1.2 Appliances in attics.
Attics containing *appliances* shall be provided with an opening and a clear and unobstructed passageway large enough to allow removal of the largest *appliance*, but not less than 30 inches (762 mm) high and 22 inches (559 mm) wide and not more than 20 feet (6096 mm) long measured along the centerline of the passageway from the opening to the *appliance*. The passageway shall have continuous solid flooring in accordance with Chapter 5 not less than 24 inches (610 mm) wide. A level service space not less than 30 inches (762 mm) deep and 30 inches (762 mm) wide shall be present along all sides of the *appliance* where access is required. The clear access opening dimensions shall be not less than of 20 inches by 30 inches (508 mm by 762 mm), and large enough to allow removal of the largest *appliance*.

Exceptions:

1. The passageway and level service space are not required where the *appliance* can be serviced and removed through the required opening.
2. Where the passageway is unobstructed and not less than 6 feet (1829 mm) high and 22 inches (559 mm) wide for its entire length, the passageway shall be not more than 50 feet (15 250 mm) long.

Add new text as follows:

M1305.1.2.2 Permanent service access.. For new construction, a permanent means of access without the use of a portable ladder shall be provided in order to comply with M1305.1. Such means shall include the use of either pulldown stairs or other permanent steps acceptable to the code official.

Exception: Existing construction.

Reason: Section M1305.1.2 provides specifications for the size of the minimum clear and unobstructed opening and passageway to allow removal of the largest appliance. However, the need for a safe and secure energy efficient access is not specified and should be added for the safety of personnel and consumers. For consumers, replacement of HVAC filters is recommended maintenance and access to the attic should be as safe as possible. ACCA believes that there is an urgent need for new homes to be constructed to take care of future service, repair, replacement and overall general safety for all including the homeowner, contractors, insurance representatives, regular structural pest control inspections, especially first responders and anyone else who may need to access to this part of the home in the future. The exception limits the proposal to new construction only. ACCA is not suggesting that existing homes anywhere in the country change their access to a stair/ladder access when they change their heating and cooling equipment or any other items in their attics. The proposal is similar to an amendment to the Georgia building code that became effective January 1, 2020.

Cost Impact: Increase

Estimated Immediate Cost Impact:

The code change proposal **will increase** the cost of construction. It is estimated that attic stairs/ladders may add $250-$350 to a new home cost, but the savings in safety over time is significantly overcome and justified.

Estimated Immediate Cost Impact Justification (methodology and variables):

A range of costs was determined based on surveying available pull-down attic stairs that are widely available in the marketplace.

RM2-24

IRC: M1401.1, ASHRAE Chapter 44 (New)

Proponents: Emily Toto, ASHRAE, ASHRAE (etoto@ashrae.org)

2024 International Residential Code

Revise as follows:

M1401.1 Installation.
Heating and cooling *equipment* and *appliances* shall be installed in accordance with the manufacturer's instructions and the requirements of this code. Heating and cooling equipment using a refrigeration system shall also be installed in accordance with ASHRAE 15.2.

Add new standard(s) as follows:

ASHRAE

ASHRAE
180 Technology Parkway
Peachtree Corners, GA 30092

15.2-2022 Safety Standard for Refrigeration Systems in Residential Applications

Staff Analysis: A review of the standard proposed for inclusion in the code, ASHRAE 15.2-2022 *Safety Standard for Refrigeration Systems in Residential Application*s, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: This code change proposal adds the reference to ASHRAE 15.2, the installation standard for residential air conditioning. This code change closes the hole that was created in the Code when ASHRAE 15 split its scope between standards 15 and 15.2.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

These changes will have no impact on the cost of construction. The equipment design of residential systems is covered by the product design standard, UL 60335-2-40. Additionally, installation instructions will be found in the installation manuals provided by the Original Equipment Manufacturers (OEMs). However, the reference to ASHRAE 15.2 is necessary, as it is now the required application standard for residential systems serving a single dwelling or sleeping unit.

RM2-24

RM3-24

IRC: M1401.3

Proponents: David Crawford Bixby, Air Conditioning Contractors of America (ACCA), ACCA (david.bixby@acca.org)

2024 International Residential Code

Revise as follows:

M1401.3 Equipment and appliance sizing.
Heating and cooling *equipment* and *appliances* shall be sized in accordance with ACCA Manual S ~~or other *approved* sizing methodologies~~ based on building loads calculated in accordance with ACCA Manual J ~~or other *approved* heating and cooling calculation methodologies~~.

~~**Exception:** Heating and cooling *equipment* and *appliance* sizing shall not be limited to the capacities determined in accordance with ACCA Manual S where either of the following conditions applies:~~

1. ~~The specified *equipment* or *appliance* utilizes multistage technology or variable refrigerant flow technology and the loads calculated in accordance with the *approved* heating and cooling calculation methodology are within the range of the manufacturer's published capacities for that *equipment* or *appliance*.~~
2. ~~The specified *equipment* or *appliance* manufacturer's published capacities cannot satisfy both the total and sensible heat gains calculated in accordance with the *approved* heating and cooling calculation methodology and the next larger standard size unit is specified.~~

Reason: The existing exceptions are no longer needed because the Normative Sections of the new edition of ACCA Manual S - 2023, *Residential Equipment Selection*, now address sizing equipment having multi-stage and VRF technologies. In addition, Manual S now requires the equipment OEM performance data to be used to calculate the capacities required to satisfy the total, latent, and sensible loads. The 2023 edition of ACCA Manual S is approved by ANSI and its updated reference appears in the 2024 edition of the IRC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

No cost impacts since ACCA Manuals J and S are ANSI standards and are widely used by the industry.

RM3-24

RM4-24

IRC: M1411.1

Proponents: Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C., Daikin U.S. (jbengineer@aol.com)

2024 International Residential Code

Revise as follows:

M1411.1 Approved refrigerants.
Refrigerants used in direct refrigerating systems shall conform to the applicable provisions of ANSI/ASHRAE 34. Refrigerants shall comply with the U.S. EPA regulations for low global warming potential.

Reason: A new Federal requirement will stipulate that residential refrigeration systems must use a low global warming potential of 700 or less after January 1, 2025. This change will add the requirement to the code for any new systems. US EPA will allow existing systems using a higher global warming potential refrigerant to be repaired, hence, the change only identifies new systems.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This code change is informative in identifying Federal requirements for the use of refrigerants. U.S. EPA regulates the use of refrigerants under the SNAP regulations. Hence, there is no impact on the cost of construction.

RM4-24

RM5-24

IRC: SECTION 202, M1413.1, CHAPTER 15, SECTION M1502, M1502.3, SECTION M1504, M1504.3, M1602.1

Proponents: Mike Moore, Stator LLC, Broan-NuTone (mmoore@statorllc.com)

2024 International Residential Code

[MP] LIVING SPACE. Space within a *dwelling unit* utilized for living, sleeping, eating, cooking, bathing, washing and sanitation purposes. For the definition applicable in Chapter 11, see Section N1101.6. For the definition applicable in Chapter 24, see Section G2403.

Revise as follows:

M1413.1 General.
Evaporative cooling *equipment* and *appliances* shall comply with UL 1995 or UL/CSA 60335-2-40, and shall be installed:

1. In accordance with the manufacturer's instructions.
2. On level platforms in accordance with Section M1305.1.3.1.
3. So that openings in exterior walls are flashed in accordance with Section R703.4.
4. So as to protect the potable water supply in accordance with Section P2902.
5. So that outdoor air intake opening locations are in accordance with Section R325.4.1.

CHAPTER 15 EXHAUST AND VENTILATION SYSTEMS

SECTION M1502
CLOTHES DRYER EXHAUST

Revise as follows:

M1502.3 Duct termination.
Exhaust ducts shall terminate on the outside of the *building*. Exhaust duct terminations shall be in accordance with the dryer manufacturer's installation instructions. If the manufacturer's instructions do not specify a termination location, the exhaust duct shall terminate not less than 3 feet (914 mm) in any direction from openings into *buildings*, including openings in ventilated soffits. Exhaust duct terminations shall be equipped with a backdraft damper. Screens shall not be installed at the duct termination. Exhaust air shall not be directed onto walkways.

SECTION M1504
VENTILATION SUPPLY DUCTS, LIVING SPACE EXHAUST DUCTS~~,~~ AND LIVING SPACE EXHAUST TERMINATIONS ~~OPENINGS~~

M1504.3 Location of ~~E~~exhaust terminations serving living spaces~~openings~~.
Exhaust air shall not be directed onto walkways. ~~Air exhaust openings shall terminate~~ Exhaust terminations serving dwelling-unit toilet rooms, bathrooms, kitchens, and other dwelling unit living spaces shall be located as follows:

1. Not less than 3 feet (914 mm) from property lines.
2. Not less than 3 feet (914 mm) from gravity outdoor air intake openings, operable windows and doors except where the exhaust opening is located not less than 1 foot (305 mm) above the gravity air intake opening, operable windows and doors.

3. Not less than 10 feet (3048 mm) from mechanical <u>outdoor</u> air intake openings except where either of the following apply:
   3.1. The exhaust <u>termination</u>~~opening~~ is located not less than 3 feet (914 mm) above the air intake opening.
   3.2. The exhaust <u>termination</u>~~opening~~ is part of a factory-built intake/exhaust combination termination fitting installed in accordance with the fan manufacturer's instructions, and the exhaust air is drawn from a *living space*.
4. ~~In accordance with Sections R303.5.2 and R303.6.~~

<u>M1505.4 Exhaust termination protection.</u> <u>Exhaust terminations</u> serving dwelling-unit toilet rooms, bathrooms, kitchens, and other dwelling unit living spaces <u>shall be protected with corrosion-resistant screens, louvers, or grilles having an opening size of not less than 1/4 inch (6 mm) and a maximum opening size of 1/2 inch (13 mm), in any dimension. Exhaust terminations shall be protected against local weather conditions.</u>

M1602.1 Outdoor air <u>intake</u> openings.
Outdoor <u>air</u> intake openings shall be located in accordance with Section R~~325.4.1~~<u>303.5.1</u>. Opening protection shall be in accordance with Section R~~325.5~~<u>303.6</u>.

Reason: In the 2009/2010 cycle, Section M1504.3 was formed through proposal RM12-09/10 based on the rationale that outdoor air intake openings should be addressed in Chapter 3 and that exhaust terminations should be addressed elsewhere. After multiple cycles, the language has become muddled, and modifications are needed to clarify the intent. This proposal does the following:

1. Uses the term "outdoor air intake opening" where referenced in Chapters 14, 15, and 16, consistent with the language in R303.5.1.

2. Uses consistent terminology when referring to "exhaust terminations," "clothes dryer exhaust duct terminations," and "vent and chimney terminations."

3. Moves the R303.5.2 prohibition for directing exhaust onto walkways to Sections M1504.3 and M1502.3, which address exhaust termination locations for exhaust air from living spaces and exhaust air from clothes dryers, respectively. Note that Table G2427.8 (503.8) already prohibits appliance vent terminations from being located above public walkways.

4. Moves the R303.6 requirements for exhaust termination protection to Section M1504.4, as this only applies to exhaust terminations that serve dwelling-unit toilet rooms, bathrooms, kitchens, and other dwelling-unit living spaces.

5. Modifies the titles for various sections to align with the material contained in those sections.

To coordinate these modifications with Sections R303.5 and R303.6 of the IRC, a companion proposal is planned for the Group B hearings.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is a clarification of existing requirements.

RM5-24

RM6-24

IRC: M1505.4.1

Proponents: Diana Burk, Energy Solutions, Energy Solutions (dburk@energy-solution.com)

2024 International Residential Code

Revise as follows:

M1505.4.1 System design.
The whole-house ventilation system shall comply with one of the following:

1. In Climate Zones 0 through 5, the whole-house ventilation system shall consist of one or more supply or exhaust fans, or a combination of such, and associated ducts and controls. *Local exhaust* or supply fans are permitted to serve as such a system. Outdoor air ducts connected to the return side of an air handler shall be considered as providing supply *ventilation*.
2. In Climate Zones 6, 7 and 8, the whole-house ventilation system shall be a *balanced ventilation system* in compliance with Section N1103.6.

Reason: This proposal is intended to align the ventilation requirements in Section 1505.4 with the ventilation requirements in Section N1103.6. Public draft #2 of the 2024 IECC requires the use of an energy recovery ventilator or heat recovery ventilator in Climate Zones 6 through 8 which are both balanced ventilation systems.

Section 1505.4 of the 2024 IRC explicitly allows the use of supply-only, exhaust-only or balanced ventilation systems. This proposal is intended to clarify that supply-only and exhaust-only ventilation systems are only allowed in Climate Zones 0 through 5 and balanced ventilation systems are required in Climate Zones 6, 7, and 8.

Bibliography: THE INTERNATIONAL RESIDENTAIL CODE-CHAPTER 11 ENERGY EFFICIENCY PUBLIC COMMENT DRAFT #2
https://www.iccsafe.org/wp-content/uploads/PCD2-IRC-CHAP-11.pdf

REPI-93-21 https://energy.cdpaccess.com/proposal/443/1236/preview/

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

There are no increased costs for this proposal, as it is simply a coordination proposal. Increased costs due to the ERV/HRV requirements have been addressed as part of the development process of the IECC-R.

RM6-24

RM7-24

IRC: M1601.1.1

Proponents: Jeanne Rice, NYS DOS, NYS DOS (jeanne.rice@dos.ny.gov); Chad Sievers, NYS, NYS DOS (chad.sievers@dos.ny.gov); Kevin Duerr-Clark, NYS DOS, NYS DOS (kevin.duerr-clark@dos.ny.gov); China Clarke, New York State Dept of State, Manager Technical Support Unit (china.clarke@dos.ny.gov)

2024 International Residential Code

Revise as follows:

M1601.1.1 Above-ground duct systems.
Above-ground *duct systems*shall conform to the following:

1. *Equipment*connected to *duct systems* shall be designed to limit discharge air temperature to not greater than 250°F (121°C).
2. Factory-made ducts shall be *listed* and *labeled* in accordance with UL 181 and installed in accordance with the manufacturer's instructions.
3. Fibrous glass duct construction shall conform to the *SMACNA Fibrous Glass Duct Construction Standards or NAIMA Fibrous Glass Duct Construction Standards .*
4. Field-fabricated and shop-fabricated metal and flexible duct constructions shall conform to the *SMACNA HVAC Duct Construction Standards—Metal and Flexible* except as allowed by Table M1601.1.1. Galvanized steel shall conform to ASTM A653.
5. The use of gypsum products to construct return air ducts or plenums is permitted, provided that the air temperature does not exceed 125°F (52°C) and exposed surfaces are not subject to condensation.
6. *Duct systems* shall be constructed of materials having a *flame spread index* of not greater than 200.
7. ~~Stud wall cavities and the spaces between solid floor joists to be used as air plenums shall comply with the following conditions:~~ <u>*Building* framing cavities shall not be used as ducts or plenums.</u>
   ~~7.1. These cavities or spaces shall not be used as a plenum for supply air.~~
   ~~7.2. These cavities or spaces shall not be part of a required fire-resistance-rated assembly.~~
   ~~7.3. Stud wall cavities shall not convey air from more than one floor level.~~
   ~~7.4. Stud wall cavities and joist-space plenums shall be isolated from adjacent concealed spaces by tight-fitting *fireblocking* in accordance with Section R302.11. *Fireblocking* materials used for isolation shall comply with Section R302.11.1.~~
   ~~7.5. Stud wall cavities in the outside walls of building envelope assemblies shall not be utilized as air plenums.~~
   ~~7.6. Building cavities used as plenums shall be sealed.~~
8. Volume dampers, equipment and other means of supply, return and exhaust air adjustment used in system balancing shall be provided with access.

Reason: Section N1103.3.7 (R403.3.7 in the IECCC) states that *building* framing cavities shall not be used as ducts or plenums. However, section M1601.1.1 provides provisions for using joist framing cavities as return air plenums, which contradicts section N1103.3.7. This change would align M1601.1.1 with N1103.3.7, prohibiting the use of framing cavities as plenums.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Sections M1601.1.1 and N1103.3.7 are contradictory on the subject of joist cavities used as return air plenums. Section 102.1 states that, in the event of such a conflict, the more restrictive provision shall apply. In this case, section 1103.3.7 is the more restrictive provision, and as such, is the provision which should govern. This proposed change merely clarifies section M1601.1.1 so that there is no confusion for users who may or may not notice the contradiction.

RM8-24

IRC: M1601.1.1

Proponents: Austin Rivera, Centrotherm Exo Systems, Centrotherm Exo Systems

2024 International Residential Code

Revise as follows:

M1601.1.1 Above-ground duct systems.
Above-ground *duct systems* shall conform to the following:

1. *Equipment* connected to *duct systems* shall be designed to limit discharge air temperature to not greater than 250°F (121°C).
2. Factory-made ducts shall be *listed* and *labeled* in accordance with UL 181 and installed in accordance with the manufacturer's instructions.
3. Fibrous glass duct construction shall conform to the *SMACNA Fibrous Glass Duct Construction Standards or NAIMA Fibrous Glass Duct Construction Standards .*
4. Field-fabricated and shop-fabricated metal and flexible duct constructions shall conform to the *SMACNA HVAC Duct Construction Standards—Metal and Flexible* except as allowed by Table M1601.1.1. Galvanized steel shall conform to ASTM A653.
5. The use of gypsum products to construct return air ducts or plenums is permitted, provided that the air temperature does not exceed 125°F (52°C) and exposed surfaces are not subject to condensation.
6. *Duct systems* shall be constructed of materials having a *flame spread index* of not greater than 200.
7. Stud wall cavities and the spaces between solid floor joists to be used as air plenums shall comply with the following conditions:
   7.1. These cavities or spaces shall not be used as a plenum for supply air.
   7.2. These cavities or spaces shall not be part of a required fire-resistance-rated assembly.
   7.3. Stud wall cavities shall not convey air from more than one floor level.
   7.4. Stud wall cavities and joist-space plenums shall be isolated from adjacent concealed spaces by tight-fitting *fireblocking* in accordance with Section R302.11. *Fireblocking* materials used for isolation shall comply with Section R302.11.1.
   7.5. Stud wall cavities in the outside walls of building envelope assemblies shall not be utilized as air plenums.
   7.6. Building cavities used as plenums shall be sealed.
8. Volume dampers, equipment and other means of supply, return and exhaust air adjustment used in system balancing shall be provided with access.
9. Factory-made ducts that are constructed of *combustible materials*, that are part of a duct system carrying only *ventilation air* and that are contained entirely within a *dwelling unit*, shall not be required to comply with items 2. and 6.

Reason: The proposed addition (Sentence 9) to this proposal aims to permit the use of combustible ducts in residential construction for mechanical ventilation systems, aligning with the National Canadian Building Code's verbatim wording. The specific allowance for combustible ducts is confined to ventilation air and is mandated to be fully contained within a single dwelling. These limitations serve to prevent the penetration of rated fire walls by the ducts and their connection to heating systems. Such constraints introduce an additional layer of safety to the system, aligning with the original code's intent under the newly specified circumstances.

Furthermore, this proposal points out that NFPA 90B concurs with the mentioned restrictions, as evidenced by the citations from the National Canadian Building Code and NFPA in the bibliography.

As ASHRAE 62.1/2 advocates for more rigorous ventilation standards, the standard practice is shifting towards fully dedicated mechanical ventilation systems, independent of heating/cooling systems. However, adhering to UL181 standards for all materials in constructing these dedicated systems may render the process economically impractical. Therefore, permitting the use of combustible duct materials for dedicated ventilation systems could substantially reduce construction costs for both contractors and homeowners. In addition to reduction of direct construction costs, the air tightness of fully sealed plastic ventilation systems increases appliance efficiency leading to decreased cost of ownership over the life of the system. It is infeasible to fully seal traditional tin ducts.

Given the multitude of benefits, the minimal associated risks that are effectively mitigated, and the longstanding integration of similar language in other codes and standards, it is recommended that these proposed changes be incorporated into the International Residential Code (IRC). This adjustment would not only enhance cost-effectiveness in construction but also align with evolving industry practices and standards.

Bibliography:

1. National Canadian Building Code, Volume I - 3.6.5.1, Sentence 3
2. National Canadian Building Code, Volume II - 9.33.6.2, Sentence 5
3. NFPA 90B, Section 4.1.1.1.2
4. Leprince, V., Lightfoot, M., & de Jong, J. (n.d.). *Impact of ductwork leakage on the fan energy use and sound production of central mechanical ventilation units in houses*.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

The estimated saving would be approximately $2,000-3,000 per installation.

Estimated Immediate Cost Impact Justification (methodology and variables):

The cost savings were calculated by designing 2 mechanical ventilation systems, one using combustible plastic duct (Centrotherm Air Excellent system) and the other using traditional tin duct and materials. The two systems were identical (dimensions, flow rates, etc) except for the material used.

Estimated Life Cycle Cost Impact:

The air tightness of fully sealed plastic ventilation systems increases appliance efficiency leading to decreased cost of ownership over the life of the system.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

Leprince, V., Lightfoot, M., & de Jong, J. (n.d.). *Impact of ductwork leakage on the fan energy use and sound production of central mechanical ventilation units in houses*.

RM8-24

RM9-24

IRC: M1601.1.1, ACCA Chapter 44 (New)

Proponents: David Crawford Bixby, Air Conditioning Contractors of America (ACCA), ACCA (david.bixby@acca.org)

2024 International Residential Code

Revise as follows:

M1601.1.1 Above-ground duct systems.
Above-ground *duct systems*shall conform to the following:

1. *Equipment*connected to *duct systems* shall be designed to limit discharge air temperature to not greater than 250°F (121°C).
2. Factory-made ducts shall be *listed* and *labeled* in accordance with UL 181 and installed in accordance with the manufacturer's instructions.
3. Fibrous glass duct construction shall conform to the *SMACNA Fibrous Glass Duct Construction Standards or NAIMA Fibrous Glass Duct Construction Standards .*
4. Field-fabricated and shop-fabricated metal and flexible duct constructions shall conform to the *SMACNA HVAC Duct Construction Standards—Metal and Flexible* except as allowed by Table M1601.1.1. Galvanized steel shall conform to ASTM A653.
5. The use of gypsum products to construct return air ducts or plenums is permitted, provided that the air temperature does not exceed 125°F (52°C) and exposed surfaces are not subject to condensation.
6. *Duct systems* shall be constructed of materials having a *flame spread index* of not greater than 200.
7. Stud wall cavities and the spaces between solid floor joists to be used as air plenums shall comply with the following conditions:
   7.1. These cavities or spaces shall not be used as a plenum for supply air.
   7.2. These cavities or spaces shall not be part of a required fire-resistance-rated assembly.
   7.3. Stud wall cavities shall not convey air from more than one floor level.
   7.4. Stud wall cavities and joist-space plenums shall be isolated from adjacent concealed spaces by tight-fitting *fireblocking* in accordance with Section R302.11. *Fireblocking* materials used for isolation shall comply with Section R302.11.1.
   7.5. Stud wall cavities in the outside walls of building envelope assemblies shall not be utilized as air plenums.
   7.6. Building cavities used as plenums shall be sealed.
8. Volume dampers, equipment and other means of supply, return and exhaust air adjustment used in system balancing shall be provided with access.
9. Zoned duct systems shall be designed and installed in accordance with ACCA Manual Zr and the manufacturer's instructions or by other approved methods.

Add new standard(s) as follows:

ACCA

Air Conditioning Contractors of America
1330 Braddock Place, Suite 350
Alexandria, VA 22314

ANSI/ACCA 11 Manual Zr-2018 Residential Zoning Systems

Staff Analysis: New Standard

Reason: Although M1601.1 *Duct design* references ACCA *Manual D* for duct design, currently there is no coverage in the residential code to address the design of zoned duct systems, such as what to do with bypass air when one or more dampers are closed. ACCA Manual Zr provides procedures for designing zoned comfort systems for single family detached homes, duplex and triplex homes, row houses, town houses, and large multi-family structures that are compatible with ACCA Manual J procedures for residential load calculations. In addition, use of Manual Zr will avoid the potential for an improperly designed zoned duct system to adversely impact the safe operation and durability of the heating/cooling equipment. For code officials, Manual Zr has three Normative sections written in code language to determine clear compliance. Manual Zr is also a consensus-based ANSI standard. A separate proposal shown below is to add ANSI/ACCA 11 Manual Zr - 2018 as an IRC referenced standard under Chapter 44. A copy of the standard has been submitted to ICC staff for committee review due to the file size.

Bibliography: ANSI/ACCA 11 Manual Zr - 2018, *Residential Zoning Systems*

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The use of ANSI/ACCA Manual Zr - 2018 is current industry practice, and the standard is based on zone damper OEM's installation instructions.

RM9-24

RM10-24

IRC: M1905 (New), M1905.1 (New), M1905.2 (New), UL Chapter 44 (New)

Proponents: Jonathan Roberts, UL Solutions, UL Solutions (jonathan.roberts@ul.com)

2024 International Residential Code

Add new text as follows:

M1905
CLOTHES DRYERS

M1905.1 General. Electric residential clothes dryers, including heat pump and condensing-type dryers, shall be *listed* and *labeled* in accordance with UL 2158, and installed in accordance with the manufacturer's instructions.

M1905.2 Exhaust required. Clothes dryers shall be exhausted in accordance with Section M1502.

Add new standard(s) as follows:

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062

2158-21	Electric Clothes Dryers

Staff Analysis: The proposed standard is in the current edition of the IMC.

Reason: Requirements for clothes dryers need to be included in the IRC. This is necessary to align with the exhaust system requirements in Section 1502, which provides exceptions for certain types of listed and labeled clothes dryers. This does not require the clothes dryers to be installed when the building is constructed. This is in the same format of what is currently in Section 913 of the IMC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Listing of electrical appliances is already required by IRC M3404.3. This proposal clarifies the listing standard. It also provides pointers to existing code for exhaust requirements. The existing requirements in M1502 already reference these listings.

RM10-24

2024 GROUP A – PROPOSED CHANGES TO THE INTERNATIONAL RESIDENTIAL CODE – PLUMBING/ MECHANICAL

PLUMBING/MECHANICAL CODE COMMITTEE

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Lead Mechanical Inspector
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TENTATIVE ORDER OF DISCUSSION
2024 PROPOSED CHANGES TO THE
INTERNATIONAL RESIDENTIAL CODE – PLUMBING

The following is the tentative order in which the proposed changes to the code will be discussed at the public hearings. Proposed changes which impact the same subject have been grouped to permit consideration in consecutive changes.

Proposed change numbers that are indented are those which are being heard out of numerical order. Indentation does not necessarily indicate that one change is related to another. Proposed changes may be grouped for purposes of discussion at the hearing at the discretion of the chair. Note that some RP code change proposals may not be included on this list, as they are being heard by another committee.

RP1-24
    E1-24 Part V
P12-24 Part II
P13-24 Part II
P4-24 Part II
P42-24 Part II
P47-24 Part II
P61-24 Part II
P62-24 Part II
P58-24 Part II
P54-24 Part II
P52-24 Part II
P53-24 Part II
P84-24 Part II
P86-24 Part II
P70-24 Part II
    RP2-24
P72-24 Part II
P73-24 Part II
    RP3-24
RP4-24
    P81-24 Part II
RP5-24
RP6-24
RP7-24
RP8-24
RP9-24
RP10-24
RP11-24
RP12-24
P78-24 Part II
P99-24 Part II
P96-24 Part II
P100-24 Part II
P101-24 Part II
P104-24 Part II
P117-24 Part II
    RP13-24
P125-24 Part II
P137-24 Part II
P138-24 Part II
P139-24 Part II
P140-24 Part II
P157-24 Part II
P160-24 Part II
P162-24 Part II
    G1-24 Part III

RP1-24

IRC: P2904.1.1

Proponents: Jeffrey M Hugo, CBO, NFSA, National Fire Sprinkler Association (hugo@nfsa.org)

2024 International Residential Code

Revise as follows:

P2904.1.1 Required sprinkler locations.
Sprinklers shall be installed to protect all areas of a *dwelling unit*.

Exceptions:

1. *Attics*, *crawl spaces* and normally unoccupied concealed spaces that do not contain fuel-fired *appliances* do not require sprinklers. In *attics*, *crawl spaces* and normally unoccupied concealed spaces that contain fuel-fired appliances ~~equipment, a~~ one quick response intermediate temperature sprinkler shall be installed above the appliance ~~equipment~~; however, additional sprinklers shall not be required in the remainder of the space.
2. Clothes *closets*, linen *closets* and pantries not exceeding 24 square feet (2.2 m^2) in area~~, with the smallest dimension not greater than 3 feet (915 mm) and~~ having wall and ceiling surfaces of *gypsum board*.
3. Bathrooms not more than 55 square feet (5.1 m^2) in area.
4. Garages; carports; exterior porches; unheated entry areas, such as mud rooms, that are adjacent to an exterior door; and similar areas.

Reason: This proposal for the residential sprinkler criteria in the IRC, Section P2904, correlates with the 2022 edition of NFPA 13D. While both documents are considered equivalent, having the correlation benefits designers and code officials using the IRC alone.

As currently written, this section uses the defined terms “equipment” and “appliance.” This change uses the term “appliance” and replaces any reference to “equipment.” NFPA 13D allows one quick response sprinkler installed to protect the area where the fuel fired appliance is and allows the remainder of the space to remain unprotected. Removing the smallest dimension in the closet correlates to NFPA 13D. Small closets, up to 24 sq ft are exempt from sprinklers.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

Source: Actual estimates

Residential pendent sprinklers cost ranges from approximately $18-$40 apiece

Quick response pendent sprinklers cost ranges from approximately $13-$20 apiece

Estimated Immediate Cost Impact Justification (methodology and variables):

Analogous methodology using actual current material costs to create a range of cost. This proposal decreases the cost of construction by offering a quick response sprinkler in lieu of a residential sprinkler with similar characteristics, such as activation time. Residential sprinklers do cost more because they are listed for the residential fire load. Quick response sprinklers cost less and can control the residential fire load near the fuel fired appliance.

RP1-24

RP2-24

IRC: P2904.2.4.2

Proponents: Jeffrey M Hugo, CBO, NFSA, National Fire Sprinkler Association (hugo@nfsa.org)

2024 International Residential Code

Revise as follows:

P2904.2.4.2 Obstructions to coverage.
Sprinkler discharge shall not be blocked by obstructions unless additional sprinklers are installed to protect the obstructed area. Additional sprinklers shall not be required where the sprinkler separation from obstructions complies with either the minimum distance indicated in Figure P2904.2.4.2 or the minimum distances specified in the sprinkler manufacturer's instructions where the manufacturer's instructions permit a lesser distance. Additional sprinklers shall not be required where obstructions caused by architectural features produce not more than an aggregate of 15 square feet (1.4 m 2) of dry floor area per sprinkler.

Reason: This proposal for the residential sprinkler criteria in the IRC, P2904 correlates with the 2022 edition of NFPA 13D. While both documents are considered equivalent, having the correlation benefits designers and code officials using the IRC.

NFPA 13D permits shadow areas per sprinkler, in Section 8.2.5.7, "Shadow areas shall be permitted in the protection area of a sprinkler as long as the cumulative dry areas do not exceed 15 ft2 (1.4 m 2) per sprinkler." This concept is permitted to address when certain architectural features can impact the sprinkler spray pattern. This change to the IRC does not supersede the obstruction rules. Sprinklers have to meet the obstruction rules first, then allow for the shadowed areas.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

Source: Actual estimates

Residential pendent sprinklers cost ranges from approximately $18-$40 apiece

Estimated Immediate Cost Impact Justification (methodology and variables):

Analogous methodology using actual current material cost estimates to create a range of cost. This proposal lowers construction costs by a potential reduction to the number of sprinkler(s) in a compartment.

RP2-24

RP3-24

IRC: P3103.1.2, P3103.1.4

Proponents: Jeanne Rice, NYS DOS, NYS DOS (jeanne.rice@dos.ny.gov); Chad Sievers, NYS, NYS DOS (chad.sievers@dos.ny.gov); Kevin Duerr-Clark, NYS DOS, NYS DOS (kevin.duerr-clark@dos.ny.gov); China Clarke, New York State Dept of State, Manager Technical Support Unit (china.clarke@dos.ny.gov)

2024 International Residential Code

Revise as follows:

P3103.1.2 Roof used for recreational or assembly purposes.
~~Where a roof is to be used for assembly, as a promenade, observation deck or sunbathing deck, or for similar purposes, open vent pipes shall terminate not less than 7 feet (2134 mm) above the roof.~~ Where a roof is to be used as a promenade, restaurant, bar, or sunbathing deck, as an observation deck, or for similar purposes, open vent pipes shall terminate not less than 7 feet (2134 mm) above the roof.

P3103.1.4 Sidewall vent terminal. Vent terminals extending through the wall shall terminate not less than 10 feet (3048 mm) from ~~a~~ the *lot line* and ~~not less than~~ 10 feet (3048 mm) above the highest adjacent grade ~~elevation~~ within 10 feet (3048 mm) ~~in any direction~~ horizontally of the vent terminal. V~~ent pipes shall not terminate under the overhang of a structure where the overhang includes soffit vents. Such vent terminals shall be protected by a method that prevents birds and rodents from entering or blocking the vent pipe opening and that does not reduce the open area of the vent pipe.~~
Vent terminals shall not terminate under the overhang of a structure with soffit vents. Sidewall vent terminals shall be protected to prevent birds and rodents from entering or blocking the vent opening.

Reason: The language in sections 3103.1.2 and 3103.1.4 (IRC) do not match sections 903.1.2 and 903.1.4 of the IPC. This proposed change edits the IRC provisions to match the ones found in the IPC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposed change merely edits the provision language to match the IPC. The code requirements are not changed, merely edited into a more clear format.

RP3-24

RP4-24

IRC: P2903.4, P2903.4.1, P2903.4.2

Proponents: Dennis Hart, Fairfax County, Virginia, Virginia Plumbing and Mechanical Inspectors Association (VPMIA) and Virginia Building and Code Officials Association (VBCOA) (dennis.hart@fairfaxcounty.gov)

2024 International Residential Code

Revise as follows:

P2903.4 Thermal expansion control.
~~A means for controlling increased pressure caused by thermal expansion shall be installed where required in accordance with Sections P2903.4.1 and P2903.4.2~~Where a storage water heater is supplied with cold water that passes through a check valve, pressure reducing valve or backflow preventer, a thermal expansion control device shall be connected to the water heater cold water supply pipe at a point that is downstream of all check valves, pressure reducing valves and backflow preventers. Thermal expansion tanks shall be sized in accordance with the tank manufacturer's instructions and shall be sized such that the pressure in the water distribution system shall not exceed that required by Section P2903.3.2.

Delete without substitution:

~~**P2903.4.1 Pressure-reducing valve.** For water service system sizes up to and including 2 inches (51 mm), a device for controlling pressure shall be installed where, because of thermal expansion, the pressure on the downstream side of a pressure-reducing valve exceeds the pressure-reducing valve setting.~~

~~**P2903.4.2 Backflow prevention device or check valve.** Where a backflow prevention device, check valve or other device is installed on a water supply system using storage water heating equipment such that thermal expansion causes an increase in pressure, a device for controlling pressure shall be installed.~~

Reason: This proposal brings in line language from the IPC to the IRC for thermal expansion controls. Thermal expansion in water piping does not know the difference between whether the piping is located in a commercial building or a one- or two-family dwelling, and there is no logical reason that the language should be different when requirements are the same. This proposal also clears up any confusion on whether thermal expansion controls are required on a non-storage type water heater. This change does not change current code requirements and brings language forward from the IPC to the IRC for correlation.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

There are already requirements for thermal expansion controls in the code. This clarification does not add conditions that would require additional thermal expansion controls.

RP4-24

RP5-24

IRC: P2903.4

Proponents: Dennis Hart, Fairfax County, Virginia, Virginia Plumbing and Mechanical Inspectors Association (VPMIA) and Virginia Building and Code Officials Association (VBCOA) (dennis.hart@fairfaxcounty.gov)

2024 International Residential Code

Revise as follows:

P2903.4 Thermal expansion control.
<u>Where a storage water heater is supplied,</u> a means for controlling increased pressure caused by thermal expansion shall be installed where required in accordance with Sections P2903.4.1 and P2903.4.2.

Reason: This proposal clarifies that thermal expansion controls are not required on a non-storage type tank water heater. Tankless water heater manufacturers typically do not require thermal expansion controls unless installed in conjunction with a storage tank. If a tankless water heater manufacturer requires thermal expansion controls per the manufacturer's installation instructions, then the requirement to install thermal expansion controls will apply per R102.4.1.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

There are already requirements for thermal expansion controls in the code. This clarification does not add conditions that would require additional thermal expansion controls.

RP5-24

RP6-24

IRC: P2904.1

Proponents: Dennis Hart, Fairfax County, Virginia, Virginia Plumbing and Mechanical Inspectors Association (VPMIA) and Virginia Building and Code Officials Association (VBCOA) (dennis.hart@fairfaxcounty.gov)

2024 International Residential Code

Revise as follows:

P2904.1 General.
The design and installation of automatic sprinkler systems shall be in accordance with NFPA 13D or Section P2904, which shall be considered to be equivalent to NFPA 13D. Partial automatic sprinkler systems shall be permitted to be installed only in buildings not required to be equipped with an automatic sprinkler system. Section P2904 shall apply to stand-alone and multipurpose wet-pipe sprinkler systems that do not include the use of antifreeze. A multipurpose automatic sprinkler system shall provide domestic water to both fire sprinklers and plumbing fixtures. A stand-alone automatic sprinkler system shall be separate and independent from the water distribution system and shall comply with P2902.5.4. A backflow preventer shall not be required to separate an automatic sprinkler system from the water distribution system, provided that the sprinkler system complies with all of the following:

1. The system complies with NFPA 13D for a multipurpose piping sprinkler system, a passive purge sprinkler system or Section P2904.
2. The piping material complies with Section P2906.
3. The system does not contain antifreeze.
4. The system does not have a fire department connection.

Reason: NFPA 13D has several design options for a residential sprinkler system. There are multipurpose systems, passive purge systems and standalone systems. When a standalone sprinkler system is installed, it is required to be separate and independent from the water distribution system. This is achieved by having a branch off the water distribution piping after it enters the dwelling that only serves the NFPA 13D standalone sprinkler system. The other branch on the water distribution system will serve as the potable water for the dwelling. Backflow protection on these NFPA 13D standalone systems is necessary because of concerns with life safety. Stagnation can occur in the piping of a standalone sprinkler system, which leads to an increased risk of bacterial growth, mold growth and leaching of metals. Multipurpose sprinkler systems and passive purge sprinkler systems allow the flow through of water; therefore, the issue of stagnation is not present. This proposal ensures that backflow is required to be installed on these systems if installed, ensuring a backflow event will not occur.

Cost Impact: Increase

Estimated Immediate Cost Impact:

$0 to $800

Estimated Immediate Cost Impact Justification (methodology and variables):

This code change proposal would increase the cost of construction when the designer chooses to install an NFPA 13D standalone system. If the designer chooses to install either a multipurpose or a passive purge NFPA 13D sprinkler system, or comply with Section 2904, then there would be no added costs.
a standalone 13D sprinkler system, in order for a backflow event to be prevented, backflow protection is necessary. Additional costs would be for the purchase and installation of the backflow preventer, and the cost of the annual inspections/maintenance of the testable device.

Costs for an ASSE 1015, Double Check Valve Assembly is listed at $469 (see the link below). Including labor, the overall initial cost for installation would be approximately $800.

Double Check Valve Assembly | Gateway Supply Co., Inc

RP7-24

IRC: TABLE P2903.2

Proponents: Diana Burk, Energy Solutions, Energy Solutions (dburk@energy-solution.com)

2024 International Residential Code

Revise as follows:

TABLE P2903.2 MAXIMUM FLOW RATES AND CONSUMPTION FOR PLUMBING FIXTURES AND FIXTURE FITTINGS [b]

PLUMBING FIXTURE OR FIXTURE FITTING	MAXIMUM FLOW RATE OR QUANTITY
Lavatory faucet	2.2 gpm at 60 psi
Shower head [a]	~~2.5~~2.0 gpm at 80 psi
Sink faucet	2.2 gpm at 60 psi
Water closet	1.6 gallons per flushing cycle

For SI: 1 gallon per minute = 3.785 L/m, 1 pound per square inch = 6.895 kPa.

a. A hand-held shower spray shall be considered to be a shower head. Where a shower compartment is served by multiple shower heads, the concurrent discharge of all shower heads controlled by a single valve shall not exceed the maximum flow rate.

b. Consumption tolerances shall be determined from referenced standards.

Reason: This proposal requires a maximum flow-rate of 2.0 gpm at 80 psi standard for showerheads in residential homes. This requirement is consistent with a similar requirement in the 2024 International Plumbing Code. More stringent standards have been adopted in multiple states including Maine, Hawaii, Washington, Oregon, New York and California. There is wide technological availability and very cost-effective water and energy savings for hot water usage. There is wide technological availability—of the 17,275 showerheads listed in DOE's Compliance Certification Database, 14,146 or 82% meet the 2.0 gpm standard. Plumbing systems in older buildings are not expected to be negatively impacted as the standards allow for only 20% less water to flow (for a 5 minute shower, that would mean 8 gallons of water with a compliant showerhead versus 10 gallons of water for a non-compliant showerhead). For a typical single family home which has roughly 2.2 showerheads, this proposal would save approximately 5,100 gallons of water per year and result in $1,170 in utility cost savings over the 10 year life of the fixture. While this has significant energy and water savings, the incremental impact for a building's plumbing system is negligible.

Bibliography: [1] https://efiling.energy.ca.gov/getdocument.aspx?tn=205654

[2] https://appliance-standards.org/sites/default/files/States%20Go%20First.pdf

[3] https://www.safeplumbing.org/files/safeplumbing.org/documents/misc/7-1-19-WaterSense-2019-Report.pdf

[4] https://appliance-standards.org/sites/default/files/States%20Go%20First.pdf

[5] https://www.eia.gov/consumption/residential/data/2020/#waterheating

[6] https://www.eia.gov/electricity/monthly/epm_table_grapher.php?t=epmt_5_3

[7] https://www.eia.gov/dnav/ng/ng_pri_sum_dcu_nus_a.htm

[8] https://www.eia.gov/dnav/pet/pet_pri_wfr_dcus_nus_m.htm

Cost Impact: Decrease

Estimated Immediate Cost Impact:

In their analysis to establish this standard in 2015, the California Energy Commission found the incremental cost for showerheads is zero because there is no cost premium for a compliant product.[1]

Estimated Immediate Cost Impact Justification (methodology and variables):

In their analysis to establish this standard in 2015, the California Energy Commission found the incremental cost for showerheads is zero because there is no cost premium for a compliant product.[1]

Estimated Life Cycle Cost Impact:

For a typical single family home which has roughly 2.2 showerheads, this proposal would save approximately 5,100 gallons of water per year and result in $1,170 in utility cost savings over the 10 year life of the fixture.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

To estimate the roughly $1,170 in life cycle cost savings, we assumed one showerhead would save 2,247 gallons of water per year resulting in 261 kWh of electricity savings and 13.4 therms/year of savings from a natural gas or oil water heater was made based on savings estimates from the appliance standards awareness program.[2] It was assumed that a typical single family home has roughly 2.2 showerheads.[3] Water and waste water prices were estimated at $11 per thousand gallons and the effective useful life of the showerhead was estimated to be 10 years.[4] It was assumed that 48% of water heaters were natural gas, 46% were electric and 6% were fuel oil based on the 2020 Residential Energy Consumption Survey.[5]Electricity was estimated to cost $0.15/kWh[6], natural gas was estimated at $1.42/therm[7] fuel oil was estimated at $3.06/therm[8] using average annual residential utility prices from the Energy Information Administration.

RP7-24

RP8-24

IRC: P2905.3

Proponents: Anthony Floyd, City of Scotsdale, City of Scottsdale (afloyd@scottsdaleaz.gov)

2024 International Residential Code

Revise as follows:

P2905.3 Hot water supply to fixtures.
The *developed length* of *hot water* piping, from the source of the *hot water* to the fixtures that require *hot water*, shall not exceed ~~100 feet (30 480 mm)~~50 feet (15 240 mm) Water heaters and recirculating system piping shall be considered to be sources of hot water.

Reason: This change reduces the length of hot water supply line from the source of hot water to the fixtures unless part of a hot water recirculation system. The 50-foot limit is replicated from IPC Section 607.2. Hot water supply lines greater than 50 feet waste water (proportional to pipe size) while occupants wait for hot water to reach fixtures for bathing, washing and culinary purposes. Even though hot water supply lines are insulated, the hot water remaining in the lines between demand periods cools down. Limiting the length and consequent volume of heated water in the supply lines reduce the amount of wasted water and occupant waiting time.

Bibliography: WaterSense Guide for Efficient Hot Water Delivery Systems -https://www.epa.gov/sites/default/files/2017-01/documents/ws-homes-hot-water-distribution-guide.pdf

Cost Impact: Increase

Estimated Immediate Cost Impact:

A hot water pump will be required where the hot water supply line exceeds 50 feet between the water heater and furthest fixture. The immediate cost of a recirculation pump range from $100 to $400 depending on size and control features.

Estimated Immediate Cost Impact Justification (methodology and variables):

Variables include length of hot water supply line between the water heater and the furthest fixture. Approximately 10 to 15 percent of the energy use associated with a hot water delivery system is wasted in distribution losses. The average home wastes more than 3,650 gallons of water per year waiting for hot water to arrive at the point of use. Annual energy and water savings will offset the upfront cost within 5 years.

RP8-24

RP9-24

IRC: P2903.4.3 (New)

Proponents: Joseph Summers, Mashantucket Pequot Tribal Nation, Building Code Enforcement

2024 International Residential Code

Add new text as follows:

P2903.4.3 **Thermal expansion tanks.** A thermal expansion tank shall be supported in accordance with the manufacturer's instructions. Thermal expansion tanks shall not be supported by the piping that connects to such tanks.

Reason: This is to provide consistency with the IPC and to emphasize that piping shall not be used to support thermal expansion tanks. The supporting of expansion tanks by means of the piping has resulted in pipe breaks and leaks as the fittings are not designed for the stresses exerted on.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is using the same language that is in the IPC and reinforces the manufacturer's requirements for the proper installation and support of the tank(s). Piping and fittings are not intended to support equipment.

RP9-24

RP10-24

IRC: TABLE P2906.6

Proponents: Christopher Adam Smith, Viega, LLC, Codes and Standards Manager for Viega, LLC

2024 International Residential Code

Revise as follows:

TABLE P2906.6 PIPE FITTINGS

MATERIAL	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic	ASTM D2468
Cast iron	ASME B16.4
Chlorinated polyvinyl chloride (CPVC) plastic	ASSE 1061; ASTM D2846; ASTM F437; ASTM F438; ASTM F439; CSA B137.6
Copper or copper alloy	ASME B16.15; ASME B16.18; ASME B16.22; ASME B16.26; ASME B16.51; ASSE 1061; ASTM F3226
Cross-linked polyethylene/aluminum/high-density polyethylene (PEX-AL-HDPE)	ASTM F1986
Fittings for cross-linked polyethylene (PEX) plastic tubing	ASSE 1061; ASTM F877; ASTM F1807; ASTM F1960; ASTM F2080; ASTM F2098; ASTM F2159; ASTM F2434; ASTM F2735; ASTM F3347; ASTM F3348; CSA B137.5
Gray iron and ductile iron	AWWA C110/A21.10; AWWA C153/A21.53
Malleable iron	ASME B16.3
Insert fittings for polyethylene/aluminum/polyethylene (PE-AL-PE) and cross-linked polyethylene/aluminum/cross-linked polyethylene (PEX-AL-PEX)	ASTM F1281; ASTM F1282; ASTM F1974; CSA B137.9; CSA B137.10
Polyethylene (PE) plastic	ASTM D2609; CSA B137.1
Fittings for polyethylene of raised temperature (PE-RT) plastic tubing	ASSE 1061; ASTM D2683; ASTM D3261; ASTM F1055; ASTM F1807; ASTM F2098; ASTM F2159; ASTM F2735; ASTM F2769; ASTM F3347; ASTM F3348; CSA B137.18
Polypropylene (PP) plastic pipe or tubing	ASTM F2389; CSA B137.11
Polyvinyl chloride (PVC) plastic	ASTM D2464; ASTM D2466; ASTM D2467; CSA B137.2; CSA B137.3
Stainless steel (Type 304/304L) pipe	ASTM A312; ASTM A778
Stainless steel (Type 316/316L) pipe	ASTM A312; ASTM A778
Steel	ASME B16.9; ASME B16.11; ASME B16.28

Staff Analysis: The proposed standards are in the current edition of the code.

Reason: The addition of ASTM F3347 "Standard Specification for Metal Press Insert Fittings with Factory Assembled Stainless Steel Press Sleeve for SDR9 Cross-linked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PE-RT) Tubing" and ASTM F3348 "Standard Specification for Plastic Press Insert Fittings with Factory Assembled Stainless Steel Press Sleeve for SDR9 Cross-linked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PE-RT) Tubing" are industry standards for PEX and PE-RT barbed fittings currently used in the International Plumbing Code and International Mechanical Code. The addition of these standards will keep the material tables aligned between the IRC and the other ICC codes, as well as keep the IRC up to date with the most relevant material standards.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The addition of this standard does not increase the cost of construction. The addition of this standard allows for a wider selection of materials but does not make their use mandatory. By including this standard in the code, the options for installers will increase while the cost of construction should stay the same or even decrease.

RP10-24

RP11-24

IRC: TABLE P2903.10.4

Proponents: Christopher Adam Smith, Viega, LLC, Codes and Standards Manager for Viega, LLC

2024 International Residential Code

Revise as follows:

TABLE P2903.10.4 VALVES

MATERIAL	STANDARD
Chlorinated polyvinyl chloride (CPVC) plastic	ASME A112.4.14, ASME A112.18.1/CSA B125.1, ASTM F1970, CSA B125.3, MSS SP-122
Copper or copper alloy	ASME A112.4.14, ASME A112.18.1/CSA B125.1, ASME B16.34, CSA B125.3, IAPMO/ANSI Z1157; MSS SP-67, MSS SP-80, MSS SP-110, MSS SP-139
Gray and ductile iron	ASTM A126, AWWA C500, AWWA C504, AWWA C507, MSS SP-42, MSS SP-67, MSS SP-70, MSS SP-71, MSS SP-72, MSS SP-78
Cross-linked polyethylene (PEX) plastic	ASME A112.4.14, ASME A112.18.1/CSA B125.1, CSA B125.3, IAPMO/ANSI Z1157; NSF 359
Polypropylene (PP) plastic	ASME A112.4.14, ASTM F2389
Polyvinyl chloride (PVC) plastic	ASME A112.4.14, ASTM F1970, MSS SP-122

Staff Analysis: A review of the standard proposed for inclusion in the code, IAPMO/ANSI Z1157-2014e1(R2019) *Ball Valves*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: This proposal adds IAPMO/ANSI Z1157 "Ball Valves" to the IRC. This Standard covers ball valves in sizes NPS-⅛ to NPS-4, with minimum rated working pressures of 860 kPa (125 psi) at 23°C (73°F), intended for use in water supply and distribution systems and specifies requirements for materials, physical characteristics, performance, testing and markings, and it is already used in the IPC. The addition of this standard will keep the material tables aligned between the IRC and the IPC, as well as keep the IRC up to date with the mast relevant materials standards.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The addition of this standard does not increase the cost of construction. The addition of this standard allows for a wider selection of materials but does not make their use mandatory. By including this standard in the code, the options for installers will increase while the cost of construction should stay the same or even decrease.

RP11-24

RP12-24

IRC: SECTION 202, M2002.4, P2503.6, P2706.2, SECTION P2709, P2709.1, P2709.2, P2709.4, P2902.3.1, TABLE P3004.1

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov)

2024 International Residential Code

Revise as follows:

[MP] AIR BREAK (DRAINAGE SYSTEM). An arrangement where a discharge pipe from a fixture, *appliance* or device drains indirectly into a waste receptor below the *flood-level rim* of the waste receptor and above the trap seal.

[MP] AIR GAP, DRAINAGE SYSTEM. The unobstructed vertical distance through free atmosphere between the outlet of a waste pipe and the *flood-level rim* of the fixture or waste receptor into which it is discharging.

[MP] FLOOD-LEVEL RIM. The edge of the waste receptor or fixture from which water overflows.

[MP] INDIRECT WASTE PIPE. A waste pipe that discharges into the drainage system through an *air gap* into a trap, fixture or waste receptor.

M2002.4 Pressure relief valve.
Boilers shall be equipped with pressure relief valves with minimum rated capacities for the *equipment* served. Pressure relief valves shall be set at the maximum rating of the boiler.

Revise as follows:

P2503.6 Shower liner test.
Where shower floors ~~and receptors~~ are made watertight by the application of materials required by Section P2709.2, the completed liner installation shall be tested. The pipe from the shower drain shall be plugged watertight for the test. The shower floor ~~and receptor~~ area shall be filled with potable water to a depth of not less than 2 inches (51 mm) measured at the threshold. Where a threshold of not less than 2 inches (51 mm) in height does not exist, a temporary threshold shall be constructed to retain the test water in the lined shower floor ~~or receptor~~ area to a level not less than 2 inches (51 mm) in depth measured at the threshold. The water shall be retained for a test period of not less than 15 minutes and there shall not be evidence of leakage.

P2706.2 Prohibited waste receptors. Plumbing fixtures that are used for washing or bathing shall not be used to receive the discharge of indirect waste piping.

Exceptions:

1. A *kitchen* sink trap is acceptable for use as a waste receptor for a dishwasher.
2. A laundry tray is acceptable for use as a waste receptor for a clothes washing machine.

SECTION P2709
SHOWER ~~RECEPTORS~~CONSTRUCTION

P2709.1 Construction.
Where a shower ~~receptor~~ has a finished curb threshold, ~~it~~ the shower depth shall be not less than 1 inch (25.4 mm) ~~below~~ at the sides and back ~~of~~ the ~~receptor~~ below the curb threshold. The curb shall be not less than 2 inches (51 mm) and not more than 9 inches (229 mm) deep when measured from the top of the curb to the top of the drain. The finished floor shall slope uniformly toward the drain not less than $^{1}/_{4}$ unit vertical in 12 units horizontal (2-percent slope) nor more than $^{1}/_{2}$ unit vertical per 12 units horizontal (4-percent slope) and *floor drains* shall be flanged to provide a watertight joint in the floor.

P2709.2 Lining required.
The adjoining walls and floor framing enclosing on-site built-up shower ~~receptors~~ shall be lined with one of the following materials:

1. Sheet lead.
2. Sheet copper.
3. Plastic liner material that complies with ASTM D4068 or ASTM D4551.
4. Hot-mopping in accordance with Section P2709.2.3.
5. Sheet-applied load-bearing, bonded waterproof membranes that comply with ANSI A118.10.

The lining material shall extend not less than 2 inches (51 mm) beyond or around the rough jambs and not less than 2 inches (51 mm) above finished thresholds. Sheet-applied load bearing, bonded waterproof membranes shall be applied in accordance with the manufacturer's instructions.

P2709.4 ~~Receptor~~Shower drains.

An *approved* flanged drain shall be installed with shower subpans or linings. The flange shall be placed flush with the subbase and be equipped with a clamping ring or other device to make a watertight connection between the lining and the drain. The flange shall have weep holes into the drain.

P2902.3.1 Air gaps.

Air gaps shall comply with ASME A112.1.2 and *air gap* fittings shall comply with ASME A112.1.3. An *air gap* shall be measured vertically from the lowest end of a water outlet to the *flood level rim* of the fixture or waste receptor into which the water outlets discharge~~s to the floor~~. The required *air gap* shall be not less than twice the diameter of the effective opening of the outlet and not less than the values specified in Table P2902.3.1.

TABLE P3004.1 DRAINAGE FIXTURE UNIT (d.f.u.) VALUES FOR VARIOUS PLUMBING FIXTURES

TYPE OF FIXTURE OR GROUP OF FIXTURES	DRAINAGE FIXTURE UNIT VALUE (d.f.u.) [a]
Bar sink	1
Bathtub (with or without a shower head or whirlpool attachments)	2
Bidet	1
Clothes washer standpipe	2
Dishwasher	2
Floor drain [b]	0
Kitchen sink	2
Lavatory	1
Laundry tub	2
Shower stall	2
Water closet (1.6 gallons per flush)	3
Water closet (greater than 1.6 gallons per flush)	4
Full-bath group with bathtub (with 1.6-gallons-per-flush water closet, and with or without shower head and/or whirlpool attachment on the bathtub or shower stall)	5
Full-bath group with bathtub (water closet greater than 1.6 gallonsper flush, and with or without shower head and/or whirlpool attachment on the bathtub or shower stall)	6
Half-bath group (1.6-gallons-per-flush water closet plus lavatory)	4
Half-bath group (water closet greater than 1.6 gallonsper flush plus lavatory)	5
Kitchen group (dishwasher and sink with or without food-waste disposer)	2
Laundry group (clothes washer standpipe and laundry tub)	3
Multiple-bath groups[c]: 1.5 baths 2 baths 2.5 baths 3 baths 3.5 baths	 7 8 9 10 11

For SI: 1 gallon = 3.785 L, 1 gallon per minute = 3.785 L/m.

a. For a continuous or semicontinuous flow into a drainage system, such as from a pump or similar device, 1.5 fixture units shall be allowed per gpm of flow. For a fixture not listed, use the highest d.f.u. value for a similar listed fixture.

b. A floor drain itself does not add hydraulic load. Where used as a waste receptor, the fixture unit value of the fixture discharging into the waste receptor shall be applicable.

c. Add 2 d.f.u. for each additional full bath.

Reason: This definition of "RECEPTOR" is already covered by the definition of a "Waste Receptor", which provide clear direction on what is considered an appropriate waste receptor for indirect wastes.

[MP] WASTE RECEPTOR. A floor sink, standpipe, hub drain or a floor drain that receives the discharge of one or more indirect waste pipes.

The intent of this proposal is to remove the defined term "RECEPTOR"

Bibliography: This definition is redundant and already covered under the definition of a waste receptor which in fact provides greater clarification as to what fixtures can be classified as waste receptors.

"WASTE RECEPTOR. A device for receiving the discharge of a waste pipe or pipes and discharges them by gravity into the sanitary drainage system. Waste receptors include, but are not limited to, floor drains, floor sinks, trench drains, hub drains, standpipes, mop basins, service sinks, and laundry trays."

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal will not impact cost of construction, it is entirely for clarification since the definition of a waste receptor already exists. Refer to reason statement.

RP12-24

RP13-24

IRC: P2904.2

Proponents: Jeffrey M Hugo, CBO, NFSA, National Fire Sprinkler Association (hugo@nfsa.org)

2024 International Residential Code

Revise as follows:

P2904.2 Sprinklers.
Sprinklers shall be new *listed* residential sprinkler. Sprinklers ~~and~~ shall be installed in accordance with the sprinkler manufacturer's instructions.

Exceptions:

1. High temperature quick response sprinklers shall be permitted to be installed in sauna and steam rooms.
2. Quick response sprinklers shall be permitted to be installed in mechanical rooms.

Reason: This proposal for the residential sprinkler criteria in the IRC, P2904 correlates with the 2022 edition of NFPA 13D. While both documents are considered equivalent, having the correlation benefits designers and code officials using the IRC.

Residential sprinklers are limited to 225°F which are too low for saunas and steam rooms located in the dwelling unit. These rooms are required to be sprinklered. This change allows a quick response sprinkler (operating with the same response thermal index (RTI) range as a residential sprinkler) in the high temperature range of 250-300°F to protect these rooms.

The quick response sprinkler is permitted to protect the mechanical room. This is an option that reduces the installation cost as quick response sprinklers are generally less in cost than the residential sprinkler. Quick response sprinklers and residential sprinklers are both in the fast response RTI range.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

Source: Actual estimates

Quick response pendent, high temperature sprinklers cost ranges from approximately $11-$17 apiece

Quick response pendent sprinklers cost ranges from approximately $11-$20 apiece

Estimated Immediate Cost Impact Justification (methodology and variables):

Analogous methodology using actual material cost estimates to create a range of cost. Listed residential sprinklers cannot be used in high temperature areas, so NFPA 13D allows a listed quick response sprinkler in lieu of residential sprinklers in these specific areas.

RP13-24

2024 GROUP A – PROPOSED CHANGES TO THE INTERNATIONAL SWIMMING POOL AND SPA CODE

SWIMMING POOL AND SPA CODE COMMITTEE

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TENTATIVE ORDER OF DISCUSSION 2024 PROPOSED CHANGES TO THE INTERNATIONAL SWIMMING POOL AND SPA CODE

The following is the tentative order in which the proposed changes to the code will be discussed at the public hearings. Proposed changes which impact the same subject have been grouped to permit consideration in consecutive changes.

Proposed change numbers that are indented are those which are being heard out of numerical order. Indentation does not necessarily indicate that one change is related to another. Proposed changes may be grouped for purposes of discussion at the hearing at the discretion of the chair. Note that some SP code change proposals may not be included on this list, as they are being heard by another committee.

- G10-24 Part II

SP1-24
SP2-24

- G1-24 Part V

SP3-24
SP4-24
SP5-24
SP6-24
SP7-24
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SP11-24
SP12-24
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SP14-24
SP15-24
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- M56-24 Part III
- P19-24 Part III

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SP23-24
SP24-24
SP25-24
SP26-24
SP27-24
SP28-24
SP29-24
SP30-24
SP31-24
SP32-24
SP33-24

SP1-24

ISPSC: SECTION 202, 202, 202 (New)

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Swimming Pool and Spa Code

Delete without substitution:

~~**EXERCISE SPA (Also known as a swim spa).** Variants of a spa in which the design and construction includes specific features and equipment to produce a water flow intended to allow recreational physical activity including, but not limited to, swimming in place. Exercise spas can include peripheral jetted seats intended for water therapy, heater, circulation and filtration system, or can be a separate distinct portion of a combination spa/exercise spa and can have separate controls. These spas are of a design and size such that they have an unobstructed volume of water large enough to allow the 99th Percentile Man as specified in APSP 16 to swim or exercise in place.~~

Revise as follows:

SPA. A structure or product intended for the immersion of persons in temperature-controlled water for the purpose of relaxing, exercise, therapy or treatment; designed and manufactured to be connected to a circulation system; ~~circulated in a closed system,~~ and not intended to be drained and filled with each use..This term includes, but is not limited to, exercise spas, hot tubs, permanent spas and portable electric spas. ~~A spa usually includes a filter, an electric, solar or gas heater, a pump or pumps, and a control, and can include other equipment, such as lights, blowers, and water-sanitizing equipment.~~

Delete without substitution:

~~**Nonself-contained spa.** A factory-built *spa* in which the water heating and circulating equipment is not an integral part of the product. Nonself-contained spas may employ separate components such as an individual filter, pump, heater and controls, or they can employ assembled combinations of various components.~~

~~**Permanent residential spa.** A spa, intended for use that is accessory to a *residential* setting and available to the household and its guests and where the water heating and water-circulating equipment is not an integral part of the product. The spa is intended as a permanent plumbing fixture and not intended to be moved.~~

~~**Portable residential spa.** A spa intended for use that is accessory to a *residential* setting and available to the household and its guests and where it is either self-contained or nonself-contained.~~

~~**Public spa.** A spa other than a permanent *residential* spa or portable *residential* spa that is intended to be used for bathing and is operated by an owner, licensee or concessionaire, regardless of whether a fee is charged for use.~~

~~**Self-contained spa.** A factory-built spa in which all control, water-heating and water-circulating equipment is an integral part of the product. Self-contained spas may be permanently wired or cord connected.~~

POOL. See "*Public swimming pool*" and "*Residential swimming pool*."

PUBLIC SWIMMING POOL (Public Pool). A pool, other than a *residential* pool, that is intended to be used for swimming or bathing and is operated by an owner, lessee, operator, licensee or concessionaire, regardless of whether a fee is charged for use. Public pools shall be further classified and defined as follows:

Class A competition pool. A pool intended for use for accredited competitive aquatic events such as Federation Internationale De Natation (FINA), USA Swimming, USA Diving, USA Synchronized Swimming, USA Water Polo, National Collegiate Athletic Association (NCAA), or the National Federation of State High School Associations (NFHS).

Class B public pool. A pool intended for public recreational use that is not identified in the other classifications of public pools.

Revise as follows:

Class C semi-public pool. A pool operated solely for and in conjunction with lodgings such as hotels, motels, apartments, ~~or~~ condominiums or property owner associations or multi-family-owned pools used by more than three owner families..

Class D-1 wave action pool. A pool designed to simulate breaking or cyclic waves for purposes of general play or surfing.

Class D-2 activity pool. A pool designed for casual water play ranging from simple splashing activity to the use of attractions placed in the pool for recreation.

Class D-3 catch pool. A body of water located at the termination of a manufactured waterslide attraction. The body of water is provided for the purpose of terminating the slide action and providing a means for exit to a deck or walkway area.

Class D-4 leisure river. A manufactured stream of water of near-constant depth in which the water is moved by pumps or other means of propulsion to provide a river-like flow that transports bathers over a defined path that may include water features and play devices.

Class D-5 vortex pool. A circular pool equipped with a method of transporting water in the pool for the purpose of propelling riders at speeds dictated by the velocity of the moving stream of water.

Revise as follows:

Class D-6 interactive water play features ~~attraction~~.
Any indoor or outdoor installation that includes sprayed, jetted, or other water sources contacting bathers and not incorporating standing or captured water as part of the bather activity area. These aquatic venues are also known as splash pads, spray pads, and wet decks.
~~A manufactured water play device or a combination of water-based play devices in which water flow volumes, pressures or patterns can be varied by the bather without negatively influencing the hydraulic conditions for other connected devices. These attractions incorporate devices or activities such as slides, climbing and crawling structures, visual effects, user-actuated mechanical devices and other elements of bather-driven and bather-controlled play.~~

Class E physical therapy pool.. A ~~P~~pools used for ~~instruction, play or~~ physical therapy and with temperatures above 86°F (30°C).

Class F wading pools. ~~Class F pools are wading pools and are covered within the scope of this code as set forth in Section 405.~~A pool with an independent circulation system and physically separated from the main pool with a water depth 18 inches or less.
~~Public pools are either a diving or nondiving type. Diving types of public pools are classified into types as an indication of the suitability of a pool for use with diving equipment.~~

Type O. A nondiving public pool.

Types VI–IX. Public pools suitable for the installation of diving equipment by type.

AQUATIC RECREATION FACILITY. A facility that is designed for free-form aquatic play and recreation. The facilities may include, but are not limited to, wave or surf action pools, leisure rivers, sand bottom pools, vortex pools, activity pools, inner tube rides, body slides and interactive play attractions.

AQUATIC VENUE. A constructed structure or modified natural structure containing water and intended for recreational or therapeutic use. Exposure to water in these structures may occur by contact, ingestion or aerosolization. Examples include swimming pools, wave pools, lazy rivers, surf pools, spas, hot tubs, therapy pools, spray pads, waterpark pools and other interactive water venues.

Revise as follows:

ELEVATED SWIMMING POOL OR PERMANENT SPA. Any permanently installed pool, spa, cold plunge, catch basin, overflow trough, including any connected water feature, or body of water water feature, that is over a habitable, occupiable or unoccupied space that is (1) inside a thermal envelope, (2) outside a thermal envelope, or (3) a combination of inside and outside the thermal envelope.

EXISTING SWIMMING POOL OR PERMANENT SPA. A pool or spa constructed prior to the date of adoption of this code, or one for which a legal building permit has been issued.

Delete without substitution:

~~**INTERACTIVE WATER PLAY FEATURES.**~~ ~~Any indoor or outdoor structure designed to allow for public recreational activities with~~

~~recirculated, filtered, and treated water that includes sprayed, jetted or other water sources contacting bathers and not incorporating standing or captured water as part of the bather activity area. These installations are also known as splash pads, spray pads, and wet decks.~~

ONGROUND STORABLE POOL. A pool that can be disassembled for storage or transport. This includes portable pools with flexible or nonrigid walls that achieve their structural integrity by means of uniform shape, a support frame or a combination thereof, and that can be disassembled for storage or relocation.

PERIMETER FLOW POOL. A pool where the water surface is lifted and flows over the perimeter of the pool into a surrounding *gutter* that delivers water to the circulation pump.

RESIDENTIAL SWIMMING POOL (Residential Pool). A pool intended for use that is accessory to a *residential* setting and available only to the household and its guests. Other pools shall be considered to be public pools for purposes of this code.

Type O. A nondiving *residential* pool.

Types I–V. *Residential* pools suitable for the installation of diving equipment by type.

SPRAY POOL. A pool or basin occupied by construction features that spray water in various arrays for the purpose of wetting the persons playing in the spray streams.

Add new definition as follows:

Exercise Spa (Also known as a swim spa). .
A variant of a spa in which the design and construction includes specific features and equipment to produce a water flow intended to allow recreational physical activity including, but not limited to, swimming in place. Exercise spas can include peripheral jetted seats intended for water therapy, heater, circulation and filtration system, or can be a separate distinct portion of a combination spa and can have separate controls. These spas are of a design and size such that they have an unobstructed volume and depth of water to allow the 99th Percentile Man as specified in APSP 16 to swim or exercise in place. An exercise spa is also known as a swim spa.

202 SWIMMING POOL. Any structure or product intended for swimming, bathing or wading; designed and manufactured to be connected to a circulation system; installed aboveground, inground, onground, or partially aboveground; and not intended to be drained and filled with each use. See “Public swimming pool” and “Residential swimming pool.”

Delete without substitution:

~~**ACTIVITY POOL.** A pool designed primarily for play activity that uses constructed features and devices including lily pad walks, flotation devices, small slide features, and similar attractions.~~

Reason: This proposal is based on a need for alignment across the I-codes with the larger definitions of “swimming pool” and “spa” and then referring to the ISPSC for the more detailed definitions. Proposals for other I-codes to follow the ISPSC “swimming pool” and “spa” definitions is expected. The other edits to ISPSC existing definitions are being made for consistency with industry terms, ANSI standards and other regulations. Duplicate terminology is also being removed. These are all meant as editorial changes to provide clarity for the user; there are no substantive changes intended.

This proposal is submitted by the ICC Plumbing Mechanical Gas Code Action Committee (PMGCAC)

PMGCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 PMGCAC has held 26 virtual meetings open to any interested party. In addition, there were several virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the PMGCAC website at PMGCAC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

A clarification for the use of these definitions in other I-codes The revised definitions do not change the technical requirements of the code and therefore there isn’t any change to the cost of complying with the code.

SP1-24

SP2-24

ISPSC: SECTION 202

Proponents: Ronald Clements, Chesterfield County, VA, Chesterfield County, VA (clementsro@chesterfield.gov)

2024 International Swimming Pool and Spa Code

Revise as follows:

SWIMOUT. An underwater seat area that is placed completely outside of the diving envelope of the pool. ~~Where located at the deep end, swimouts are permitted to be used as the deep-end means of entry or exit to the pool.~~

Reason: The sentence proposed for deletion from the definition goes beyond defining the term, it is stating when used in the deep end the swimout can be used as a means of egress. That statement is a code requirement/allowance, it is not a definition. Section 411.1.3 is the code section addressing egress from deep ends and that section already lists swimouts as an approved deep end means of egress. Definitions should not go beyond defining the term.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Where located at the deep end, swimouts are permitted to be used as the deep-end means of entry or exit to the pool." is proposed to be deleted because it is not a definition, it is a code requirement that has been repeated from the code requirement in Section 411.1.3. Section 411.1.3, provided below for comparison, states that in the deep area of pools means of entry and exit can be by swimouts as provided in list item #6; therefore, removal of a copy from code section 411.1.3 #6 from the definition of swimout in chapter 2 is editorial. It is editorial because removal of the sentence from the definition does not change how the term is defined, nor the code requirement that uses the term with regards to entry and exits from deep ends of pools.

SWIMOUT.

An underwater seat area that is placed completely outside of the diving envelope of the pool. Where located at the deep end, swimouts are permitted to be used as the deep-end means of entry or exit to the pool.

411.1.3 Deep area.

The means of entry and exit in the deep area of pools shall consist of one of the following:

1. Steps/stairs.
2. Ladders.
3. Grab rails with recessed treads.
4. Ramps.
5. Beach entries.
6. Swimouts.
7. Other designs that provide the minimum utility as specified in this code.

SP2-24

SP3-24

ISPSC: SECTION 202, SECTION 202 (New), SECTION 303, 303.1, 303.1.2 (New), TABLE 303.1.2 (New), 303.1.3 (New), 303.1.1, 303.1.2, 303.1.3, 303.2, 303.3, DOE (New)

Proponents: Maureen Guttman, Senior Fellow, Energy Solutions, California Investor-Owned Utilities

2024 International Swimming Pool and Spa Code

SECTION 202 DEFINITIONS

Add new definition as follows:

SITE-RECOVERED ENERGY. Waste energy recovered at the building site that is used to offset consumption of purchased energy supplies.

SOLAR THERMAL WATER HEATER. An assembly of components designed to heat water through the conversion of incident solar radiation at the building site.

SECTION 303 ENERGY

Revise as follows:

303.1 Energy consumption of pools and permanent spas. The energy consumption of pools and permanent spas shall be controlled by the requirements in Sections 303.1.1 through ~~303.1.3~~ 303.1.4 and with Section 317.

Add new text as follows:

303.1.1 Primary heating systems. The primary pool or spa heating system shall be one of the following:

1. A *solar thermal water heater* with a solar collector surface area equivalent to at least 65 percent of the pool or spa surface area.
2. A heat pump pool heater.
3. Systems that do not use *solar thermal water heaters* or heat pump pool heaters as their primary heat source shall derive no less than 60 percent of annual heating energy from *on-site renewable energy* or *site-recovered energy*.

Exceptions:

1. *Residential* pools and *residential* spas.
2. Portable electric spas.
3. A pool or spa heated only by a *solar thermal water heater*.

303.1.2 Pool heater efficiency. Pool heaters shall meet the minimum efficiency requirements of Table 303.1.2 when tested in accordance with the test procedure listed in DOE 10 CFR 430.23(p) and Appendix P to Subpart B of Part 430.

TABLE 303.1.2 POOL HEATER MINIMUM EFFICIENCY REQUIREMENTS

EQUIPMENT TYPE	MINIMUM EFFICIENCY

Heat Pump Pool Heater	4.0 COP rated at 50° F db 44.2° F wb outdoor air 80.0° F entering water
Gas-Fired Pool Heater	*Before 5/31/2028* *Integrated Thermal Efficiency not less than the following:* *600 (PE)/(PE + 1,619)* *where PE is the active electrical power, in Btu/h* *After 5/31/2028* *82% Et* *Before 5/31/2028* *84(QIN + 491)/(QIN + 2,536)* *where QIN is the input capacity, in Btu/h* *After 5/31/2028*

303.1.3 Heater controls. Heater controls and ignition pilots shall comply with Section 303.1.3.1 through Section 303.1.3.3.

Revise as follows:

~~303.1.1~~ 303.1.3.1 ~~Heaters~~ Electric switches. The electric power to heaters shall be controlled by an on-off switch with ready access that is an integral part of the heater, mounted on the exterior of the heater or external to and within 3 feet (914 mm) of the heater. Operation of such switch shall not change the setting of the heater thermostat. Such switches shall be in addition to a circuit breaker for the power to the heater. ~~Gas-fired heaters shall not be equipped with continuously burning ignition pilots.~~

~~303.1.2~~ 303.1.3.2 Time switches. Time switches or other control methods that can automatically turn off and on heaters and pump motors according to a preset schedule shall be installed for heaters and pump motors. Heaters and pump motors that have built-in time switches shall be in compliance with this section.

Exceptions:

1. Where public health standards require 24-hour pump operation.
2. Pumps that operate solar- or waste-heat recovery pool heating systems.

~~303.1.1~~ 303.1.3.3 ~~Heaters~~ Ignition pilots. ~~The electric power to heaters shall be controlled by an on-off switch with ready access that is an integral part of the heater, mounted on the exterior of the heater or external to and within 3 feet (914 mm) of the heater. Operation of such switch shall not change the setting of the heater thermostat. Such switches shall be in addition to a circuit breaker for the power to the heater.~~ Gas-fired heaters shall not be equipped with continuously burning ignition pilots.

~~303.1.3~~ 303.1.4 Covers. Outdoor heated pools and outdoor permanent spas shall be provided with a vapor-retardant cover or other *approved* vapor-retardant means in accordance with Section 104.9.1.

Exception: Where more than 75 percent of the energy for heating, computed over an operating season of not fewer than 3 calendar months, is from a heat pump or an on-site renewable energy system, covers or other vapor-retardant means shall not be required.

303.2 Portable spas. The energy consumption of electric-powered portable spas shall be controlled by the requirements of APSP 14.

303.3 Residential pools and permanent residential spas. The energy consumption of *residential* swimming pools and permanent *residential* spas shall be controlled in accordance with the requirements of APSP 15.

Add new standard(s) as follows:

DOE 10 CFR Part 430. Energy Conservation Program for Consumer Products: Test Procedures and Certification and Enforcement

Requirement for Plumbing Products; and Certification and Enforcement Requirements for Residential Appliances; Final Rule; Pool heaters

Staff Analysis: A review of the standard proposed for inclusion in the code, DOE 10CFR Part 430 *Energy Conservation Program for Consumer Products: Test Procedures and Certification and Enforcement Requirement for Plumbing Products; and Certification and Enforcement Requirements for Residential Appliances; Final Rule; Pool heaters*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: This proposal, based on pool heater requirements proposed for California's 2025 energy code, requires that the primary heating system for pools and spas is either a solar thermal water heater, a heat pump pool heater or a heating system that derives no less than 60 percent of its annual heating energy from either on-site renewable energy or site-recovered energy. Natural gas or electric back-up heating systems are allowed in all cases. The proposal also includes mandatory minimum efficiency standards for pool heaters established by the U.S. Department of Energy.

The purpose of this proposal is to save energy and reduce carbon emissions from new swimming pool and spa heaters. According to CBECS 2018, the majority of pool and spa heaters installed today to heat indoor commercial pools are powered with natural gas (71%) which ties building owners to unpredictable utility costs caused by price swings in the natural gas market.

Solar thermal heating systems are cost effective alternatives to conventional gas-fired pool heaters which result in reduced energy use and lower monthly utility costs. Solar swimming pool and spa heating systems are one of the simplest and least expensive forms of solar thermal technology. The most common and least expensive type of solar swimming pool and spa heating systems are unglazed solar collectors which are made of a black plastic material that absorbs the sun's energy, converting it into heat which is then transferred to the water in the pool. Unglazed solar collectors are popular for swimming pools because they are easy to install, require little to no maintenance, and result in significantly lower monthly utility bills.

While a solar thermal heater with a backup gas-fired pool heater is more expensive than installing just a gas-fired pool heater (incremental costs are around $5,250 for a 20,000 gallon capacity pool), the reduction in monthly utility costs results in very short payback periods. A recent California CASE Study found that installing a solar pool and spa heating system with gas-fired back-up reduces natural gas use by 64 therms/year for residential pools and 45,000 therms/year for an Olympic sized pool. The same CASE study found that the reduction in natural gas use over 30 years resulted in a reduction in utility bills for solar pool and spa heating systems that were two to six times higher than the incremental cost for installing the system. The Department of Energy similarly states that the payback period for a solar pool and spa heating system alone is on the order of 1 to 7 years.

Not only do solar thermal water heaters result in reduced utility bills, but they can also reduce carbon emissions. The California CASE Study found that this requirement would reduce greenhouse gas emissions in California by approximately 37,000 metric tons of CO_2e per year. Given that commercial pools in California make up roughly 20% of the commercial pool market in the U.S., this proposal, if adopted nationwide, could result in a reduction of roughly 190,000 metric tons of CO_2e per year which is equivalent to taking 42,000 cars off the road.

As an alternative to installing a solar thermal heating system, this proposal allows for the installation of heat pump pool heaters or pool heaters which derive at least 60 percent of their annual heating energy from either on-site renewable energy or site-recovered energy. The California CASE study found that heat pump pool heaters save more energy and are more cost effective than solar thermal heating systems. This proposal exempts residential pools and spas and portable electric spas.

Bibliography: U.S. Department of Energy. *Solar Swimming Pool Heaters*. Accessed December 15, 2023. https://www.energy.gov/energysaver/solar-swimming-pool-heaters

California Energy Codes and Standards. *Codes and Standards Enhancement (CASE) Initiative 2025 California Energy Code: Swimming Pool Heating*. Revised October 2023. https://title24stakeholders.com/wp-content/uploads/2023/10/Revised-2025-T24-Final-CASE-Report_-NR-Swimming-Pool-Spa-Heating-1.pdf

Cost Impact: Increase

Estimated Immediate Cost Impact:

The California CASE study found that installing a solar thermal water heaters in addition to a gas-fired pool heating system in nonresidential pools resulted in total 30-year incremental installation and maintenance costs of $18,786. The California CASE study found that heat pump pool heaters in addition to a gas-fired pool heating system result in $17,416 in incremental installation and maintenance costs over 30 years.

Estimated Immediate Cost Impact Justification (methodology and variables):

The estimated immediate incremental cost assumed that the owner installed a solar thermal water heater or a heat pump pool heater as the primary system and a gas heater as back-up. The incremental cost therefore is the full installed cost of solar thermal water heater or heat pump pool heater. The cost of the solar collectors was estimated from a database of installation cost values from the California Solar Initiative Commercial Pool Solar Thermal Rebate program. The database contains over 1,100 commercial pool solar thermal projects with data on the collector size and total project cost.

Estimated Life Cycle Cost Impact:

Over 30 years, the CASE study found that solar thermal water heaters saved between $38,000 to $150,000 for non-residential pools yielding a benefit to cost ratio between 2.0 to 6.6 depending on the Climate Zone. If one includes the immediate and maintenance costs for the solar thermal water heaters, total life cycle cost savings over 30 years are between $19,214 and $131,214 depending on the Climate Zone.

Over 30 years, the CASE study found that heat pump pool heaters saved between $40,697 to $202,301 for consumers yielding a benefit to cost ratio between 2.3 to 11.6 depending on the Climate Zone. If one includes the immediate and maintenance costs for the solar thermal water heaters, total life cycle cost savings over 30 years are between $23,281 and $184,885 depending on the Climate Zone.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

The methodology and variables for the life cycle cost impact calculation are descripted in the CASE study.

SP3-24

SP4-24

ISPSC: 303.1.2

Proponents: Jennifer Hatfield, J. Hatfield & Associates, Pool & Hot Tub Alliance (jen@jhatfieldandassociates.com); Gregory Andrew Ceton, Pool and Hot Tub Alliance (gceton@phta.org)

2024 International Swimming Pool and Spa Code

Revise as follows:

303.1.2 Time switches. Time switches or other control methods that can automatically turn off and on heaters and pump motors according to a preset schedule shall be installed for heaters and pump motors. Heaters and pump motors that have built-in time switches shall be in compliance with this section.

Exceptions:

1. Where public health standards require 24-hour pump operation.
2. Pumps that operate ~~solar~~ on-site renewable energy or waste-heat recovery pool heating systems.

Reason: This proposal is being made to align with a change made in the 2024 IECC, Residential and 2024 IRC, Chapter 11. Section 303 Energy of the ISPSC is also in the IECC and Ch 11 of the IRC, so it is important to have them all align.

This change was done in the IECC to allow for more than just solar as an on-site renewable energy option to operate a pump, as other on-site renewable energy options may exist that would then fall under the exception to the time switch requirements. This change aligns with verbiage used in the IECC, but also aligns with the verbiage used in the exception to section 303.1.3 of the ISPSC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

It simply aligns the ISPSC code provisions with that of the IECC, for consistency and to ensure there is no confusion.

SP4-24

SP5-24

ISPSC: 305.1, 305.4

Proponents: Dan Lenz, All Seasons Dist., Inc., Midwest Chapter of the PHTA (dan@aspools.com)

2024 International Swimming Pool and Spa Code

Revise as follows:

305.1 General. The provisions of this section shall apply to the design of barriers for restricting entry into areas having pools and spas. Where spas or hot tubs are equipped with a lockable *safety cover* complying with ASTM F1346 ~~and swimming pools are equipped with a powered *safety cover* that complies with ASTM F1346~~, the areas where those spas~~,~~ or hot tubs ~~or pools~~ are located shall not be required to comply with Sections 305.2 through 305.7.

305.4 Structure wall as a barrier. Where a wall of a dwelling or structure serves as part of the barrier and where doors, gates or windows provide direct access to the pool or spa through that wall, one of the following shall be required:

1. Operable windows having a sill height of less than 48 inches (1219 mm) above the indoor finished floor, doors and gates shall have an alarm that produces an audible warning when the window, door or their screens are opened. The alarm shall be *listed* and labeled as a water hazard entrance alarm in accordance with UL 2017.
2. In dwellings not required to be Accessible units, Type A units or Type B units, the operable parts of the alarm deactivation switches shall be located at not less than 54 inches (1372 mm) above the finished floor.
3. In dwellings that are required to be Accessible units, Type A units or Type B units, the operable parts of the alarm deactivation switches shall be located not greater than 54 inches (1372 mm) and not less than 48 inches (1219 mm) above the finished floor.
4. In structures other than dwellings, the operable parts of the alarm deactivation switches shall be located not greater than 54 inches (1372 mm) and not less than 48 inches (1220 mm) above the finished floor.
5. A *safety cover* that is *listed* and *labeled* in accordance with ASTM F1346 is installed for the ~~pools and~~ spas.
6. An *approved* means of protection, such as self-closing doors with self-latching devices, is provided. Such means of protection shall provide a degree of protection that is not less than the protection afforded by Item 1 or 2.

Reason: Section 305.1 provides that pools with a powered safety cover that complies with ASTM F1346, the areas where those pools are located do not need to comply with Sections 305.2 through 305.7, removing all other barrier requirements.

Cover manufacturer's guidelines contain provisions whereby the cover is required to be left open given certain circumstances, including when the pool water is not balanced to industry standards, or when certain treatments, such as high concentrations of chlorine are introduced. When these events occur, and no other barriers exist, a significant safety hazard is created that can cause injury or death. As one example, Latham, a leading powered safety cover manufacturer posts on its website at https://www.lathampool.com/blog/maintain/automatic-pool-cover-maintenance-checklist/ that 'You may think you need to leave your pool closed permanently during the winter months when it's not in use, but weather permitting, it's important to open your cover once per week. When you do so, ***open the cover all the way for several hours*** in order to allow excessive chemicals to dissipate/evaporate.' The CDC recommends that if a pool encouters a fecal accident involving diarrhea, and the pool water contains cyanuric acid (Which most pool water does), that the pool water should be hyperchlorinated by raising the free chlorine level to 20 ppm for 28 hours (https://www.cdc.gov/healthywater/swimming/pdf/fecal-incident-response-guidelines.pdf). Latham's recommended safe chlorine level for a powered safety cover is 1.0 ppm (https://www.lathampool.com/blog/maintain/how-to-keep-pool-chemicals-from-damaging-your-automatic-safety-cover/), and that 'It is important to note that pool chemical damage is not covered under Latham's warranty. Chemical levels are the responsibility of the homeowner. Latham is not responsible for damage to any part of the pool that is caused by chemical imbalance.'

Additionally, representatives of the pool and spa industry with knowledge of construction and service know that these covers are often not covering the pool or are in some other state of disrepair, are closed but covered in water, or by other means creating a potential drowning hazard.

Bibliography: Dan Lenz is a 37 year pool industry veteran who is a PHTA Certified Building Professional, PHTA Certified Service Professional, past President and current Vice President of the Midwest chapter of the PHTA, Vice Chair of the PHTA Builder's Council, a member of the PHTA Education Committee and PHTA Service Council. He is a PHTA instructor who teaches industry certification courses including CPO, CMS, CST, CHTT and legacy CBP. Dan is also a pool industry consultant, called on routinely to speak to investors interested in the pool industry. He is employed as Vice President of All Seasons Dist., Inc out of Orland Park, IL, where his oversight includes their service and construction divisions, both of which are honored in the industry as one of the Top 50 Builders as well as one of the Top 50 Service Companies in the country.

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Cost Impact: Decrease

Estimated Immediate Cost Impact:

The cost of installing conventional barriers, such as 4ft. high fencing with self-closing, self-latching gates, is less than the cost of installing a powered safety cover, and in an example of an 18' x 36' inground pool, can save consumers anywhere from $7,750 to $15,500.

Estimated Immediate Cost Impact Justification (methodology and variables):

A powered safety cover installed on an 18' x 36' inground pool will cost a consumer $14,000 to $20,000 (Materials) and $1000 to $5000 for labor to install it.

Variables for cover materials include the pool's shape, pool construction type (Vinyl, fiberglass, or gunite), installation method (Are the tracks on top of the deck vs. concealed, is the mechanism on top of the deck vs. concealed, is the recessed mechanism lid designed to be walked on), recessed mechanism lid type, fabric color, control type, type of lid for the recessed mechanism (Aluminum vs. stone or brick), and is the motor hydraulic vs. electric.

Variables for cover labor include installation method, such as whether the tracks are on top of the deck vs. concealed; whether the mechanism on top of the deck vs. concealed; the length and source of the electrical and/or hydraulic feed; whether the mechanism lid is aluminum, stone, built to be walked on or not; as well as the distance that required drainage for the recessed mechanism must be run.

As opposed to a powered safety cover, a 4 ft. high, ornamental aluminum fence that is 188 ft. long (Which would surround the same 18' x 36' inground pool with 10' of space all around the pool from the pool edge to the fence), with two 4 ft. high, 3 ft. wide gates that include self-closing, self-latching hardware, would cost a consumer $6500 to $8000 (Materials) and $750 to $1500 for labor to install it.

Variables for fence materials include color and fence design detail.

Variable for fence labor include differences in quantity of fence posts and whether those posts are surface deck mounted vs. inground.

Powered safety covers have a cost to consumers that starts at $10,000 and quickly rises to as much as $25,000. As a PHTA Certified Building Professional, 37 year industry veteran, Vice President of the Midwest chapter of the PHTA, Vice Chair of the PHTA Builder's Council, member of the PHTA Education Committee and Service Council, PHTA CPO Instructor, Industry Consultant and Vice President of All Seasons Dist., Inc out of Orland Park, IL, where I oversee our pool construction division, I am fully knowledgeable of these costs.

Latham, an industry leader in vinyl and fiberglass pool manufacturing, as well as a powered safety cover manufacturer, indicates a similar powered safety cover cost range between $10,000 to $20,000 on their website at https://www.lathampool.com/plan-your-pool/inground-pool/automatic-pool-cover-price-guide/ .

A pool fence, as identified by Angi.com at https://www.angi.com/articles/pool-fence-cost.htm , costs between $15.00 and $25.00 per linear foot. Pools and their surrounding areas vary, but they indicate that "For $6000 you can easily have 300 linear feet of fencing installed, more than enough to surround even the larger residential inground pools."

SP5-24

SP6-24

ISPSC: 305.1.2 (New)

Proponents: Daniel Stonkus, Pool & Spa Enclosures, LLC. (dan@sunrooms-enclosures.com)

2024 International Swimming Pool and Spa Code

Add new text as follows:

305.1.2 Retractable Pool Enclosures. Where pools, spas or hot tubs are equipped with a manual lockable retractable enclosure complying with ASTM F1346, the areas where those pools, spas or hot tubs are located shall not be required to comply with Sections 305.2 through 305.7.

Staff Analysis: The proposed standard is in the current edition of the code.

Reason: Pool Enclosures offer security equal to, or beyond existing approved barriers while also providing the pool owner with other benefits(reduced chemicals, reduced debris, increased swimming season, reduced heating costs, etc.). This proposal is intended to make available an alternate method meeting the barrier requirements in section 305.

Please reference these additional insights to support the consideration of our proposal:

1. Manual safety covers are currently listed as an appropriate minimum construction standard for spas and hot tubs. I assume this is the case due to the ease at which a manual cover can secure a smaller area such as a spa or hot tub. If a manual cover can also secure a pool with the same ease, that should be acceptable as a minimum construction standard.
2. Due to the variety of designs, there are varying levels of difficulty in which a manual cover can secure a pool. We don't feel it's appropriate to classify all manual safety covers the same way. For example, enclosures can be produced with self-Locking sections. No guess work as someone simply manually slides the segment that will stop and lock down securing our manual cover in place whereby, securing the pool from unwanted entry. For refence, please see this video which shows how easy it can be to open or secure the pool. https://www.youtube.com/watch?v=hR8mnP6N818
3. There is no perfect solution to securing a pool. Motorized safety covers can be left open, motors can fail, or the fabric can rip. Fences can be left open. We believe that the risk of leaving a retractable pool enclosure open is comparable to the other currently acceptable barriers.
4. We are open to collaborating to further refine the language and specifications in our proposal. This will help ensure that the inclusion of retractable pool enclosures in Section 305 aligns with the overarching goal of enhancing pool safety standards.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal provides an alternate method to meet the barrier requirements. It does not impose a mandatory cost increase or decrease. Retractable pool enclosures are installed for a host of benefits beyond pool safety (reduced chemicals, reduced debris, increased swimming season, reduced heating costs, etc.). This proposal may be considered a cost reduction since another form of barrier would no longer be required.

SP6-24

SP7-24

ISPSC: 305.2.1

Proponents: Peter Zvingilas, State of Connecticut, SECTBO

2024 International Swimming Pool and Spa Code

Revise as follows:

305.2.1 Barrier height and clearances. Barrier heights and clearances shall be in accordance with all of the following:

1. The top of the barrier shall be not less than 48 inches (1219 mm) above grade where measured on the side of the barrier that faces away from the pool or spa. Such height shall exist around the entire perimeter of the barrier and for a distance of 3 feet (914 mm) measured horizontally from the outside of the required barrier.
2. The vertical clearance between grade and the bottom of the barrier shall not exceed 2 inches (51 mm) for grade surfaces that are not solid, such as grass or gravel, where measured on the side of the barrier that faces away from the pool or spa.
3. The vertical clearance between a surface below the barrier to a solid surface, such as concrete, and the bottom of the required barrier shall not exceed 4 inches (102 mm) where measured on the side of the required barrier that faces away from the pool or spa.
4. Where the top of the pool or spa structure is above grade, the barrier shall be installed on grade or shall be mounted on top of the pool or spa structure. Where the barrier is mounted on the top of the pool or spa, the vertical clearance between the top of the pool or spa and the bottom of the barrier shall not exceed 4 inches (102 mm).
5. The barrier shall be a minimum of 3 feet (914mm) from the property line.

Reason: A property owner applies to install a pool with a code compliant barrier that is located along the property line. When applying for this permit, the neighbor has no fence on his property, while the project is undertaken the neighbor installs a fence on their adjoining property line to not see the pool owner's fence. (no building permit required) Final inspection comes along after both install their respective fences and shows a non-compliant fence now. Who has to move their respective fence for compliance?

Bibliography:

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposal will not change the cost for a pool barrier. It just fixes the location adjacent to property lines.

SP7-24

SP8-24

ISPSC: 305.3, 305..3.1 (New), 305.3.1, 305.3.2, 305.3.3, 305.3.4, 305.4, 305.3.2.1 (New), 305.3.2.2 (New), 305.3.2.3 (New)

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Swimming Pool and Spa Code

Revise as follows:

305.3 Doors and gates. Doors, ~~and~~ gates and windows in barriers shall comply with the requirements of Section~~s~~ 305.3.1 or 305.3.2. ~~through 305.3.3 and shall be equipped to accommodate a locking device. Pedestrian access doors and gates shall open outward away from the pool or spa, shall be self-closing and shall have a self-latching device. Doors and gates shall not swing over stairs.~~

Add new text as follows:

305..3.1 Doors and gates in barriers. Where a door or gate is not in a wall of a dwelling or structure, doors and gates in barriers shall comply with the requirements of Sections 305.3.1.1 through 305.3.1.4 and shall be equipped to accommodate a locking device. Pedestrian access doors and gates shall open outward away from the pool or spa, shall be self-closing and shall have a self-latching device. Doors and gates shall not swing over stairs.

Revise as follows:

~~**305.3.1**~~ 305.3.1.1 **Utility or service doors and gates.** Doors and gates not intended for pedestrian use, such as utility or service doors and gates, shall remain locked when not in use.

~~**305.3.2**~~ 305.3.1.2 **Double or multiple doors and gates.** Double doors and gates or multiple doors and gates shall have not fewer than one leaf secured in place and the adjacent leaf shall be secured with a self-latching device.

~~**305.3.3**~~ 305.3.1.3 **Latch release.** For doors and gates in barriers, the door and gate latch release mechanisms shall be in accordance with the following:

1. Where door and gate latch release mechanisms are accessed from the outside of the barrier and are not of the self-locking type, such mechanism shall be located above the finished floor or ground surface in accordance with the following:
   1.1. At public pools and spas, not less than 52 inches (1219 mm) and not greater than 54 inches (1372 mm).

   1.2. At *residential* pools and spas, not less than 54 inches (1372 mm).

2. Where door and gate latch release mechanisms are of the self-locking type such as where the lock is operated by means of a key, an electronic opener or the entry of a combination into an integral combination lock, the lock operation control and the latch release mechanism shall be located above the finished floor or ground surface in accordance with the following:
   2.1. At public pools and spas, not less than 34 inches and not greater than 48 inches (1219 mm).

   2.2. At *residential* pools and spas, at not greater than 54 inches (1372 mm).

3. At private pools, where the only latch release mechanism of a self-latching device for a gate is located on the pool and spa side of the barrier, the release mechanism shall be located at a point that is at least 3 inches (76 mm) below the top of the gate.

~~**305.3.4**~~ 305.3.1.4 **Barriers adjacent to latch release mechanisms.** Where a latch release mechanism is located on the inside of a barrier, openings in the door, gate and barrier within 18 inches (457 mm) of the latch shall not be greater than $^1/_2$ inch (12.7 mm) in any dimension.

~~**305.4**~~ 305.3.2 **Structure wall as a barrier.** Where a wall of a dwelling or structure serves as part of the barrier and where doors, gates or windows provide direct access to the pool or spa through that wall, each door, gate, or window in such barriers shall comply with the requirements of Section 305.3.2.1 or 305.3.2.2.~~one of the following shall be required:~~

1. ~~Operable windows having a sill height of less than 48 inches (1219 mm) above the indoor finished floor, doors and gates shall have an alarm that produces an audible warning when the window, door or their screens are opened. The alarm shall be *listed* and labeled as a water hazard entrance alarm in accordance with UL 2017.~~

2. ~~In dwellings not required to be Accessible units, Type A units or Type B units, the operable parts of the alarm deactivation switches shall be located at not less than 54 inches (1372 mm) above the finished floor.~~

3. ~~In dwellings that are required to be Accessible units, Type A units or Type B units, the operable parts of the alarm deactivation switches shall be located not greater than 54 inches (1372 mm) and not less than 48 inches (1219 mm) above the finished floor.~~

4. ~~In structures other than dwellings, the operable parts of the alarm deactivation switches shall be located not greater than 54 inches (1372 mm) and not less than 48 inches (1220 mm) above the finished floor.~~

5. ~~A *safety cover* that is *listed* and *labeled* in accordance with ASTM F1346 is installed for the pools and spas.~~

6. ~~An *approved* means of protection, such as self-closing doors with self-latching devices, is provided. Such means of protection shall provide a degree of protection that is not less than the protection afforded by Item 1 or 2.~~

Add new text as follows:

305.3.2.1 Doors and gates. Where doors or gates provide direct access to the pool or spa, each door or gate shall comply with one of the following:

1. The doors or gate shall comply with the requirements of Sections 305.3.1.
2. The door or gate shall have an alarm that complies with Section 305.3.2.3.
3. A *safety cover* that is *listed* and *labeled* in accordance with ASTM F1346 is installed for the pools and spas.
4. An *approved* means of protection shall be provided. Such means of protection shall provide a degree of protection that is not less than the protection afforded by Item 1, 2 or 3.

305.3.2.2 Operable windows. Where one or more operable windows provides direct access to the pool or spa, each operable window with a sill height of less than 48 inches shall comply with one of the following:

1. The window shall have an alarm that complies with Section 305.3.2.3.
2. A *safety cover* that is *listed* and *labeled* in accordance with ASTM F1346 is installed for the pools and spas.
3. An *approved* means of protection shall be provided. Such means of protection shall provide a degree of protection that is not less than the protection afforded by Item 1 or 2.

305.3.2.3 Alarms. Doors, gates, and operable windows having a sill height of less than 48 inches (1219 mm) above the indoor finished floor shall have an alarm that produces an audible warning when the door, gate, window, or its screen is opened. The alarm shall be *listed* and labeled as a water hazard entrance alarm in accordance with UL 2017.

1. In dwellings not required to be Accessible units, Type A units or Type B units, the operable parts of the alarm deactivation switches shall be located at not less than 54 inches (1372 mm) above the finished floor.
2. In dwellings that are required to be Accessible units, Type A units or Type B units, the operable parts of the alarm deactivation switches shall be located not greater than 54 inches (1372 mm) and not less than 48 inches (1219 mm) above the finished floor.
3. In structures other than dwellings, the operable parts of the alarm deactivation switches shall be located not greater than 54 inches (1372 mm) and not less than 48 inches (1220 mm) above the finished floor.

Staff Analysis: The proposed standards are in the current edition of the code.

Reason: Sections 305.3 and 305.4 were modified in the 2021 edition of the ISPSC to address accessibility considerations. (See proposal SP8-18 which was approved as submitted.) The latch release provisions under Section 305.3.3 were expanded, and Items 2, 3 and 4 under Section 305.4 were separated out from Item 1 to differentiate between the requirements for dwellings and other structures.

Some fixes were identified to improve these sections. This change reorganizes Sections 305.3 and 305.4 into one section encompassing all openings in barriers. And it reorganizes the section dealing with openings in a structural used as a barrier (previously 305.4).

Section-by-section substantiation:

Section 305.3: The title was changed to include doors, gates, AND windows to support the reorganization. Each opening must comply with either of the new subsections.

Section 305.3.1: This is the existing 305.3, and no substantive changes to the requirements were made. A scoping statement was added to limit the section to barriers that are not part of a structure. The language was taken from the existing 305.4 and changed to the negative.

Section 305.3.2: This is the existing 305.4, and it was reorganized and updated. The issue that made a simple fix impossible was the fact that the charging paragraph ended with “one of the following shall be required.” This meant that only one of the items that followed could be applied to the entire situation. The language was changed in this proposal to allow each opening to be considered individually and comply with any of the provisions that follow.

Section 305.3.2.1: Doors and gates are now treated separately from windows for flexibility of compliance. Each opening should be considered individually to determine compliance.

Item 1: This requirement was implied, but not stated, in existing Section 305.4, Item 6, which pointed to “self-closing doors with self-latching devices” as an approved means of protection. This was required in existing Section 305.3, and it is logical that doors and gates complying with the requirements for doors and gates <u>in barriers</u> are acceptable for doors and gates <u>in barriers that are part of a structure</u>.

Item 2: This item points to the alarm requirements found in the existing section 305.4. It was repeated for operable windows below.

Items 3 and 4: These were copied from existing section 305.4 Items 5 and 6 (shown deleted) and are repeated for operable windows below.

Section 305.3.2.2: This is the complementary section for windows, similar to the section for doors and gates above. The option of providing operable windows with a sill height of 48 inches or more was not clearly stated in the existing language, but it was implied by requiring an alarm for operable windows with a sill height of less than 48 inches. It is provided in the charging statement for the sake of completeness.

Item 1: This item points to the alarm requirements found in the existing section 305.4.

Items 2 and 3: These are copied from existing section 305.4 Items 5 and 6 (shown deleted) and are repeated for operable windows below.

Section 305.3.2.3: This was moved to a separate section to be referenced by Section 305.3.2.1 Item 2 as well as Section 305.3.2.2 Item 2 above. The text was modified to editorially move doors and gates before operable windows and its qualifying language. The intent was to make it clear that the sill height limitation only applies to operable windows. The word “each” was added to clarify that each opening is treated individually.

Before the 2018 proposal, existing Items 2, 3 and 4 were part of the same paragraph with the charging language and should have been kept subordinate to it. These items were renumbered as Items 1, 2 and 3 to restore that subordination.

This proposal is submitted by the ICC Plumbing Mechanical Gas Code Action Committee (PMGCAC)

PMGCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 PMGCAC has held 26 virtual meetings open to any interested party. In addition, there were several virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the PMGCAC website at PMGCAC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Provides clarification to make it easier to understand the current requirements for doors gates windows and alarms. Makes it easier to navigate for the code user. The technical requirements are the same as the current code so there are not any changes that would impact the costs to comply.

SP8-24

SP9-24

ISPSC: 305.4, ASTM Chapter 11 (New)

Proponents: Alan Korn, CamerEye (alankorn@msn.com)

2024 International Swimming Pool and Spa Code

Revise as follows:

305.4 Structure wall as a barrier. Where a wall of a dwelling or structure serves as part of the barrier and where doors, gates or windows provide direct access to the pool or spa through that wall, one of the following shall be required:

1. Operable windows having a sill height of less than 48 inches (1219 mm) above the indoor finished floor, doors and gates shall have an alarm that produces an audible warning when the window, door or their screens are opened. The alarm shall be *listed* and labeled as a water hazard entrance alarm in accordance with UL 2017.
2. In dwellings not required to be Accessible units, Type A units or Type B units, the operable parts of the alarm deactivation switches shall be located at not less than 54 inches (1372 mm) above the finished floor.
3. In dwellings that are required to be Accessible units, Type A units or Type B units, the operable parts of the alarm deactivation switches shall be located not greater than 54 inches (1372 mm) and not less than 48 inches (1219 mm) above the finished floor.
4. In structures other than dwellings, the operable parts of the alarm deactivation switches shall be located not greater than 54 inches (1372 mm) and not less than 48 inches (1220 mm) above the finished floor.
5. A *safety cover* that is *listed* and *labeled* in accordance with ASTM F1346 is installed for the pools and spas.
6. A pool alarm that is listed and labeled in accordance with ASTM F2208 Section Classification Type A 4.1.1, Type B 4.1.2 or Type C 4.1.3

~~6~~ 7. An *approved* means of protection, such as self-closing doors with self-latching devices, is provided. Such means of protection shall provide a degree of protection that is not less than the protection afforded by Item 1 or 2.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor, P.O. Box C700
West Conshohocken, PA 19428-2959

F2208-08(2019) Standard Safety Specification for Residential Pool Alarms

Staff Analysis: A review of the standard proposed for inclusion in the code, ASTM F2208-08(2019) S*tandard Safety Specification for Residential Pool Alarms*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Attached Files

- **ISPSC CamerEye Submission Final.docx**
  https://www.cdpaccess.com/proposal/9785/28931/files/download/4072/

Reason: It has been many years since Section 304 of the International Swimming Pool & Spa Code (hereinafter referred to as the "ISPSC") has been officially revisited and/or revised. Since that time the technology behind pool alarms and their many varieties have seen remarkable advances. Advances that have produced products that, if used, will substantially improve the safety of aquatics environments and, in particular, pools and spas. The ISPSC should reflect those advances as it has in the past when revision have been made from the 2012 to 2015 to 2018 versions. For example, alarms have been improved dramatically by infrared detection, Artificial Intelligence technology, and visual and imagery data. These technologies are readily available and used in the marketplace today. In fact, many pool/spa builders and contractors (and pool owners themselves) prefer the advanced and better designed alarms compared to just traditional window and door alarms commonly used. The new alarms not only serve safety better, but some can be permanently affixed to the home and are out of sight, so pool and spa owners are not tempted (due to aesthetics) to remove the alarms after inspection and approval by code officials. These new and generally accepted devices and technologies make for a more robust pursuit of the universally accepted "layers of protection" that work together to prevent downing, especially for children.

Bibliography: n/a

Cost Impact: Increase

Estimated Immediate Cost Impact:

Cost impact depends on the safety device selected to provide the additional layer of protection. The range is from $50 to approximately $700.

Estimated Immediate Cost Impact Justification (methodology and variables):

Dependent on the safety device selected to comply. See above.

Estimated Life Cycle Cost Impact:

This is a one time cost. There are no apparent, material additional costs.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

n/a

SP9-24

SP10-24

ISPSC: 305.4, ASTM Chapter 11 (New)

Proponents: Ed Trevisani, Idc Services, Manager (edtrev3@gmail.com)

2024 International Swimming Pool and Spa Code

Revise as follows:

305.4 Structure wall as a barrier. Where a wall of a dwelling or structure serves as part of the barrier and where doors, gates or windows provide direct access to the pool or spa through that wall, one of the following shall be required:

1. ~~Operable windows having a sill height of less than 48 inches (1219 mm) above the indoor finished floor, doors and gates shall have an alarm that produces an audible warning when the window, door or their screens are opened. The alarm shall be *listed* and labeled as a water hazard entrance alarm in accordance with UL 2017.~~All doors and windows providing direct access from the home to the pool shall be equipped with an exit alarm complying with UL 2017 that has a minimum sound pressure rating of 85 dBA at 10 feet (3048 mm). Any deactivation switch shall be located at least 54 inches (1372 mm) above the threshold of the access. Separate alarms are not required for each door or window if sensors wired to a central alarm sound when contact is broken at any opening.
2. In dwellings not required to be Accessible units, Type A units or Type B units, the operable parts of the alarm deactivation switches shall be located at not less than 54 inches (1372 mm) above the finished floor.
3. In dwellings that are required to be Accessible units, Type A units or Type B units, the operable parts of the alarm deactivation switches shall be located not greater than 54 inches (1372 mm) and not less than 48 inches (1219 mm) above the finished floor.
4. In structures other than dwellings, the operable parts of the alarm deactivation switches shall be located not greater than 54 inches (1372 mm) and not less than 48 inches (1220 mm) above the finished floor.
5. A *safety cover* that is *listed* and *labeled* in accordance with ASTM F1346 is installed for the pools and spas.
6. An *approved* means of protection, such as self-closing doors with self-latching devices, is provided. Such means of protection shall provide a degree of protection that is not less than the protection afforded by Item 1 or 2.
7. A swimming pool alarm that, when placed in a pool, sounds an alarm upon detection of an accidental or unauthorized entrance into the water. Such pool alarm shall be listed and labeled to ASTM F2208, which includes surface motion, pressure, sonar, laser, and infrared alarms. For purposes of this item, the term swimming pool alarm shall not include any swimming protection alarm device designed for individual use, such as an alarm attached to a child that sounds when the child exceeds a certain distance or becomes submerged in water.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor, P.O. Box C700
West Conshohocken, PA 19428-2959

F2208-08(2019) ***Standard Safety Specification for Residential Pool Alarms***

Staff Analysis: A review of the standard proposed for inclusion in the code, ASTM F2208-08(2019) S*tandard Safety Specification for Residential Pool Alarms*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: Current standards for Audible alarms for pools do not work and are missing today's technological advancements! Many states in the us have changed code language; added options and/or eliminated Part of the code due to its inefficiency in protecting human life.

We simply propose a change in language that promotes better safety practices beyond specifically "listed" devices.

Regardless of approved device pool code can't stop human error! Pool Safety starts with combating Human error.

In our 25 years of construction experience we have found that 90% of homeowners remove the approved audible alarms after inspections are completed.

Bibliography: According to a survey conducted by the Consumer Product Safety Commission (CPSC), pool alarms are an effective way to prevent drowning incidents. The survey found that pool alarms were the second most effective safety measure after pool fencing [1].

There are two types of pool alarms: audible alarms and monitored alarms. Audible alarms emit a loud sound when triggered, while monitored alarms send a notification to a remote monitoring center or a smartphone app [2].

Audible alarms are generally less expensive than monitored alarms and can be installed by homeowners themselves. However, they may produce false alarms due to wind, rain, or other environmental factors. Monitored alarms, on the other hand, are more reliable and can be customized to suit individual needs. They are also more expensive and require professional installation [12].

It's important to note that pool alarms are not a substitute for adult supervision. They are an additional layer of protection that can help prevent accidents. It's recommended to use multiple safety measures, such as pool fencing, pool covers, and pool alarms, to ensure maximum safety [1].

R4501.17.1.9

Where a wall of a dwelling serves as part of the barrier, one of the following shall apply:

1. 1.All doors and windows providing direct access from the home to the pool shall be equipped with an exit alarm complying with UL 2017 that has a minimum sound pressure rating of 85 dBA at 10 feet (3048 mm). Any deactivation switch shall be located at least 54 inches (1372 mm) above the threshold of the access. Separate alarms are not required for each door or window if sensors wired to a central alarm sound when contact is broken at any opening.

   Exceptions:

   1. a.Screened or protected windows having a bottom sill height of 48 inches (1219 mm) or more measured from the interior finished floor at the pool access level.
   2. b.Windows facing the pool on floor above the first story.
   3. c.Screened or protected pass-through kitchen windows 42 inches (1067 mm) or higher with a counter beneath.
2. 2.All doors providing direct access from the home to the pool must be equipped with a self-closing, self-latching device with positive mechanical latching/locking installed a minimum of 54 inches (1372 mm) above the threshold, which is approved by the authority having jurisdiction.
3. 3.A swimming pool alarm that, when placed in a pool, sounds an alarm upon detection of an accidental or unauthorized entrance into the water. Such pool alarm must meet and be independently certified to ASTM Standard F2208, titled "Standard Safety Specification for Residential Pool Alarms," which includes surface motion, pressure, sonar, laser, and infrared alarms. For purposes of this paragraph, the term "swimming pool alarm" does not include any swimming protection alarm device designed for individual use, such as an alarm attached to a child that sounds when the child exceeds a certain distance or becomes submerged in water.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Monitored alarms are an option to the current alarm options in the code. Options have no cost impact as the the choice of which option to use if up the builder or designer of the pool.

SP10-24

SP11-24

ISPSC: 305.4

Proponents: David Renn, PE, SE, City and County of Denver, Colorado Chapter Code Development Committee (david.renn@denvergov.org)

2024 International Swimming Pool and Spa Code

Revise as follows:

305.4 Structure wall as a barrier. Where a wall of a dwelling or structure serves as part of the barrier and where doors, gates or windows provide direct access to the pool or spa through that wall, one of the following 3 items shall be provided~~required~~:

1. Operable windows having a sill height of less than 48 inches (1219 mm) above the indoor finished floor, doors and gates shall have an alarm that produces an audible warning when the window, door or their screens are opened. The alarm shall be *listed* and labeled as a water hazard entrance alarm in accordance with UL 2017.
   - 1.1. ~~2~~ In dwellings not required to be Accessible units, Type A units or Type B units, the operable parts of the alarm deactivation switches shall be located at not less than 54 inches (1372 mm) above the finished floor.
   - 1.2. ~~3~~ In dwellings that are required to be Accessible units, Type A units or Type B units, the operable parts of the alarm deactivation switches shall be located not greater than 54 inches (1372 mm) and not less than 48 inches (1219 mm) above the finished floor.
   - 1.3. ~~4~~ In structures other than dwellings, the operable parts of the alarm deactivation switches shall be located not greater than 54 inches (1372 mm) and not less than 48 inches (1220 mm) above the finished floor.

2 ~~5.~~ A *safety cover* that is *listed* and *labeled* in accordance with ASTM F1346 is installed for the pools and spas.

3 ~~6.~~ An *approved* means of protection, such as self-closing doors with self-latching devices, is provided. Such means of protection shall provide a degree of protection that is not less than the protection afforded by Item 1 or 2.

Reason: In the 2021 ISPSC, Section 305.4 was revised from including 3 items to including 6 items, and the charging language requires compliance with any of these 6 items. However, Items 2, 3 and 4 were previously part of Item 1 and were never intended to be separate items since they just give height requirements of the alarm deactivation switch for various conditions - the alarm itself is Item 1. This proposal clarifies that one of 3 items must be provided, and the height requirements are changed to 1.1, 1.2 and 1.3 so they are part of Item 1.

Note that the last item references a means of protection that is not less than that of Items 1 or 2 - this wasn't changed in the 2021 revision and, therefore, didn't correspond to the new numbering with 6 items - this proposal leaves this item as is since reference to Item 1 or 2 is now correct.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is editorial as it just brings back the previous numbering system with 3 items as intended.

SP11-24

SP12-24

ISPSC: 307.1.2, 307.1.2.1, ASTM Chapter 11 (New)

Proponents: Gregory Andrew Ceton, Pool and Hot Tub Alliance (gceton@phta.org); Jennifer Hatfield, J. Hatfield & Associates, Pool & Hot Tub Alliance (jen@jhatfieldandassociates.com)

2024 International Swimming Pool and Spa Code

Revise as follows:

307.1.2 Colors and finishes. For other than *residential* pools and *residential* spas, the colors, patterns, or finishes of the pool and spa interiors shall not obscure objects or surfaces within the pool or spa. The ~~interior finish coating~~ floors and walls <u>of the interior finish</u> shall be white or light–colored.

307.1.2.1 ~~Munsell gray scale~~ <u>Testing</u>. ~~Finishes shall be not less than 8.0 on the Munsell gray scale~~ <u>The interior finish shall have a dry lightness value of 80.0 CIE L* Value (8.0 Munsell Grey Scale) or greater, and a wet Luminous Reflectance Value (CIE Y value) of 50.0 or greater, as determined by test results provided by the manufacturer utilizing the testing methods and procedures of ASTM D 4086, ASTM E 1477, or ASTM E 1347.</u>

Exceptions: The following shall not be required to comply with this section:

1. Competitive lane markings.
2. Floors of dedicated competitive diving wells.
3. Step or bench edge markings.
4. Pools shallower than 24 inches (609.6 mm).
5. Water line tiles.
6. Wave and surf pool depth change indicator tiles.
7. Depth change indicator tiles where a rope and float line is provided.
8. Features such as rock formations, as *approved*.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor, P.O. Box C700
West Conshohocken, PA 19428-2959

<u>E1347-06(2020)</u>	<u>Standard Test Method for Color and Color-Difference Measurement by Tristimulus Colorimetry</u>
<u>E1477-98a(2022)</u>	<u>Standard Test Method for Luminous Reflectance Factor of Acoustical Materials by Use of Integrating-Sphere Reflectometers</u>
<u>D4086-18</u>	<u>Standard Practice for Visual Evaluation of Metamerism</u>

Staff Analysis: A review of the standards proposed for inclusion in the code,
ASTM E1347-06(2020) *Standard Test Method for Color and Color-Difference Measurement by Tristimulus Colorimetry*
ASTM E1477-98a(2022) *Standard Test Method for Luminous Reflectance Factor of Acoustical Materials by Use of Integrating-Sphere Reflectometers*
ASTM D4086-18 *Standard Practice for Visual Evaluation of Metamerism*
, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: The 'Munsell Grey Scale Test' (Dry Lightness Value) is only adequate for Health Department Engineer's (or AHJ's) to compare submitted samples, or to make an initial 'go/'no go' (pass/fail) assessment. To understand the actual coloration of the interior finish requires the sample to be wetted prior to testing, in order to mimic the real-world underwater environment.

All cementitious interior finishes for swimming pools get darker (shade) when wetted. Some finishes are worse than others. Therefore, the only way to properly ‘approve’ an interior finish is to test dry and wet.

The dry test can be used by the AHJ as an initial pass/pass/failure, and the wet test can be used by the AHJ to determine bather safety based on the ability of a lifeguard to effectively see a bather in distress, and on other prevailing conditions present for each swimming pool.

The Florida Building Code adopted similar proposed language on January 1, 2018. Most manufacturers/producers have followed suit and provide this testing for all finishes that have the potential to be submitted for usage in public pools.

Cost Impact: Increase

Estimated Immediate Cost Impact:

$450-500 per finish to provide wet testing.

Estimated Immediate Cost Impact Justification (methodology and variables):

The Manufacturer/Producer of interior finishes for swimming pools will have a one-time cost for testing each interior finish that they deem to be white, or light colored enough to have the potential for usage in public pools.

Manufacturers are already required to test the dry lightness. The additional cost would be for the wet light reflectance test which gives the AHJ a true and realistic way of determining the coloration of the finish once underwater.

Currently, this one-time outside laboratory testing is about $450-$500 per finish. The interior swimming pool finish does not need to be re-tested unless a significant change is made to any component or proportion of the mix design of that interior finish.

Estimated Life Cycle Cost Impact:

None.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

N/A

SP12-24

SP13-24

ISPSC: SECTION 202, 307.2.1.1

Proponents: Jennifer Hatfield, J. Hatfield & Associates, Pool & Hot Tub Alliance (jen@jhatfieldandassociates.com); Gregory Andrew Ceton, Pool and Hot Tub Alliance (gceton@phta.org)

2024 International Swimming Pool and Spa Code

Revise as follows:

AQUATIC RECREATION FACILITY. A facility that is designed for free-form aquatic play and recreation. The facilities may include, but are not limited to, wave ~~or surf~~ action pools, leisure rivers, ~~sand bottom pools,~~ vortex pools, activity pools,catch pools ~~inner tube rides, body slides~~ and interactivewater play features ~~attractions~~.

307.2.1.1 ~~Beach~~ Sand bottom pools. Clean sand or similar material, where used underwater in a ~~beach~~ pool environment, shall be used over an impervious surface. The sand area shall be designed and controlled so that the circulation system, maintenance, safety, sanitation, and operation of the pool are not adversely affected.

Reason: This proposal aligns the "Aquatic Recreation Facility" definition with the classifications and wording used in the Class D pools. It removes pool types that are not listed within the Class D pools and also adds a Class D pool type, catch pools, that is not currently listed within the definition. These changes do not limit other aspects that could be included in an "Aquatic Recreation Facility" designed for free-form aquatic play and recreation, but ensure the examples listed fall within defined Class D categories that currently exist in the ISPSC definitions.

The proposal also more accurately titles Section 307.2.1.1 to reflect that this section is addressing pools that use sand or similar material under the water of a pool. Whereas beach pools could also be beach entry/zero entry pools that do not necessarily have sand or similar material being used under the water. This will make it clear to the code user that if a pool is utilizing a sand bottom, it must meet the requirements within this subsection.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is not intending to make any technical changes, but simply clarify a current definition and subsection for consistency and in order to provide clarity to the code user.

SP13-24

SP14-24

ISPSC: 307.2.2

Proponents: Gregory Andrew Ceton, Pool and Hot Tub Alliance (gceton@phta.org); Jennifer Hatfield, J. Hatfield & Associates, Pool & Hot Tub Alliance (jen@jhatfieldandassociates.com)

2024 International Swimming Pool and Spa Code

Revise as follows:

307.2.2 Materials and structural design. Pools and spas shall conform to one or more of the standards indicated in Table 307.2.2. The structural design of pools and spas shall be in accordance with the *International Building Code* or the *International Residential Code*, as applicable in accordance with Section 102.7.1 of this code.

> ~~**Exception:** Pools and spas constructed with reinforced concrete or reinforced shotcrete with a minimum compressive strength of 2,500 pounds per square inch (175.8 kg/cm^2) as designed by a design professional and approved shall be permitted.~~

Reason: This proposal removes the 2,500 minimum psi compressive strength exception in 307.2.2 in favor of strength calculated by following American Concrete Institute (ACI) 318.

This change will place the burden of calculating and justifying minimum compressive strength of a concrete pool shell in the hands of the Licensed Design Professional or Engineer and the AHJ and their interpretations of the requirements of ACI 318. This interpretation may vary depending on location, type of structure (structurally watertight vessel), and placement environment severity (constant water contact having chlorides, sulfates, potentially low pH and/or low alkalinity).

ACI 318 is authoritative for the engineering of structural reinforced concrete or shotcrete used for the water-containment portion of a swimming pool as spa. The swimming pool structure should be engineered to resist the anticipated stresses, deflection, and load factors that can occur when filling and draining the pool with water, and include other anticipated regional concerns, such as expansive soils and freeze/thaw, per ACI 318.

The current ISPSC exception allows 2,500 psi minimum compressive strength, but in ACI 318 2,500 psi is the starting point for calculations for all structures. The ACI 318 requires that the durability section must also considered, and the engineer address the placement environment severity (mentioned above) as part of the engineering.The American Shotcrete Association has several Shotcrete for Swimming Pool Position Papers stipulating 4,000 psi minimum compressive strength:

Bibliography: Position papers referenced at Resources - American Shotcrete Association

1. American Shotcrete Association, ASA Pool and Recreational Shotcrete Committee, Position Statement #1, "Compressive (Strength) Values of Pool Shotcrete."
2. American Shotcrete Association, ASA Pool and Recreational Shotcrete Committee, Position Statement #2, "Definitions of Key Shotcrete Terminology."
3. American Shotcrete Association, ASA Pool and Recreational Shotcrete Committee, Position Statement #3, "Sustainability of Shotcrete in the Pool Industry."
4. American Shotcrete Association, ASA Pool and Recreational Shotcrete Committee, Position Statement #4, "Watertight Shotcrete for Swimming Pools."
5. American Shotcrete Association, ASA Pool and Recreational Shotcrete Committee, Position Statement #5, "Monolithic Shotcrete for Swimming Pools (No Cold Joints)."
6. American Shotcrete Association, ASA Pool and Recreational Shotcrete Committee, Position Statement #6, "Forming and Substrates in Pool Shotcrete."

Cost Impact: Increase

Estimated Immediate Cost Impact:

$350 - $650 per pool depending on size of pool and area of country.

Estimated Immediate Cost Impact Justification (methodology and variables):

To achieve the structural strength required per ACI 318would require the additional of 1-one extra bag of Portland cement be added for every square yard of concrete/shotcrete placed.

Approximate increase to an average swimming pool costing $30,000-$50,000, depending on the region of the country, would be approximately $350 - $650 for additional required cement as above.

The above assumes an average-sized 450 square foot pool.

Estimated Life Cycle Cost Impact:

None. Possible decrease for some pools from lower chance of structural failure.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

None.

SP14-24

SP15-24

ISPSC: 307.2.2, 307.2.2.1 (New), TABLE 307.2.2, 307.2.2.2 (New), 307.2.2.2.1 (New)

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Swimming Pool and Spa Code

Revise as follows:

307.2.2 Materials and structural design. Materials shall be in accordance with Section 307.2.2.1. Structural design shall be in accordance with Section 307.2.2.2.~~Pools and spas shall conform to one or more of the standards indicated in Table 307.2.2. The structural design of pools and spas shall be in accordance with the *International Building Code* or the *International Residential Code*, as applicable in accordance with Section 102.7.1 of this code.~~

> **Exception:** Pools and spas constructed with reinforced concrete or reinforced shotcrete with a minimum compressive strength of 2,500 pounds per square inch (175.8 kg/cm^2) as designed by a design professional and approved shall be permitted.

Add new text as follows:

307.2.2.1 Materials. Pools and spas shall conform to one or more of the standards indicated in Table 307.2.2.1.

Revise as follows:

TABLE ~~307.2.2~~ 307.2.2.1 RESERVOIRS AND SHELLS

MATERIAL	STANDARD
Fiberglass reinforced plastic	IAPMO Z124.7
Plastic	IAPMO Z124.7
Reinforced concrete	ACI 318
Reinforced shotcrete	ACI 318
Stainless steel (Types 316, 316L, 304, 304L)	ASTM A240
Tile	ANSI A108/A118/A136.1
Vinyl	ASTM D1593

Add new text as follows:

307.2.2.2 Structural Design. The structural design of pools and spas shall be in accordance with the International Building Code or the International Residential Code, as applicable in accordance with Section 102.7.1 of this code.

307.2.2.2.1 Angle of repose. Trenching and excavations associated with pools and spas installed parallel to footings and walls shall not extend into the bearing plane of a footing or wall. The upper boundary of the bearing plane shall be defined as a line that extends downward, at an angle of 45 degrees (0.79 rad) from horizontal, from the outside bottom edge of the footing or wall.

> **Exception:** This section shall not apply where approved underpinning or other methods designed by an engineer are used to protect the foundation system of the pool, spa, and adjacent structures.

Reason: Currently the ISPSC does not address the angle of repose from a foundation. This code section is needed to ensure that when excavation associated with pools and spas occur those excavations do not adversely affect any adjacent structure or walls.

With some developers choosing to use smaller lot sizes and a nationwide effort to increase density, we are seeing more dwellings and public areas where pools are installed in a manner that adversely affects the structures in the immediate vicinity of the excavation sites for pools and spas. This code section is needed to protect the adjacent structures and walls. Furthermore, this requirement can be found in the IPC for trenches and will align with existing requirements.

This proposal is submitted by the ICC Plumbing Mechanical Gas Code Action Committee (PMGCAC)

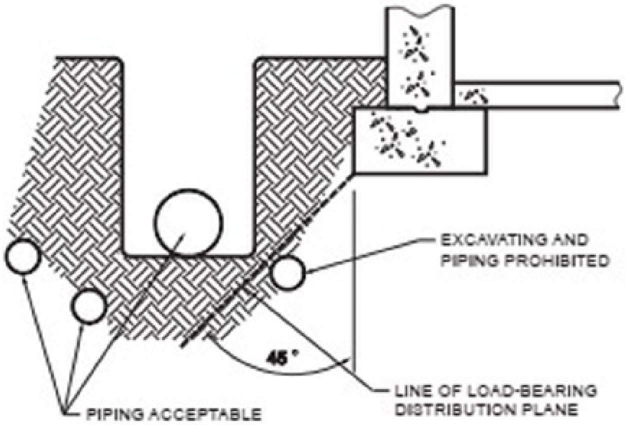
PMGCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 PMGCAC has held 26 virtual meetings open to any interested party. In addition, there were several virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the PMGCAC website at PMGCAC.

Bibliography:

IPC: 307.5 Protection of footings.

Trenching installed parallel to footings and walls shall not extend into the bearing plane of a footing or wall. The upper boundary of the bearing plane is a line that extends downward, at an angle of 45 degrees (0.79 rad) from horizontal, from the outside bottom edge of the footing or wall.

IPC Commentary: A footing requires a minimum load-bearing area to distribute the weight of the building. This load-bearing distribution plane extends downward at approximately a 45-degree (0.79 rad) angle from the base of the footing. Water, building drainage and building sewer piping must not be installed below this load-bearing plane. Excavation for the installation of pipe below the plane could affect the load capacity of the footing or cause the excavation to collapse (see Commentary Figure 307.5).



Commentary Figure 307.5
EXCAVATION IN RELATION TO FOOTING

Cost Impact: Increase

Estimated Immediate Cost Impact:

For a 30 foot pool wall, about $900.

Estimated Immediate Cost Impact Justification (methodology and variables):

Generally about $25-30 per foot of wall for more reinforcing steel, concrete and added labor.

Estimated Life Cycle Cost Impact:

N/A

Estimated Life Cycle Cost Impact Justification (methodology and variables):

N/A

SP15-24

SP16-24

ISPSC: TABLE 312.4, TABLE 312.4.1

Proponents: Gregory Andrew Ceton, Pool and Hot Tub Alliance (gceton@phta.org); Jennifer Hatfield, J. Hatfield & Associates, Pool & Hot Tub Alliance (jen@jhatfieldandassociates.com)

2024 International Swimming Pool and Spa Code

Revise as follows:

TABLE 312.4 CIRCULATION SYSTEM PIPE MATERIAL STANDARD

MATERIAL	STANDARD
~~Acrylonitrile butadiene styrene (ABS) plastic pipe~~	~~ASTM D1527~~
Chlorinated polyvinyl chloride (CPVC) plastic pipe and tubing	ASTM D2846; CSA B137.6
Copper or copper-alloy tubing	ASTM B88; ASTM B447
Polyvinyl chloride (PVC) hose	ASTM D1785; ASTM D2241; ASTM D2672; CSA B137.3
Polyvinyl chloride (PVC) plastic pipe	ASTM D1785; CSA B137.3
Stainless steel pipe, Types 304, 304L, 316, 316L	ASTM A312

TABLE 312.4.1 CIRCULATION SYSTEM FITTINGS

MATERIAL	STANDARD
~~Acrylonitrile butadiene styrene (ABS) plastic pipe~~	~~ASTM D1527~~
Chlorinated polyvinyl chloride (CPVC) plastic pipe and tubing	ASTM D2846; ASTM F437;ASTM F438; ASTM F439; CSA B137.6
Copper or copper-alloy tubing	ASME B16.15
Polyvinyl chloride (PVC) plastic pipe	ASTM D2464; ASTM D2466; ASTM D2467; CSA B137.2; CSA B137.3
Stainless steel pipe, Types 304, 304L, 316, 316L	ASTM A182; ASTM A403

Reason: ASTM D1527 has been withdrawn by ASTM and there is no substitute standard to guide installation.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$1-2,000

Estimated Immediate Cost Impact Justification (methodology and variables):

Total cost of residential pool piping is approximately $7,500 to $10,000. ABS piping tends to be more expensive than PVC piping, so that cost could be as high as $12,000 for an average residential pool. Removing the more expensive option results in the estimated average savings.

All of these costs can increase dramatically in a typical public pool installation due to the greater average size of the projects.

Estimated Life Cycle Cost Impact:

None.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

N/A

SP16-24

SP17-24

ISPSC: SECTION 202 (New), SECTION 202, 316.4.1

Proponents: Gregory Ceton, Pool and Hot Tub Alliance (gceton@phta.org); Jennifer Hatfield, J. Hatfield & Associates, Pool & Hot Tub Alliance (jen@jhatfieldandassociates.com)

2024 International Swimming Pool and Spa Code

Add new definition as follows:

FREEBOARD. The vertical distance between the operating level of the pool and the level where the water would spill beyond the pool or onto the deck. For a pool with a vanishing edge, or where the coping is lower than the design pool water level, the freeboard would be zero.

Revise as follows:

SURGE CAPACITY. The storage volume in a surge tank, *gutter,* and plumbing lines that is available during operation of the pool to temporarily hold water that has been displaced from the pool by bathers, without diverting that water to waste. Water held in surge capacity shall not be in motion due to gravity, rather, only by the pumps.

316.4.1 Surge capacity. Where perimeter surface skimming systems are used, they shall be connected to a circulation system with a system surge capacity of not less than ~~1~~ 0.5 gallon for each square foot (~~40.7~~ 20.4 liters per square meter) of water surface, unless there is 2 inches (51 mm) or more of freeboard around the entirety of the pool perimeter. The capacity of the perimeter overflow system and related piping is permitted to be considered as a portion of the surge capacity.

Reason: The purpose of surge capacity is poorly understood. The idea of surge capacity is to allow the pool to fill up with people and empty out without having to divert the displaced water to waste.

1. Surge capacity should not be required on pools with adequate freeboard, because they will not dump water to waste during a high bather load event. Some pools, such as vanishing edge pools or tension edge pools, would not have adequate freeboards, for example.
2. Areas that only ever have water in motion (such as gutter pipes and gutter trenches) should not count as surge capacity, because these areas typically cannot fill up with water. For example, consider a vanishing edge pool with no main drain that has a section of sloping gutter pipe above the catch basin static water level. This pipe does not get fuller when more people come into the pool. Its fullness depends on the flow rate and pipe slope only.
3. Experience shows many areas have adopted this requirement, but few enforce it, and those that do are not consistent in how they apply it. The requirement of one gallon per square foot converts to a height of about 1.75 inches of water over the pool. Surge capacity is intended to prevent water from going to waste every time a group of bathers enters the pool. Therefore, in a typical open gutter pool, with freeboard behind the gutter dropouts, water is never diverted to waste due to high bather load, and surge capacity is not needed. All that happens in that case is the water over the gutter lip temporarily grows, and this is benign.

The current definition of surge capacity expects the excess water to go to places it will not actually go, because gutter pipes typically run partially full of flowing water down a slope. The volume held in a gutter pipe is a function of the gutter flow rate, and it does not change when some volume is displaced.

Surge capacity should be more narrowly defined, and it should only be required where freeboard is low. This proposal addresses that and adds a definition for "freeboard".

Cost Impact: Decrease

Estimated Immediate Cost Impact:

Difficult to estimate due to the differences in pool sizes and tank costs between projects.

Surge tanks range in price from $150-$10,000

Assuming a larger residential pool able to use a smaller surge tank under the proposal, the average decrease would likely be $1,000 to $2,000.

Estimated Immediate Cost Impact Justification (methodology and variables):

Listed prices of surge tanks, cost of installation would be unaffected by the tank size.

Estimated Life Cycle Cost Impact:

None.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

None.

SP17-24

SP18-24

ISPSC: 317.2, TABLE 317.2(1), TABLE 317.2(2), CSA Chapter 11 (New)

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Swimming Pool and Spa Code

Revise as follows:

317.2 Certification. Heaters ~~and hot water storage tanks~~ shall be *listed* and *labeled* in accordance with the applicable standard indicated in Table 317.2(1). ~~Hot water~~ H~~h~~eating systems and components shall comply with the applicable standard indicated in Table 317.2(2).

TABLE 317.2(1) ~~WATER HEATERS~~ POOL AND SPA HEATERS

DEVICE	STANDARD
Electric ~~water heater~~ pool and spa heaters	UL 1261, UL 1563 or CSA C22.2 No. 218.1
Gas-fired ~~water heater~~ pool and spa heaters	ANSI Z21.56/CSA 4.7a
Heat exchanger	AHRI 400
Heat pump ~~water heater~~ pool and spa heaters	AHRI 1160 and one of the following: ~~CSA C22.2 No. 236, UL 1995, or~~ UL~~/CSA~~ 60335-2-40 or CSA C22.2 No.60335-2-40

TABLE 317.2(2) ~~WATER~~ POOL AND SPA HEATING SYSTEMS AND COMPONENTS

SYSTEM	STANDARD
Solar ~~water heater~~ pool and spa heating system	ICC/APSP 902/SRCC 400

Add new standard(s) as follows:

CSA

CSA Group
8501 East Pleasant Valley Road
Cleveland, OH 44131-5516

CSA 22.2 NO. 60335-2-40:22 Household and similar electrical appliances — Safety — Part 2-40: Particular requirements for electrical heat pumps, air-conditioners and dehumidifiers (Binational standard UL 60335-2-40)

Staff Analysis: A review of the standard proposed for inclusion in the code, CSA CSA C22.2 No.60335-2-40 *Household and similar electrical appliances — Safety — Part 2-40: Particular requirements for electrical heat pumps, air-conditioners and dehumidifiers (Binational standard UL 60335-2-40)*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: "Water heater" is not defined in the ISPSC, but it is a defined term in the IMC/IPC. The referenced devices are more accurately referred to as "Pool and Spa Heaters" as witnessed by the titles of the referenced standards. Removed the reference to storage tanks because none of the referenced standards apply to storage tanks other than solar system, where they are a component as already included in Table 316.2(2). Updated standard reference for heat pump pool and spa heaters to remove standards which will be sunsetted by publication date of 2027 ISPSC.

This proposal is submitted by the ICC Plumbing Mechanical Gas Code Action Committee (PMGCAC) PMGCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 PMGCAC has held 26 virtual meetings open to any interested party. In addition, there were several virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the PMGCAC website at PMGCAC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal simply clarifies existing requirements. There is no technical change and therefore there are no changes to labor and materials that would impact the cost of construction.

SP18-24

SP19-24

ISPSC: SECTION 202, SECTION 202 (New), SECTION 325, 325.1, 325.2, 325.7.2, 325.3 (New), 325.3, 325.5 (New), 325.4, 325.5, 325.6, 325.7, 325.9.1, 325.7.1, 325.7.2.1, 325.9.2.1 (New), 325.8.2.2 (New), SECTION 326 (New), 326.1 (New), 325.8, 326.2.1 (New), 326.2.2 (New), 325.8.1, 326.3.1 (New), 326.3.2 (New), 325.8.1.1, 325.8.2, 326.4.1 (New), 325.8.2.1, 325.8.2.2, 325.8.2.3, 325.10, 325.11, 326.8.1 (New), 326.8.2 (New), 325.12, SECTION 327 (New), 327.1 (New), 325.9, 327.2.1 (New), 327.2.2 (New), 327.2.3 (New), 325.9.2

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Swimming Pool and Spa Code

SECTION 202
DEFINITIONS

Add new definition as follows:

<u>CHEMICAL STORAGE SPACE</u>. <u>A room dedicated for storing pool or spa chemicals.</u>

Revise as follows:

EQUIPMENT ROOM. A space intended for the operation of pool <u>or spa</u> pumps, filters, heaters, and controllers. This space is not intended for the storage of hazardous pool or spa chemicals.

SECTION 325
EQUIPMENT ROOMS

Revise as follows:

325.1 General. The provisions of this section apply to public pools and spas and aquatic recreation facilities.

<u>**Exception:** Equipment rooms for other purposes and equipment not serving the pool, spa or aquatic recreation facility shall be in accordance with the *International Mechanical Code.*</u>

Delete and substitute as follows:

~~**325.2 Requirements.** The equipment area or room floor shall be of concrete or other suitable material having a smooth slip-resistant finish and have positive drainage, including a sump drain pump, if necessary. Floors shall have a slope toward the floor drain or sump drain pump adequate to prevent standing water at all times. The opening to the equipment room or area shall be designed to provide access for all anticipated equipment. At least one hose bibb with backflow preventer shall be located in the equipment room or allow for access within an adequate distance of the equipment room so that a hose can service the entire room.~~

<u>325.2</u> <u>Floor Requirements</u>. <u>The floor of the equipment room shall be of concrete or other nonabsorbent material having a smooth slip-resistant finish. The floor shall have positive drainage with a slope toward the floor drain or sump drain pump to prevent standing water.</u>

~~**325.7.2 Indoor aquatic facility access.** Where a door or doors are installed in a wall between an equipment room and an indoor aquatic facility, the floor of the equipment room shall slope back into the equipment room in such a way as to prevent any equipment room spills from running under the door into the indoor aquatic facility. This requirement shall be accomplished by one of the following:~~

1. ~~A floor all of which is at least 4 inches (102 mm) below the level of the nearest part of the indoor aquatic facility floor.~~
2. ~~A continuous dike not less than 4 inches (102 mm) high located entirely within the equipment room, which will prevent spills from reaching the indoor aquatic facility floor.~~

325.2.1 Indoor aquatic facility equipment room floor requirements. Where doors are installed in a wall between an equipment room and an indoor aquatic facility, the floor of the equipment room shall slope back into the equipment room to prevent any equipment room spills from entering the indoor aquatic facility. This requirement shall be accomplished by one of the following:

1. A floor all of which is at least 4 inches (102 mm) below the level of the nearest part of the indoor aquatic facility floor.
2. A continuous dike not less than 4 inches (102 mm) high located entirely within the equipment room, which will prevent spills from reaching the indoor aquatic facility floor.
3. Installation of floor drains.

Add new text as follows:

325.3 Hose bibbs. A minimum of one hose bibb with backflow preventer shall be installed in the equipment room or within 25 feet of the equipment room door opening so that a hose can service the entire room.

Revise as follows:

325.4 ~~325.3~~ Construction tolerances. The size of the equipment room ~~or area~~ shall provide working space to perform routine operations and equipment service. Equipment rooms ~~also intended~~ which include ~~for~~ storage, shall have ~~adequate~~ the required space provided for such storage, without reducing the working spaces. ~~Equipment rooms or areas shall be lighted to provide 30 foot-candles (323 lux) of illumination at floor level.~~ The opening to the equipment room shall be large enough in size to provide access for all equipment.

Add new text as follows:

325.5 Lighting. Equipment rooms shall be lighted to provide 30 foot-candles (323 lux) of illumination at floor level.

Revise as follows:

325.6 ~~325.4~~ Electrical. All electrical wiring shall be installed in accordance with NFPA 70.

325.7 ~~325.5~~ Ventilation. Equipment room ventilation shall address all of the following:

1. Combustion requirements.
2. Heat dissipation from equipment.
3. Humidity from surge or balance tanks.
4. Ventilation to the outside.
5. Air quality.

325.8 ~~325.6~~ Markings. All piping in the equipment room shall be permanently identified by its use and the pool or spa it serves. Identification shall be provided for all of the following:

1. Main drains and skimmer lines.
2. Filtered water.
3. Make-up water
4. Chlorine (or disinfection) feeds.
5. Acid (or pH) feeds.
6. Compressed air lines.
7. *Gutter* lines.
8. Chemical sample piping.

9. Pool heating lines.

All piping shall be marked with directional arrows as necessary to determine flow direction and all valves shall be clearly identified ~~by number~~ with a brass tag, plastic laminate tag or permanently affixed alternative. Valves shall be identified and described as to their function and referenced in the operating instruction manual.

325.9 ~~325.7~~ Separation from chemical storage spaces. ~~Combustion~~ Fuel-fired equipment, air-handling equipment, and electrical equipment shall not ~~be exposed to air contaminated with corrosive chemical fumes or vapors. Spaces containing combustion equipment, air-handling equipment or electrical equipment and spaces~~ share~~ing~~ air distribution with chemical storage spaces.~~containing such equipment shall not be used as chemical storage spaces at the same time unless the equipment is listed and labeled for use in that atmosphere.~~. ~~Spaces containing combustion equipment, air-handling equipment, or electrical equipment and spaces sharing air distribution with spaces containing such equipment shall be isolated from chemical storage space air.~~

Delete without substitution:

~~**325.9.1 Signage.** In addition to the signs on all chemical storage areas, a sign shall be posted on the exterior of the entry door stating "DANGER - GASEOUS OXIDIZER — OZONE" in lettering not less than 4 inches (102 mm) high.~~

Revise as follows:

325.9.1 ~~325.7.1~~ Doors and openings. A door or opening ~~doors~~ shall not be installed in a wall between such equipment rooms and an interior chemical storage space. There shall be no ducts, grilles, pass-throughs, or other openings connecting such equipment rooms to chemical storage spaces~~, except as permitted by the *International Fire Code*~~.
~~Spaces containing combustion equipment, air-handling equipment, or electrical equipment and spaces sharing air distribution with spaces containing such equipment shall be isolated from indoor aquatic facility air unless the equipment is listed for the atmosphere. There shall be no ducts, grilles, pass-throughs, or other openings connecting such spaces to an indoor aquatic facility.~~

~~Ducts that connect the indoor aquatic facility to the duct connections of air handlers shall not be construed as connecting the air-handler space to the indoor aquatic facility unless HVAC equipment is rated for indoor aquatic facility atmosphere and serves only that indoor aquatic facility.~~

~~Where building construction leaves any openings or gaps between floors and walls, or between walls and other walls, or between walls and ceilings, such gaps shall be permanently sealed against air leakage.~~

325.9.2 ~~325.7.2.1~~ Automatic closer and lock. A door between an equipment room and an indoor aquatic facility shall be equipped with an automatic closer and automatic lock~~. The door, frame, and automatic closer shall be installed so as to ensure that the door~~ that closes the door completely and latches without human assistance.The automatic lock shall require a key or combination to open from the indoor aquatic facility side. The lock shall be designed and installed to be opened by one hand from the inside of the room under all circumstances, without the use of a key or tool.~~Such doors shall be equipped with permanent signage warning against unauthorized entry. All sides of such doors shall be equipped with a gasket. The gasket shall be installed to prevent the passage of air, fumes, or vapors when the door is closed.~~

Add new text as follows:

325.9.2.1 Signage. A door between an equipment room and an indoor aquatic facility shall be equipped with permanent signage warning against unauthorized entry.

325.8.2.2 Gaskets. All sides of doors between an equipment room and an indoor aquatic facility shall be equipped with a gasket to prevent the passage of air, fumes, or vapors when the door is closed.

SECTION 326
CHEMICAL STORAGE SPACE

326.1 General. The provisions of this section apply to public pools and spas and aquatic recreation facilities.

Revise as follows:

326.2 ~~325.8~~ Chemical storage space. At least one space dedicated to chemical storage space shall be provided to allow safe storage of pool and spa chemicals. In all chemical storage spaces, an emergency eyewash station shall be provided. The construction of a chemical storage space shall ~~take into account foreseeable hazards and~~ protect the stored materials against tampering, wildfires, unintended exposure to water and the transfer of fumes into any interior space of a building intended for occupation. ~~Any walls, floors, doors, ceilings, and other building surfaces of an interior chemical storage space shall join each other tightly.~~
~~If chemicals are to be stored outdoors, they shall be stored in a well-ventilated protective area with an installed barrier to prevent unauthorized access. Exterior chemical storage spaces not joined to a wall of a building shall be completely enclosed by fencing that is at least 6 feet high (1829 mm). Fencing shall be equipped with a self-closing and self-latching gate having a permanent locking device.~~

Add new text as follows:

326.2.1 Interior chemical storage space. Any walls, floors, doors, ceilings, and other building surfaces of an interior chemical storage space shall be sealed. There shall be no transfer grille, pass-through grille, louver, or other device or opening that will allow air movement from the chemical storage space into any other interior space of a building.

326.2.2 Outdoor chemical storage space. Where chemicals are to be stored outdoors, they shall be stored in a ventilated protective area with an installed barrier to prevent unauthorized access. Exterior chemical storage spaces not joined to a wall of a building shall be completely enclosed by fencing that is at least 6 feet high (1829 mm). Fencing shall be equipped with a self-closing and self-latching gate having a permanent locking device.

Revise as follows:

326.3 ~~325.8.1 Chemical storage space doors~~ Doors and openings. All doors opening into chemical storage spaces shall be equipped with permanent signage having all of the following:

1. A warning against unauthorized entry.
2. Statement of the ~~expected~~ hazards.
3. Statement of the location of the associated safety data sheet forms.
4. Product chemical hazard NFPA chart.

~~Where a single door is the only means of egress from a chemical storage space, the door shall be equipped with an emergency-egress device. Where a chemical storage space door must open to an interior space, spill containment shall be provided to prevent spilled chemicals from leaving the chemical storage space and the door shall not open to a space containing combustion equipment, air-handling equipment, or electrical equipment.~~

Add new text as follows:

326.3.1 Emergency-egress. Where a single door is the only means of egress from a chemical storage space, the door shall be equipped with an emergency-egress device.

326.3.2 Spill containment. Where a chemical storage space door opens to an interior space, spill containment shall be provided to prevent spilled chemicals from leaving the chemical storage space.

Revise as follows:

326.3.3 ~~325.8.1.1~~ Interior opening doors. Where a chemical storage space door ~~must~~ opens to an interior space, such door shall ~~have~~ meet all of the following requirements:

1. Constructed of corrosion-resistant materials.

2. Equipped with a corrosion-resistant, automatic lock to prevent unauthorized entry.
   2.1. Such lock shall require a key or combination to open from the outside into the chemical storage space.
   2.2. Such lock shall be designed and installed as to be capable of being opened by one hand from the inside of the chemical storage space without the use of a key or tool.
3. Supported on corrosion-resistant hinges, tracks, or other supports.
4. Equipped with ~~suitable~~ gaskets or seals on the top and all sides to ~~minimize~~ prevent air leakage between the door and the door frame.
5. Equipped with a floor or threshold seal to ~~minimize~~ prevent air leakage between the door and the floor or threshold.
6. Equipped with an automatic door closer that will completely close the door and latch without assistance ~~and against the specified difference in air pressure~~.
7. Equipped with a limit switch and an alarm that will sound if the door remains open for more than 30 minutes. The alarm shall have a minimum output level of 85 dbA at 10 feet (2028 mm).

326.4 32~~5.8.2~~ Interior chemical storage spaces~~s~~ ventilation. ~~There shall be no transfer grille, pass-through grille, louver, or other device or opening that will allow air movement from the chemical storage space into any other interior space of a building intended for occupancy or into another chemical storage space.~~
Interior chemical storage spaces that share any building surface with any other interior space shall be equipped with a ventilation system that operates continuously and ensures that all air movement is from all other interior space and toward the chemical storage space.

Interior chemical storage spaces that share an electrical conduit system with any other interior space shall be equipped with a ventilation system that operates continuously and ensures that all air movement is from all other interior spaces and toward the chemical storage space. This pressure difference shall be maintained by a continuously operated exhaust system used for no other purpose than to remove air from that one chemical storage space.

~~Where more than one chemical storage space is present, a separate exhaust system shall be provided for each chemical storage space. The exhaust airflow rate shall be the amount specified in the *International Mechanical Code*. The function of this exhaust system shall be monitored continuously by an audible differential-pressure alarm system that shall sound if the specified differential air pressure is not maintained for a period of 30 minutes. This alarm shall have a minimum output level of 85 dbA at 10 feet (3048 mm) and shall require manual reset to silence it.~~

Add new text as follows:

326.4.1 Multiple exhaust systems. Where more than one chemical storage space exists, a separate exhaust system shall be installed for each space. An audible differential-pressure alarm system that sounds if the specified differential air pressure is not maintained for a period of 30 minutes shall be provided for each chemical storage space. The alarm shall have a minimum output level of 85 dbA at 10 feet (3048 mm) and shall require manual reset. The exhaust airflow rate shall be the amount specified in the International Mechanical Code.

Delete and substitute as follows:

~~**325.8.2.1 Air ducts in interior chemical storage spaces.** No duct shall allow air movement from the chemical storage space into any other interior space of a building intended for occupation or into any other chemical storage space.~~
~~Air ducts shall not enter or pass through an interior chemical storage space unless it is a corrosion-resistant duct used for no other purpose than to exhaust air from the chemical storage space. This corrosion-resistant duct must exhaust to the exterior and must end at a point on the exterior of the building, at least 20 feet (6096 mm) from any air intake for breathing air, cooling air, or combustion air.~~

~~A duct used for no other purpose than to supply makeup air to the chemical storage area shall be acceptable. This makeup air supply duct must end at a point on the exterior of the building, at least 20 feet (6096 mm) from any air intake for breathing air, cooling air, or combustion air.~~

~~Any other ducts specifically allowable by the *International Mechanical Code* where such ducts are corrosion resistant and free of joints to the extent feasible shall be acceptable.~~

326.4.2 Air ducts in interior chemical storage spaces. Air ducts shall not enter or pass through an interior chemical storage space.

Exceptions:

1. A corrosion-resistant duct used for no other purpose than to exhaust air from the chemical storage space. The corrosion-resistant duct shall exhaust to the exterior and shall terminate at a point on the exterior of the building, at least 20 feet (6096 mm) from any air intake or combustion air intake.
2. A duct used to supply makeup air to the chemical storage area shall be acceptable.

Revise as follows:

326.5 ~~325.8.2.2~~ Pipes and tubes in interior chemical storage spaces. Piping, tubes, drain bodies, grates, and attachment and restraint devices shall be corrosion resistant including floor drain bodies and grates. All wall penetrations shall be sealed airtight. Sealing materials shall be compatible with the wall assembly and the chemical environment present. Pipes and tubes shall not enter or pass through an interior chemical storage space.

Exceptions:

1. As required to service devices integral to the function of the chemical storage space, such as pumps, vessels, controls, freeze protection, and safety devices.
2. As required to allow for automatic fire suppression.
3. As required for drainage.

~~Piping, tubes, drain bodies, grates, and attachment and restraint devices shall be corrosion resistant and rated for the chemical environment(s) present, including floor drain bodies and grates. All wall penetrations shall be sealed air tight and commensurate with the rating of the wall assembly. Sealing materials shall be compatible with the wall assembly and the chemical environment(s) present.~~

326.6 ~~325.8.2.3~~ ~~Combustion~~ Fuel-fired equipment in interior chemical storage. No ~~combustion device or~~ fuel-fired appliance shall be installed in a chemical storage space, or in any other place where it will be exposed to the air from a chemical storage space.

~~**Exceptions:** A combustion device or appliance that meets all of the following requirements shall be acceptable:~~

1. ~~The device or appliance is required for one or more processes integral to the function of the room, such as space heat.~~
2. ~~The device is listed for such use.~~
3. ~~The device as installed is *approved*.~~

326.7 ~~325.10~~ Gaseous chlorination space. Use of compressed chlorine gas shall be prohibited for new construction and after substantial *alteration* to existing facilities.

326.8 ~~326.11~~ Windows. Windows shall comply with Sections 326.8.1 and 326.8.2.~~Where windows are installed in an interior wall, ceiling, or door of a chemical storage space, such windows shall have the following components:~~

1. ~~Tempered or plasticized glass.~~
2. ~~A corrosion-resistant frame.~~
3. ~~Incapable of being opened or operated.~~

~~Where windows are installed in an exterior wall or ceiling, such windows shall:~~

1. ~~Be mounted in a corrosion-resistant frame.~~
2. ~~Be protected by a roof, eave, or permanent awning as to minimize the entry of rain or snow in the event of window breakage.~~

Add new text as follows:

326.8.1 Interior windows. Where windows are installed in an interior wall, ceiling, or door of a chemical storage space, such windows shall have the following components:

1. Tempered or plasticized glass.
2. A corrosion-resistant frame.
3. Incapable of being opened or operated.

326.8.2 Exterior windows. Where windows are installed in an exterior wall or ceiling, such windows shall:

1. Be mounted in a corrosion-resistant frame.
2. Be protected by a roof, eave, or permanent awning as to minimize the entry of rain or snow in the event of window breakage.

Revise as follows:

326.9 ~~326.12~~ Sealing and blocking materials. Materials used for sealing and blocking openings in an interior chemical storage space shall:

1. Minimize the leakage of air, vapors, or fumes from the chemical storage space.
2. Be compatible for use in the environment.
3. Be commensurate with the fire rating assembly in which they are installed.

Add new text as follows:

SECTION 327
OZONE EQUIPMENT ROOMS

327.1 General. The provisions of this section apply to public pools and spas and aquatic recreation facilities.

Revise as follows:

327.2 ~~325.9~~ Ozone equipment rooms. An ozone equipment room shall not be used for storage of chemicals, solvents, or any combustible materials, other than those required for the operation of the recirculation and ozone-generating equipment.Where an equipment room includes ozone equipment, the equipment room shall meet the requirements of Sections 327.2.1 through 327.2.4. ~~Rooms that are designed to include ozone equipment shall be equipped with an emergency ventilation system capable of 6 air changes per hour. The exhaust intake shall be located 6 inches (152 mm) from the floor, on the opposite side of the room from the make-up air intake.~~

~~The emergency ventilation system shall be so arranged as to run on command of an ozone-leak alarm or on command of a manual switch. The manual emergency ventilation switch shall be located outside the room and near the door to the ozone room.~~
~~Ozone rooms which are below grade shall be equipped with force-draft ventilation capable of 6 changes per hour. The exhaust intake shall be located 6 inches (152 mm) from the floor, on the opposite side of the room from the make-up air intake. Such ventilation shall be so arranged as to:~~

1. ~~Run automatically concurrent with the ozone equipment and for at least a time allowing for 15 air changes after the ozone equipment is stopped.~~
2. ~~Run on activation of the ozone detection and alarm system.~~
3. ~~Run on command of a manual switch.~~

~~The manual ventilation switch shall be located outside the room and near the door to the ozone room.~~

Add new text as follows:

327.2.1 Emergency mechanical ventilation. Ozone equipment rooms shall be equipped with an emergency mechanical ventilation system capable of 6 air changes per hour. An exhaust intake shall be located 6 inches (152 mm) from the floor, on the opposite side of the room from the make-up air intake. The emergency mechanical ventilation system shall be installed to run on command of an ozone-leak alarm or manual switch. Where a manual switch is installed, the manual switch shall be located outside the door to the ozone equipment room.

327.2.2 Ozone rooms below grade. Ozone rooms below grade shall be equipped with mechanical ventilation capable of 6 changes per hour. The exhaust intake shall be located 6 inches (152 mm) from the floor, on the opposite side of the room from the make-up air intake. The mechanical ventilation shall be installed to meet all the following requirements:

1. Run automatically concurrent with the ozone equipment and for a minimum 15 air changes after the ozone equipment is stopped.
2. Run on activation of the ozone detection and alarm system.
3. Run on command of a manual switch located outside the door to the ozone equipment room.

327.2.3 Signage. A sign shall be posted on the exterior of an ozone equipment room entry door stating "DANGER - GASEOUS OXIDIZER -- OZONE" in lettering not less than 4 inches (102 mm) high.

Revise as follows:

327.2.4 ~~325.9.2~~ Ozone detection and Alarm ~~alarm~~ system. ~~Rooms containing ozone-generation equipment shall be equipped with an audible and visible ozone detection and alarm system.~~
~~The alarm system shall consist of both an audible alarm capable of producing at least 85 decibels at a 10-foot (3048 mm) distance and a visible alarm consisting of a flashing light mounted in plain view of the entrance to the ozone equipment room.~~

~~The ozone sensor shall be located at a height of 18-24 inches (457-610 mm) above floor level. The ozone sensor shall be capable of measuring ozone in the range of 0-2 ppm.The alarm system shall activate when the ozone concentration equals or exceeds 0.1 ppm in the room. Activation of the alarm system shall shut off the ozone-generating equipment and turn on the emergency ventilation system.~~An ozone detection and alarm system shall be installed in accordance with all of the following

1. Activate when the ozone concentration equals or exceeds 0.1 ppm in the ozone equipment room.
2. Shut off the ozone-generating equipment and turn on the emergency mechanical ventilation system.
3. Provide an audible alarm producing a minimum 85 decibels at a 10-foot (3048 mm) distance.
4. Provide a visible alarm consisting of a flashing light mounted in plain view of the entrance to the ozone equipment room.
5. Provide an ozone sensor that can measure ozone in the range of 0-2 ppm and located at a height of 18-24 inches (457-610 mm) above floor level.

Reason: The proposal is intended to clean-up the current ISPSC language to provide clarity of what is required and remove language that is duplicative or that does not provide specific requirements. Further, the proposal separates the current section into two separate sections, one for equipment rooms and one for chemical storage spaces. It also provides for more subsections to add clarity and moves same subject requirements to be together in one place.

This proposal does not make any technical changes. It simply makes the current requirements clearer for the code user and removes any language that is not a requirement that the code user can follow or enforced.For better understanding of the results of those changes shown in this proposal, the following "clean" code text is provided:

SECTION 202

DEFINITIONS

CHEMICAL STORAGE SPACE.

A room dedicated for storing pool or spa chemicals.

EQUIPMENT ROOM. A space intended for the operation of pool or spa pumps, filters, heaters, and controllers. This space is not intended for the storage of hazardous pool or spa chemicals.

SECTION 325

EQUIPMENT ROOMS

325.1 General. The provisions of this section apply to public pools and spas and aquatic recreation facilities.

Exception: Equipment rooms for other purposes and equipment not serving the pool, spa or aquatic recreation facility shall be in accordance with the *International Mechanical Code.*

325.2 Floor Requirements. The floor of the equipment room shall be of concrete or other nonabsorbent material having a smooth slip-resistant finish. The floor shall have positive drainage with a slope toward the floor drain or sump drain pump to prevent standing water.

325.2.1 Indoor Aquatic Facility Equipment Room Floor Requirements. Where a door is installed in a wall between an equipment room and an indoor aquatic facility, the floor of the equipment room shall slope back into the equipment room to prevent any equipment room spills from entering the indoor aquatic facility. This requirement shall be accomplished by one of the following:

1. A floor at least 4 inches (102 mm) below the level of the nearest part of the indoor aquatic facility floor.
2. A continuous dike not less than 4 inches (102 mm) high located entirely within the equipment room.
3. Installation of floor drains.

325.3 Hose bibbs. A minimum of one hose bibb with backflow preventer shall be installed in the equipment room or within 25 feet of the equipment room door opening so that a hose can service the entire room.

325.4 Construction tolerances. The size of the equipment room shall provide working space to perform routine operations and equipment service. Equipment rooms which include storage, shall have the required space provided for such storage, without reducing the working spaces. The opening to the equipment room shall be large enough in size to provide access for all equipment.

325.5 Lighting. Equipment rooms shall be illuminated to provide 30 foot-candles (323 lux) of illumination at floor level.

325.6 Electrical. All electrical wiring shall be installed in accordance with NFPA 70.

325.7 Ventilation. Equipment room ventilation shall address all of the following:

1. Combustion requirements.
2. Heat dissipation from equipment.
3. Humidity from surge or balance tanks.
4. Ventilation to the outside.
5. Air quality.

325.8 Markings. All piping in the equipment room shall be permanently identified by its use and the pool or spa it serves. Identification shall be provided for all of the following:

1. Main drains and skimmer lines.
2. Filtered water.
3. Make-up water
4. Chlorine (or disinfection) feeds.
5. Acid (or pH) feeds.
6. Compressed air lines.
7. Gutter lines.

8. Chemical sample piping.

9. Pool heating lines.

All piping shall be marked with directional arrows to determine flow direction and all valves shall be clearly identified with a brass tag, plastic laminate tag or permanently affixed alternative. Valves shall be identified and described as to their function and referenced in the operating instruction manual.

325.9 Separation from chemical storage spaces. Fuel-fired equipment, air-handling equipment, and electrical equipment shall not share air distribution with chemical storage spaces.

325.9.1 Doors and openings. A door or opening ~~doors~~ shall not be installed in a wall between such equipment rooms and an interior chemical storage space. There shall be no ducts, grilles, pass-throughs, or other openings connecting such equipment rooms to chemical storage spaces.

325.9.2 Automatic closer and lock. A door between an equipment room and an indoor aquatic facility shall be equipped with an automatic closer and automatic lock that closes the door completely and latches without human assistance. The automatic lock shall require a key or combination to open from the indoor aquatic facility side. The lock shall be designed and installed to be opened by one hand from the inside of the room under all circumstances, without the use of a key or tool.

325.9.2.1 Signage. A door between an equipment room and an indoor aquatic facility shall be equipped with permanent signage warning against unauthorized entry.

325.9.2.2 Gaskets. All sides of doors between an equipment room and an indoor aquatic facility shall be equipped with a gasket to prevent the passage of air, fumes, or vapors when the door is closed.

SECTION 326

CHEMICAL STORAGE SPACE

326.1 General. The provisions of this section apply to public pools and spas and aquatic recreation facilities.

326.2 Chemical storage space. At least one space dedicated to chemical storage space shall be provided to allow safe storage of pool and spa chemicals. In all chemical storage spaces, an emergency eyewash station shall be provided. The construction of a chemical storage space shall protect the stored materials against tampering, wildfires, unintended exposure to water and the transfer of fumes into any interior space of a building intended for occupation.

326.2.1 Interior chemical storage space. Any walls, floors, doors, ceilings, and other building surfaces of an interior chemical storage space shall be sealed. There shall be no transfer grille, pass-through grille, louver, or other device or opening that will allow air movement from the chemical storage space into any other interior space of a building.

326.2.2 Outdoor chemical storage space. Where chemicals are to be stored outdoors, they shall be stored in a ventilated protective area with an installed barrier to prevent unauthorized access. Exterior chemical storage spaces not joined to a wall of a building shall be completely enclosed by fencing that is at least 6 feet high (1829 mm). Fencing shall be equipped with a self-closing and self-latching gate having a permanent locking device.

326.3 Doors and openings. All doors opening into chemical storage spaces shall be equipped with permanent signage having all ~~of~~ the following:

1. A warning against unauthorized entry.

2. Statement of the hazards.

3. Statement of the location of the associated safety data sheet forms.

4. Product chemical hazard NFPA chart.

326.3.1 Emergency-egress. Where a single door is the only means of egress from a chemical storage space, the door shall be equipped with an emergency-egress device.

326.3.2 Spill containment. Where a chemical storage space door opens to an interior space, spill containment shall be provided to prevent spilled chemicals from leaving the chemical storage space.

326.3.3 Interior opening doors. Where a chemical storage space door opens to an interior space, such door shall meet all of the following requirements:

1. Constructed of corrosion-resistant materials.

2. Equipped with a corrosion-resistant, automatic lock to prevent unauthorized entry.

2.1. Such lock shall require a key or combination to open from the outside into the chemical storage space.

2.2. Such lock shall be designed and installed as to be capable of being opened by one hand from the inside of the chemical storage space without the use of a key or tool.

3. Supported on corrosion-resistant hinges, tracks, or other supports.

4. Equipped with gaskets or seals on the top and all sides to prevent air leakage between the door and the door frame.

5. Equipped with a floor or threshold seal to prevent air leakage between the door and the floor or threshold.

6. Equipped with an automatic door closer that will completely close the door and latch without assistance.

7. Equipped with a limit switch and an alarm that will sound if the door remains open for more than 30 minutes. The alarm shall have a minimum output level of 85 dbA at 10 feet (2028 mm).

326.4 Interior chemical storage space~~s~~ ventilation. Interior chemical storage spaces that share any building surface with any other interior space shall be equipped with a ventilation system that operates continuously and ensures that all air movement is from all other interior space and toward the chemical storage space. Interior chemical storage spaces that share an electrical conduit system with any other interior space shall be equipped with a ventilation system that operates continuously and ensures that all air movement is from all other interior spaces and toward the chemical storage space. This pressure difference shall be maintained by a continuously operated exhaust system used for no other purpose than to remove air from that one chemical storage space.

326.4.1 Multiple exhaust systems. Where more than one chemical storage space exists, a separate exhaust system shall be installed for each space. An audible differential-pressure alarm system that sounds if the specified differential air pressure is not maintained for a period of 30 minutes shall be provided for each chemical storage space. The alarm shall have a minimum output level of 85 dbA at 10 feet (3048 mm) and shall require manual reset. The exhaust airflow rate shall be the amount specified in the International Mechanical Code.

326.4.2 Air ducts in interior chemical storage spaces. Air ducts shall not enter or pass through an interior chemical storage space.

Exceptions:

1. A corrosion-resistant duct used for no other purpose than to exhaust air from the chemical storage space. The corrosion-resistant duct shall exhaust to the exterior and shall terminate at a point on the exterior of the building, at least 20 feet (6096 mm) from any air intake or combustion air intake.

2. A duct used to supply makeup air to the chemical storage area shall be acceptable.

326.5 Pipes and tubes in interior chemical storage spaces. Piping, tubes, drain bodies, grates, and attachment and restraint devices shall be corrosion resistant, including floor drain bodies and grates. All wall penetrations shall be sealed airtight. Sealing materials shall be compatible with the wall assembly and the chemical environment present. Pipes and tubes shall not enter or pass through an interior chemical storage space.

Exceptions:

1. As required to service devices integral to the function of the chemical storage space, such as pumps, vessels, controls, freeze protection, and safety devices.

2. As required to allow for automatic fire suppression.

3. As required for drainage.

326.6 Fuel-fired equipment in interior chemical storage. No fuel-fired appliance shall be installed in a chemical storage space, or in any other place where it will be exposed to the air from a chemical storage space.

326.7 Gaseous chlorination space. Use of compressed chlorine gas shall be prohibited for new construction and after substantial alteration to existing facilities.

326.8 Windows. Windows shall comply with Sections 326.8.1 and 326.8.2.

326.8.1 Interior windows. Where windows are installed in an interior wall, ceiling, or door of a chemical storage space, such windows shall have the following components:

1. Tempered or plasticized glass.

2. A corrosion-resistant frame.

3. Incapable of being opened or operated.

326.8.2 Exterior windows. Where windows are installed in an exterior wall or ceiling, such windows shall:

1. Be mounted in a corrosion-resistant frame.

2. Be protected by a roof, eave, or permanent awning as to minimize the entry of rain or snow in the event of window breakage.

326.9 Sealing and blocking materials. Materials used for sealing and blocking openings in an interior chemical storage space shall:

1. Minimize the leakage of air, vapors, or fumes from the chemical storage space.

2. Be compatible for use in the environment.

3. Be commensurate with the fire rating assembly in which they are installed.

SECTION 327

OZONE EQUIPMENT ROOMS

327.1 General. The provisions of this section apply to public pools and spas and aquatic recreation facilities.

327.2 Ozone equipment rooms. An ozone equipment room shall not be used for storage of chemicals, solvents, or any combustible materials, other than those required for the operation of the recirculation and ozone-generating equipment. Where an equipment room includes ozone equipment, the equipment room shall meet the requirements of Sections 327.2.1 through 327.2.4.

327.2.1 Emergency mechanical ventilation. Ozone equipment rooms shall be equipped with an emergency mechanical ventilation system capable of 6 air changes per hour. An exhaust intake shall be located 6 inches (152 mm) from the floor, on the opposite side of the room from the make-up air intake. The emergency mechanical ventilation system shall be installed to run on command of an ozone-leak alarm or manual switch. Where a manual switch is installed, the manual switch shall be located outside the door to the ozone equipment room.

327.2.2 Ozone rooms below grade. Ozone rooms below grade shall be equipped with mechanical ventilation capable of 6 changes per hour. The exhaust intake shall be located 6 inches (152 mm) from the floor, on the opposite side of the room from the make-up air intake. The mechanical ventilation shall be installed to meet all the following requirements:

1. Run automatically concurrent with the ozone equipment and for a minimum 15 air changes after the ozone equipment is stopped.

2. Run on activation of the ozone detection and alarm system.

3. Run on command of a manual switch located outside the door to the ozone equipment room.

327.2.3 Signage. A sign shall be posted on the exterior of an ozone equipment room entry door stating “DANGER - GASEOUS OXIDIZER -- OZONE” in lettering not less than 4 inches (102 mm) high.

327.2.4 Ozone detection and alarm system. An ozone detection and alarm system shall be installed in accordance with all of the following:

1. Activate when the ozone concentration equals or exceeds 0.1 ppm in the ozone equipment room.

2. Shut off the ozone-generating equipment and turn on the emergency mechanical ventilation system.

3. Provide an audible alarm producing a minimum 85 decibels at a 10-foot (3048 mm) distance.

4. Provide a visible alarm consisting of a flashing light mounted in plain view of the entrance to the ozone equipment room.

5. Provide an ozone sensor that can measure ozone in the range of 0-2 ppm and located at a height of 18-24 inches (457-610 mm) above floor level.

This proposal is submitted by the ICC Plumbing Mechanical Gas Code Action Committee (PMGCAC)

PMGCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 PMGCAC has held 26 virtual meetings open to any interested party. In addition, there were several virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the PMGCAC website at PMGCAC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is a reorganization of existing code text. No new technical requirements are being added and thus there is not a impact to labor or material to comply with the code.

SP19-24

SP20-24

ISPSC: 325.5, ACCA (New)

Proponents: Gregory Andrew Ceton, Pool and Hot Tub Alliance (gceton@phta.org); Jennifer Hatfield, J. Hatfield & Associates, Pool & Hot Tub Alliance (jen@jhatfieldandassociates.com)

2024 International Swimming Pool and Spa Code

Revise as follows:

325.5 Ventilation. Equipment room ventilation shall comply with ANSI/ACCA 10 Manual SPS and address all of the following:

1. Combustion requirements.
2. Heat dissipation from equipment.
3. Humidity from surge or balance tanks.
4. Ventilation to the outside.
5. Air quality.

Add new standard(s) as follows:

ACCA

Air Conditioning Contractors of America
2800 Shirlington Road, Suite 300
Arlington, VA 22206

ANSI/ACCA 10 Manual SPS--2017	HVAC Design for Swimming Pools and Spas

Staff Analysis: A review of the standard proposed for inclusion in the code, ANSI/ACCA 10 Manual SPS--2017 *HVAC Design for Swimming Pools and Spas*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: Section 325.5 currently states items that shall be addressed by equipment room ventilation but provides no requirements to inspect or operate an equipment room.

This proposal requires compliance with ANSI/ACCA 10 Manual SPS, which provides HVAC Design for Swimming Pools and Spas that should be applied to equipment room ventilation, clarifying the expected performance of these systems that provide ventilation to these areas.

The cited standard is then added to Chapter 11 of the ISPSC. The ACCA 10 is also cited in the IMC.

Bibliography: Air Conditioning Contractors of America (ACCA), *Manual SPS HVAC Design for Swimming Pools and Spas* [ANSI/ACCA 10 Manual SPS - 2010 (RA 2017)]

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

These requirements are already in place for pool rooms and spaces, including the equipment room. ACCA manual 10 is already referenced as a requirement through International Mechanical Code Section 403.2.1 Recirculation of air. This proposal simply clarifies for code users that this is the standard to comply with in order to meet the requirements in 325.5 of the ISPSC.

SP20-24

SP21-24

ISPSC: SECTION 326

Proponents: Gregory Andrew Ceton, Pool and Hot Tub Alliance (gceton@phta.org); Jennifer Hatfield, J. Hatfield & Associates, Pool & Hot Tub Alliance (jen@jhatfieldandassociates.com)

2024 International Swimming Pool and Spa Code

Revise as follows:

SECTION 326
INDOOR AIR QUALITY <u>AND MECHANICAL VENTILATION</u>

Reason: This title change is needed to bring the title of section 326 in line with the referenced code and standard. Section 326 references the International Mechanical Code and ASHRAE 62.1 Standard, which address ventilation systems used to achieve indoor air quality. The minor change in title will help users understand that the focus is on that aspect of achieving indoor air quality.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

It is a title change only. It creates no additional requirements for construction.

SP21-24

SP22-24

ISPSC: SECTION 326, 326.1, ACCA (New)

Proponents: David Crawford Bixby, Air Conditioning Contractors of America (ACCA), ACCA (david.bixby@acca.org)

2024 International Swimming Pool and Spa Code

SECTION 326
INDOOR AIR QUALITY

Revise as follows:

326.1 General. Indoor public pool and spa air-handling system design, construction, and installation shall comply with the requirements of the *International Mechanical Code* or ASHRAE 62.1. The design of ventilation systems serving indoor aquatic facilities shall comply with ACCA 10 Manual SPS.

Add new text as follows:

Add new standard(s) as follows:

ACCA **10 Manual SPS-2010 (RA 2017).** HVAC Design for Swimming Pools and Spas

Staff Analysis: A review of the standard proposed for inclusion in the code, ACCA 10 Manual SPS-2010 (RA 2017) *HVAC Design for Swimming Pools and Spas*
, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: Paragraph 403.2.1, *Recirculation of air*, in the 2021 IMC, contains Item 2 which references ANSI/ACCA Manual SPS for design and installation of dehumidification systems. Manual SPS should also be referenced by the ISPSC in terms of maintaining IAQ for enclosed pools and hot tubs. The mechanical system must be designed to continuously control the dew point temperature of space air, then measures are taken to control space temperature. If this is not accomplished, moisture can cause visible and concealed condensation, wet sagging ceilings, wet framing, wet structural surfaces, wet insulation, visible or concealed mold and mildew, corroded or discolored fixtures and finishes, rust, or masonry. Manual SPS is also a consensus-based ANSI approved standard.

Bibliography: ANSI/ACCA 10 Manual SPS – 2010 (RA 2017), *HVAC Design for Swimming Pools and Spas*

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Due to this standard already being specified and referenced in the 2021 IMC for pool ventilation and dehumidification, this proposal represents a clarification or correlation between the ISPSC and the current IMC.

SP22-24

SP23-24

ISPSC: SECTION 327 (New), 327.1 (New), PHTA Chapter 11 (New)

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Swimming Pool and Spa Code

Add new text as follows:

SECTION 327
OPERATIONS AND MAINTENANCE

327.1 Public pool and spa operation and maintenance. Public pools, public spas and aquatic recreation facilities shall be operated and maintained in accordance with PHTA/ICC-2.

Add new standard(s) as follows:

PHTA

Pool and Hot Tub Alliance
2111 Eisenhower Avenue, Suite 500
Alexandria, VA 22314

ANSI/PHTA/ICC-2-2023 Public pool and spa operations and maintenance

Staff Analysis: A review of the standard proposed for inclusion in the code, PHTA/ICC ANSI/PHTA/ICC-2-2023 *Public pool and spa operations and maintenance*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: This proposal seeks to incorporate the *ANSI/PHTA/ICC-2 2023 Standard for Public Pool and Spa Operations and Maintenance* into the International Swimming Pool and Spa Code to ensure maintenance and operations requirements and guidance exist for public pools, public spas and aquatic recreation facilities. Seeing that these types of aquatic venues are governed under Chapters 4, 5, and 6, it makes sense to put the requirement under Chapter 3, General Compliance, so it can apply to all three types.

The standard can be access at the following web address: https://issuu.com/thephta/docs/phta-icc-2_2023_standard_04-03-23_digital_pdf-prot

The PHTA-2 is intended to cover public/commercial aquatic venues operation and maintenance, as a resource for jurisdictions seeking guidance on this topic. This Standard can then be used by state and local authorities as a health and safety document for the operation and maintenance of all types of public aquatic venues. Industry partners such as commercial pool and spa service companies, water park operators and public pool operators will then be required to use this Standard as the benchmark for the minimum standards to operate and maintain public aquatic venues. In many states building and health officials regulate public pools and spas together, by adding this Standard into the ISPSC, we are providing one code that covers design, construction, operation and maintenance. This will make it easier for the building and health officials by having all requirements in one place. Further, public health officials can adopt this Standard through adoption of the ISPSC when adopting the Code by reference in their rule or ordinance.

This proposal is submitted by the ICC Plumbing Mechanical Gas Code Action Committee (PMGCAC)

PMGCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 PMGCAC has held 26 virtual meetings open to any interested party. In addition, there were several virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the PMGCAC website at PMGCAC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

It doesn’t affect the cost of construction as operation and maintenance occur after the construction permit is closed out. This might increase operational cost as the standard clarifies the minimum proper operation and maintenance which is always part of the pool ownership to provide for safe water conditions.

SP23-24

SP24-24

ISPSC: 409.4, 409.4.1 (New), 409.4.1, 409.4.2, 409.4.3

Proponents: Gregory Andrew Ceton, Pool and Hot Tub Alliance (gceton@phta.org); Jennifer Hatfield, J. Hatfield & Associates, Pool & Hot Tub Alliance (jen@jhatfieldandassociates.com)

2024 International Swimming Pool and Spa Code

Revise as follows:

409.4 Lifesaving equipment. Public pool Classes A, B, and C shall be provided with lifesaving equipment in accordance with Sections 409.4.1 through 409.4.~~3~~4. Such lifesaving equipment shall be visually conspicuous and conveniently located at all times.

Add new text as follows:

409.4.1 Rope and Float. Where a pool has a water depth ranging from less than 5 feet (1524 mm) to greater than 5 feet (1524 mm), a rope and float line shall be located a minimum of 1 foot (304 mm.) horizontally from the 5-foot (1524 mm) depth location, toward the shallow end of the pool. The rope and float line shall be securely fastened to wall anchors made of corrosion- resistant material and shall be recessed or have no projection that would constitute a hazard when the line is removed. The line shall have size and strength to support the load of a user using it as a handhold.

Revise as follows:

409.4.2 ~~409.4.1 Accessory~~ Reaching pole. A ~~swimming pool accessory~~ reaching pole not less than 12 feet (3658 mm) in fixed length and including ~~a body hook~~ shepherd's crook securely attached shall be provided.

409.4.3 ~~409.4.2~~ Throwing rope. A throwing rope attached to a ring buoy or similar flotation device shall be provided. The rope shall be not less than $^{1}/_{4}$ inch (6.4 mm) in diameter and shall have a length of not less than $1^{1}/_{2}$ times the maximum width of the pool or 50 feet (15 240 mm), whichever is less. A ring buoy shall have an outside diameter of not less than 15 inches (381 mm).

409.4.4 ~~409.4.3~~ Emergency response units. Pools covered by this chapter shall be provided with first aid equipment, including a first aid kit. First aid equipment and kits shall be located to allow access.

Reason: There is no requirement in the 2024 ISPSC Chapter 4 for Rope and Float for public pools. Rope and Float is included in Aquatic Facilities Chapter 6 as a safety marking at the 5' to over 5' water depth and at the first slope change. It should be included in this chapter as well.

A provision for removable rope and float and a requirement that anchors not pose a projection into the pool is necessary to provide safety for when a pool is also used for other activities.

The sections have been renumbered to accommodate the addition. To further clarify intent and purpose of the accessory pole the description for fixed length and the recommended name of the hook were added.

Cost Impact: Increase

Estimated Immediate Cost Impact:

$1-1,500 for rope and float, fixed length shepherd's hook, and installation.

Estimated Immediate Cost Impact Justification (methodology and variables):

Cost for a rope and float assembly ($1-100) and shepherd's hook ($1-500) plus estimated cost for installation.

Estimated Life Cycle Cost Impact:

No life cycle cost impact.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

No life cycle cost impact.

SP24-24

SP25-24

ISPSC: 411.1, 411.1.2, 411.1.2.1 (New), 411.1.3

Proponents: Gregory Andrew Ceton, Pool and Hot Tub Alliance (gceton@phta.org); Jennifer Hatfield, J. Hatfield & Associates, Pool & Hot Tub Alliance (jen@jhatfieldandassociates.com)

2024 International Swimming Pool and Spa Code

Revise as follows:

411.1 Entry and exit. All public pools shall have a primary means of entry and exit in all shallow areas where the water depth exceeds 24 in. (61.0 cm) at the shallowest point. The means of entry and exit shall be located on the shallow side of any first slope change. A secondary means of entry and exit shall be provided in the deep area of the pool where the water depth exceeds 5 ft (152.4 cm). ~~Pools shall have not less than two means of entry and exit that are located so as to serve both ends of a pool.~~ Pool lifts, transfer walls and transfer systems that provide for pool entry and exit by persons with physical disabilities in accordance with Section 307.1.5 shall not be counted as the means of entry or exit that is required by this section.

411.1.2 Shallow area primary entry and exit. A primary means of entry and exit shall be provided in shallow areas of pools and shall consist of pool stairs, a ramp or a beach entry.

Add new text as follows:

411.1.2.1 Shallow area secondary entry and exit. The secondary means of entry and exit shall consist of any method prescribed in Section 411.1.3.

> **Exception:** A secondary entry and exit shall not be required for shallow only pools when the water surface area is less than 1176 square feet.

Revise as follows:

411.1.3 Deep area secondary entry and exit. The secondary means of entry and exit in the deep area of pools shall consist of one of the following:

1. Steps/stairs.
2. Ladders.
3. Grab rails with recessed treads.
4. Ramps.
5. Beach entries.
6. Swimouts.
7. Other designs that provide the minimum utility as specified in this code.

Reason: This code change is needed to address shallow only pools entry and exiting requirements. The hazard associated with secondary entering and exiting of a deep area are not any different than if the pool is designed as a shallow only pool with no deep area exceeding 5 foot in depth for public pools. The exception further allows for small public pools to only have one means of entry and exit. The 1176 square feet of water surface area equates to an occupancy load of 49. This is being proposed to align secondary exits with other occupancy classification in the IBC for when a second means of egress is required.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$200-500 per pool for smaller pools (described below) only. No change in cost for pools larger than those described below.

Estimated Immediate Cost Impact Justification (methodology and variables):

This code proposal will decrease construction cost for pools that have a water surface area equal or greater than 1176 square feet or an occupancy load of 49 or less by removing the requirement for a second means of entry and exit.

Cost is for one in ground pool ladder + the estimated cost of installation.

Estimated Life Cycle Cost Impact:

None.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

This proposal will have no effect on costs after first (construction) cost.

SP25-24

SP26-24

ISPSC: 504.2

Proponents: Gregory Ceton, Pool and Hot Tub Alliance (gceton@phta.org); Jennifer Hatfield, J. Hatfield & Associates, Pool & Hot Tub Alliance (jen@jhatfieldandassociates.com)

2024 International Swimming Pool and Spa Code

Revise as follows:

504.2 Timer. The operation of the hydrotherapy jets shall be limited by a cycle timer having a maximum setting of 15~~10~~ minutes. The cycle timer shall be located not less than 5 feet (1524 mm) away, adjacent to, and within sight of the spa.

Reason: Ten-minute spa timers are largely unavailable on the market. Change in required timer type is needed to accommodate construction.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal makes no substantive change in the requirement to have a timer in a public spa, it merely changes the type of timer that is acceptable.

The former requirement was unable to be met with timers existing on the market. This is a clarification of the existing requirement that accommodates spa construction.

SP26-24

SP27-24

ISPSC: 604.2, TABLE 604.2

Proponents: Jennifer Hatfield, J. Hatfield & Associates, Pool & Hot Tub Alliance (jen@jhatfieldandassociates.com); Gregory Andrew Ceton, Pool and Hot Tub Alliance (gceton@phta.org)

2024 International Swimming Pool and Spa Code

Revise as follows:

604.2 Turnover. Circulation system equipment shall be designed to turn over 100 percent of the nominal pool water volume in the amount of time specified in Table 604.2. Where Class D pools exist in combination with Class A through Class F pools, each element in the pool shall have the turnover time specified in Table 604.2 or elsewhere in this code as if the element functioned as a freestanding pool of that class. The system shall be designed to give the required turnover time based on the manufacturer's recommended maximum pressure and flow of the filter in ~~clean~~dirty media condition.

TABLE 604.2 TURNOVER TIME

CLASS OF POOL	MAXIMUM TURNOVER TIME[a] (hours)
D-1	~~2~~3
D-2 with less than 24 inches water depth	1
D-2 with 24 inches or greater water depth	2
D-3 with every flume ending in a runout, or less than 24 inches average water depth	1
D-3 with 24 to 48 inches average water depth	2
D-3 with greater than 48 inches average water depth	3
D-4	~~2~~3
D-5	1
D-6	1

For SI: 1 inch = 25.4 mm.

a. Pools with a sand bottom require a 1-hour turnover time.

Reason: The code currently combines Class D uses such as slides, lazy rivers and wade pool activities with Class A-C uses, such as diving and lap swimming. The recirculation rate requirement becomes very punitive. The proposal provides clarification that where Class D pools exist in combination with other Class pools, each element in the pool shall be required to have the turnover time specified in Table 604.2 or elsewhere in the code as if that one element was freestanding.

Further, the current turnover time for lazy rivers, wave pools, and waterslide catch pools is too fast. In Florida, where lazy rivers and wave pools are prevalent, it has been 3 hours, without any issues or complaints. Florida has also separated D-3 waterslide catch pools based on water depth at the catch pool where the flume/slide ends, providing different turnover times based on that depth. For example, the FlyTime Slide from SplashTacular, and similar products from other manufacturers, is intended to drop the rider into deep water that is approximately the same dimensions as a diving well. It is therefore punitive and unnecessary to require a 1 hour turnover for an entire diving well volume simply because a slide has been installed next to it.

Therefore, the proposal provides for three categories of D-3 pools based on water depth, with the appropriate turnover based on that depth. It also updates the turnover table to lessen the turnover rate of lazy rivers and wave pools to match Florida requirements.

Bibliography: Sections 454.1.9.2.6.1, 454.1.9.4.3, and 454.1.9.5.3 of the 8th edition Florida Building Code: https://codes.iccsafe.org/content/FLBC2023P1/chapter-4-special-detailed-requirements-based-on-occupancy-and-use#FLBC2023P1_Ch04_Sec454.1

Cost Impact: Decrease

Estimated Immediate Cost Impact:

Based on the change in turnover times and allowance for a Class D pools to have a turnover time based on that exact element alone, the proposal will result in some Class D pools having a longer turnover time than currently required. Longer turnover times then allow for smaller piping, circulation pumps and filters, which typically cost less than their larger counterparts.

The exact decrease in cost will vary project to project, but could range between $0 and $60,000. A very small Lazy River or Plunge Pool may utilize negligible savings, but a larger feature will realize proportionally more.

Estimated Immediate Cost Impact Justification (methodology and variables):

The methodology to calculate the estimated cost impact is as follows:

On a recent leisure river project built in compliance with the ISPSC, the filtration turnover rate had to be 1250 gpm. This was a medium sized river, approximately 650' long. This code change would allow the flow rate to be reduced to 833 gpm. The filter pipes would be able to be reduced from 10" to 8". The savings from the reduction would depend on local construction conditions and the length of the pipe.

The filters pipes are reduced from 10", which costs about $9,000 per 100', to 8", which costs about $7,000 per 100'. The reduction is $2,000 per 100'. If we assume that the mechanical room is 200' away, and there is a suction run and a discharge run, that would require 400' of pipe and the savings would be $2,000 * (400' / 100') = $8,000.

The pump is reduced from a 40HP pump that costs about $17,000 to 25 HP pump that costs about $12,000. This reduction is about $5,000.

The filter is reduced from an approximate 50" diameter regenerative media tank that costs about $131,000 to an approximate 40" diameter regenerative media tank that costs about $106.000. This reduction is about $25,000.

The savings for this example project, using the variables of the pipe, pump and filter, would be about ($8,000 + $5,000 + $25,000) = $38,000. These numbers may vary by region and by vendor selected. Larger project than this are developed and their savings would be proportionally larger.

SP27-24

SP28-24

ISPSC: TABLE 604.2

Proponents: Jennifer Hatfield, J. Hatfield & Associates, Pool & Hot Tub Alliance (jen@jhatfieldandassociates.com); Gregory Andrew Ceton, Pool and Hot Tub Alliance (gceton@phta.org)

2024 International Swimming Pool and Spa Code

Revise as follows:

TABLE 604.2 TURNOVER TIME

CLASS OF POOL	MAXIMUM TURNOVER TIME[a] (hours)
D-1	2
D-2 with less than 24 inches water depth	1
D-2 with 24 inches or greater water depth	2
D-3	1
D-4	2
D-5	1
D-6	~~1~~0.5

For SI: 1 inch = 25.4 mm.

a. Pools with a sand bottom require a 1-hour turnover time.

Reason: This code proposal decreases the turnover time for D-6 pools (interactive play features, also known as splash pads) to match both the Model Aquatic Health Code and the Florida Code, both of which require a more stringent turnover time of 0.5 hours instead of 1 hour. This is needed due to the typical young age of those using these types of features, requiring greater disinfection.

Bibliography: Section 454.1.9.8.6.1 of the 8th edition Florida Code and 4.7.1.10 of the 2023 Model Aquatic Health Code.

https://codes.iccsafe.org/content/FLBC2023P1/chapter-4-special-detailed-requirements-based-on-occupancy-and-use#FLBC2023P1_Ch04_Sec454.1

https://www.cdc.gov/mahc/pdf/2023-MAHC-508.pdf

Cost Impact: Increase

Estimated Immediate Cost Impact:

For a typical interactive water feature (D-6 pool) that uses a 5,000 gallon system, the increased size of the pump, filter, and pipes that would be required to comply with the change in turnover time would increase costs by approximately $4,650.

Estimated Immediate Cost Impact Justification (methodology and variables):

Most interactive water features (D - 6 pools) have tanks that are between 3,000 and 5,000 gallons in capacity. For a 5,000 - gallon system, the minimum flow rate increases from 5,000 gallons/1 hour (83 gallons per minute) to 5,000 gallons/0.5 hour (167 gallons per minute).

The pumps used to accommodate this increased flow rate are likely to be mass-produced plastic pumps, and the designer would likely double the flow rate by adding a second pump. Pumps this size currently cost about $1500 each.

The filters are also likely to be mass-produced plastic cartridge or sand filters, and the flow of 167 gpm is a bit too large for one of these, so the designer would likely specify a second filter as well. These cartridge filters also cost about $1500 currently.

The suction pipe for the single pump with a 1-hour-turnover was likely a 3" pipe, and the discharge pipe was likely a 2.5" pipe. We estimate that the cost to trench, assemble, and commission 4" pipe is $2,600 per 100', the corresponding cost for 2.5" pipe is $1400. Estimating that the pipe run from the mechanical room to the tank is 50' long, a second 3" suction pipe to serve the second pump costs ($2,100 * 50'/100') = $1050. Then the 2.5" discharge back to the tank becomes a 4" discharge serving both pumps, and that cost increase is ($2600 - $1400) * (50'/100') = $600. Therefore, the total cost estimate for pipe upgrades is $1050 + $600 = $1650.

In this scenario with the design assumptions given, the code change would cost $1500 (pump) +$1500 (filter) + $1650 (pipes) = $4,650.

SP28-24

SP29-24

ISPSC: 604.2.2, APSP Chapter 11 (New)

Proponents: Gregory Andrew Ceton, Pool and Hot Tub Alliance (gceton@phta.org); Jennifer Hatfield, J. Hatfield & Associates, Pool & Hot Tub Alliance (jen@jhatfieldandassociates.com)

2024 International Swimming Pool and Spa Code

Revise as follows:

604.2.2 Reduced ~~circulation~~flow rate. ~~The circulation rate~~ The aquatic recreation facility shall be permitted to ~~be~~ reduce~~d~~ the flow rate ~~during periods that the pool is closed for use~~ when not open to bathers and provided ~~that acceptable water clarity conditions are met prior to reopening the pool for public use.~~the water quality is maintained and documented in accordance with APSP-11. Water quality shall be tested and documented prior to opening the aquatic venue to bathers. The reduced ~~circulation~~ flow rate shall not be zero~~.~~ unless approved.

APSP

Pool & Hot Tub Alliance (formerly The Association of Pool & Spa Professionals)
2111 Eisenhower Avenue, Suite 500
Alexandria, VA 22314

ANSI/APSP/ICC 11--2019 American National Standard for Water Quality in Public Pools and Spas

Staff Analysis: A review of the standard proposed for inclusion in the code, ANSI/APSP/ICC 11--2019 *American National Standard for Water Quality in Public Pools and Spas*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: This change aligns the term "flow rate" which is used in PHTA–2, APSP-11, and the Model Aquatic Health Code (MAHC).

The sanitation and pH guidelines incorporated by reference clarify required operation. These requirements for water quality are required by reference in other sections of the ISPSC and do not change the cost of operation.

Bibliography: ANSI/APSP/ICC-11 American National Standard for Water Quality in Public Pools and Spas

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

It is a language change and clarification to ensure similar terminology ("flow rate" as opposed to "circulation rate") is used in all referenced PHTA standards and the Model Aquatic Health Code.

SP29-24

SP30-24

ISPSC: SECTION 202, 202, SECTION 202 (New), TABLE 604.2, SECTION 613 (New), 613.1 (New), 613.1.1 (New), 613.1.2 (New), ASTM Chapter 11 (New)

Proponents: Jennifer Hatfield, J. Hatfield & Associates, Pool & Hot Tub Alliance (jen@jhatfieldandassociates.com); Gregory Andrew Ceton, Pool and Hot Tub Alliance (gceton@phta.org)

2024 International Swimming Pool and Spa Code

PUBLIC SWIMMING POOL (Public Pool). A pool, other than a *residential* pool, that is intended to be used for swimming or bathing and is operated by an owner, lessee, operator, licensee or concessionaire, regardless of whether a fee is charged for use. Public pools shall be further classified and defined as follows:

Class A competition pool. A pool intended for use for accredited competitive aquatic events such as Federation Internationale De Natation (FINA), USA Swimming, USA Diving, USA Synchronized Swimming, USA Water Polo, National Collegiate Athletic Association (NCAA), or the National Federation of State High School Associations (NFHS).

Class B public pool. A pool intended for public recreational use that is not identified in the other classifications of public pools.

Class C semi-public pool. A pool operated solely for and in conjunction with lodgings such as hotels, motels, apartments or condominiums.

Revise as follows:

Class D-1 wave action pool. A pool designed to simulate breaking or cyclic waves for purposes of general play ~~or surfing~~.
<u>It does not include a *surf venue*, *surf basin* or *stationary wave system*.</u>

Class D-2 activity pool. A pool designed for casual water play ranging from simple splashing activity to the use of attractions placed in the pool for recreation.

Class D-3 catch pool. A body of water located at the termination of a manufactured waterslide attraction. The body of water is provided for the purpose of terminating the slide action and providing a means for exit to a deck or walkway area.

Class D-4 leisure river. A manufactured stream of water of near-constant depth in which the water is moved by pumps or other means of propulsion to provide a river-like flow that transports bathers over a defined path that may include water features and play devices.

Class D-5 vortex pool. A circular pool equipped with a method of transporting water in the pool for the purpose of propelling riders at speeds dictated by the velocity of the moving stream of water.

Class D-6 interactive play attraction. A manufactured water play device or a combination of water-based play devices in which water flow volumes, pressures or patterns can be varied by the bather without negatively influencing the hydraulic conditions for other connected devices. These attractions incorporate devices or activities such as slides, climbing and crawling structures, visual effects, user-actuated mechanical devices and other elements of bather-driven and bather-controlled play.

Class E. Pools used for instruction, play or therapy and with temperatures above 86°F (30°C).

Class F. Class F pools are wading pools and are covered within the scope of this code as set forth in Section 405.
Public pools are either a diving or nondiving type. Diving types of public pools are classified into types as an indication of the suitability of a pool for use with diving equipment.

Type O. A nondiving public pool.

Types VI–IX. Public pools suitable for the installation of diving equipment by type.

Add new definition as follows:

<u>**STATIONARY WAVE SYSTEMS.** A system that delivers a constantly flowing sheet of water nominally up to 24 in. thick travelling over a</u>

form allowing for patron interaction with a perpetual wave.

SURF BASIN.
Mechanical devices to generate moving waves with suitable characteristics for surfing and can provide multiple different wave profiles suitable to any level of surfing.

SURF VENUE.
A facility designed to accommodate a large body of water dedicated only to surfing on a surfboard or other similar surfing or wave-riding device, with bathymetry, shape, and design that can use a variety of different mechanisms to generate ocean like surfable waves that shoal and break progressively towards shallow water.

Revise as follows:

TABLE 604.2 TURNOVER TIME

CLASS OF POOL	MAXIMUM TURNOVER TIME[a] (hours)
D-1[b]	2
D-2 with less than 24 inches water depth	1
D-2 with 24 inches or greater water depth	2
D-3	1
D-4	2
D-5	1
D-6	1

For SI: 1 inch = 25.4 mm.

a. Pools with a sand bottom require a 1-hour turnover time.

b. Surf venues, surf basins, and stationary wave systems in compliance with Section 613 are not considered D-1 pools.

Add new text as follows:

SECTION 613
SURF VENUES, SURF BASINS, AND STATIONARY WAVE SYSTEMS

613.1 Surf venues. Surf venues shall comply with Section 613.1.1 or 613.1.2.

613.1.1 SURF basins. Surf basins shall comply with ASTM wk75193.

613.1.2 Stationary wave systems. Stationary wave systems shall comply with ASTM F3133.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor, P.O. Box C700
West Conshohocken, PA 19428-2959

F3133–21 Standard Practice for Classification, Design, Manufacture, Construction, Maintenance, and Operation of Stationary Wave Systems

wk75193-xx Standard Practice for Classification, Design, Manufacture, Construction, Maintenance, and Operation of Controlled Surf(ing) Basins

Staff Analysis: A review of the standards proposed for inclusion in the code, ASTM F3133–21 S*tandard Practice for Classification, Design, Manufacture, Construction, Maintenance, and Operation of Stationary Wave Systems* and ASTM wk75193-xx *Standard Practice for Classification, Design, Manufacture, Construction, Maintenance, and Operation of Controlled Surf(ing) Basins*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: The ISPSC currently addresses surf pools within Class D-1 wave action pools; however, these are two different types of pools/systems/venues. This proposal clarifies that a D-1 wave action pool is not a surf pool by striking that current wording and at the same time adding a sentence to clarify that a surf venue, surf basin or stationary wave system is not a D-1 wave action pool.

The proposal then provides new definitions to define a surf venue, surf basin and stationary wave system. These are the terms associated with this rapidly growing facet of the aquatic industry. The surf venue and surf basin definitions are based on industry code and standard work that is currently being worked on. Whereas the stationary wave system definition is based on an approved ASTM standard.

This proposal moves to Chapter 6 to clarify in Table 604.2 that D-1 turnover requirements do not apply to surf venues, surf basins and stationary wave systems that comply with the newly proposed Section 613. This is to ensure D-1 wave pool turnover requirements are not erroneously applied to these surfing areas and systems.

The new section 613 being proposed then requires that surf venues comply with either two subsections. One subsection requires surf basins to comply with the draft ASTM standard currently being developed and the other subsection requires stationary wave systems to comply with the 2021 edition of the ASTM F3133 Standard for such systems.

This proposal is needed to both ensure these increasingly popular surfing venues and devices are a) not confused with wave action pools and their associated requirements and b) to ensure there are appropriate requirements for surf venues, basins and stationary wave system devices to protect those who utilize them. Simply put, unique surfing venues are currently not appropriately captured in the ISPSC. This proposal is a first step in doing so, recognizing that additional design guidelines will need to be added in the future.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

The decrease in cost can range from $40,000 to $2,000,000 per project due to the greater allowance in turnover time by clarifying these products are not wave pools.

Estimated Immediate Cost Impact Justification (methodology and variables):

The cost estimate range considers the filtration cost comparing the filter system required for a 2-hour D-1 wave pool turnover rate to a 6 hour turnover rate.

SP30-24

SP31-24

ISPSC: CHAPTER 7, SECTION 701, 701.1, 701.1.1, 701.2, 701.3, 701.3.1, 701.3.2, 701.3.3, 701.3.4, SECTION 702, 702.1, 702.2, FIGURE 702.2, 702.2.1, 702.2.2, 702.2.3, 702.2.4, 702.2.5, 702.2.6, 702.2.7, 702.3, FIGURE 702.3, 702.3.1, 702.3.2, 702.3.3, 702.3.4, 702.3.5, 702.3.6, 702.4, FIGURE 702.4, 702.4.1, 702.4.2, 702.4.3, 702.4.4, 702.4.5, 702.4.6, 702.4.7, 702.5, FIGURE 702.5, 702.5.1, 702.5.2, 702.5.3, 702.5.4, 702.5.5, 702.5.6, 702.5.7, 702.6, 702.6.1, 702.6.2, 702.6.3, 702.6.4, 702.6.5, 702.6.6, 702.6.7, SECTION 705, 705.1., 705.2, 705.2.1, 705.2.1.1, 705.2.1.2, 705.2.1.3, 705.2.1.4, 705.2.1.4.1, 705.2.2, 705.2.3, 705.2.3.1, 705.2.3.2, CHAPTER 8, SECTION 801, 801.1, 801.2, SECTION 802, 802.1, 802.3 (New), TABLE 803.1, 805.1, 809.2, 809.2.1 (New), 809.10 (New)

Proponents: Jennifer Hatfield, J. Hatfield & Associates, Pool & Hot Tub Alliance (jen@jhatfieldandassociates.com); Gregory Andrew Ceton, Pool and Hot Tub Alliance (gceton@phta.org)

2024 International Swimming Pool and Spa Code

CHAPTER 7 ONGROUND STORABLE RESIDENTIAL SWIMMING POOLS

SECTION 701 GENERAL

Revise as follows:

701.1 Scope. ~~This chapter describes certain criteria for the d~~Design, manufacturing, and testing of *onground storable pools* intended for *residential* use, shall comply with this chapter. ~~This includes portable pools with flexible or nonrigid side walls that achieve their structural integrity by means of uniform shape, support frame or a combination thereof, and that can be disassembled for storage or relocation. This chapter includes what has been commonly referred to in past standards or codes as onground or above-ground pools.~~

Delete without substitution:

~~**701.1.1 Permanent inground residential swimming pool.** This chapter does not apply to permanent inground *residential* pools, as defined in Chapter 8.~~

~~**701.2 General.** In addition to the requirements of this chapter, onground storable *residential* swimming pools shall comply with the requirements of Chapter 3.~~

~~**701.3 Floor slopes.** Floor slopes shall be uniform and in accordance with Sections 701.3.1 through 701.3.4.~~

~~**701.3.1 Shallow end.** The slope of the floor from the shallow end wall towards the deep area shall not exceed 1 unit vertical in 7 units horizontal (14-percent slope) to the point of the first slope change.~~

~~**701.3.2 Transition.** The slope of the floor from the point of the first slope change towards the deepest point shall not exceed 1 unit vertical in 3 units horizontal (33-percent slope).~~

~~**701.3.3 Adjacent.** The slope adjacent to the shallow area shall not exceed 1 unit vertical in 3 units horizontal (33-percent slope) and the slope adjacent to the side walls shall not exceed 1 unit vertical in 1 unit horizontal (100-percent slope).~~

~~**701.3.4 Change point.** The point of the first slope change shall be defined as the point at which the shallow area slope exceeds 1 unit vertical in 7 units horizontal (14-percent slope) and is not less than 6 feet (1889 mm) from the shallow end wall of the pool.~~

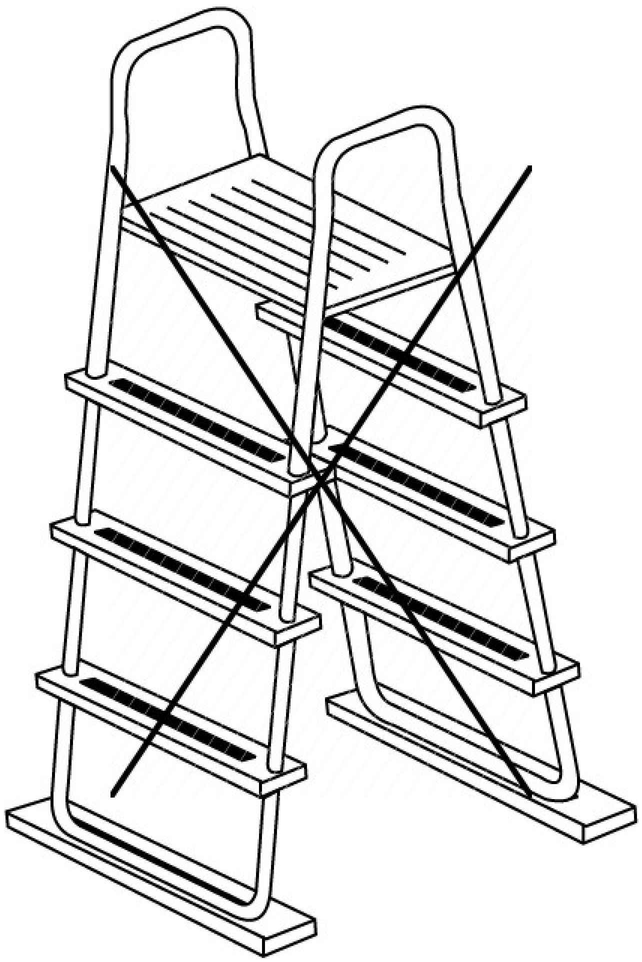
SECTION 702 LADDERS AND STAIRS

Revise as follows:

702.1 Ladders and stairs. Pools shall have a means of entry and exit consisting of not less than one ladder or a ladder and staircase combination. <u>All ladders or staircase means of entry shall meet the ladder and staircase requirements of APSP-4.</u>

Delete without substitution:

~~**702.2 Type A and Type B ladders.** Type A, double access, and Type B, limited access, A-frame ladders shall comply with Sections 702.2.1 through 702.2.7. See Figure 702.2.~~



~~**FIGURE 702.2 TYPICAL A-FRAME LADDER, TYPES A AND B**~~

~~**702.2.1 Barrier required.** Ladders in the pool shall have a physical barrier to prevent children from swimming through the riser openings or behind the ladder.~~

~~**Exception:** Barriers for ladders shall not be required where the ladder manufacturer provides a certification statement that the ladder complies with the ladder entrapment test requirements of APSP 4.~~

~~**702.2.2 Platform.** Where an A-frame ladder has a platform between the handrails, the platform shall have a width of not less than 12 inches (305 mm) and a length of not less than 12 inches (305 mm). The platform shall be at or above the highest ladder tread. The walking surface of the platform shall be slip resistant.~~

~~**702.2.3 Handrails or handholds.** A-frame ladders shall have two handrails or handholds that serve all treads. The height of the handrails and handholds shall be not less than 20 inches (508 mm) above the platform or uppermost tread, whichever is higher.~~

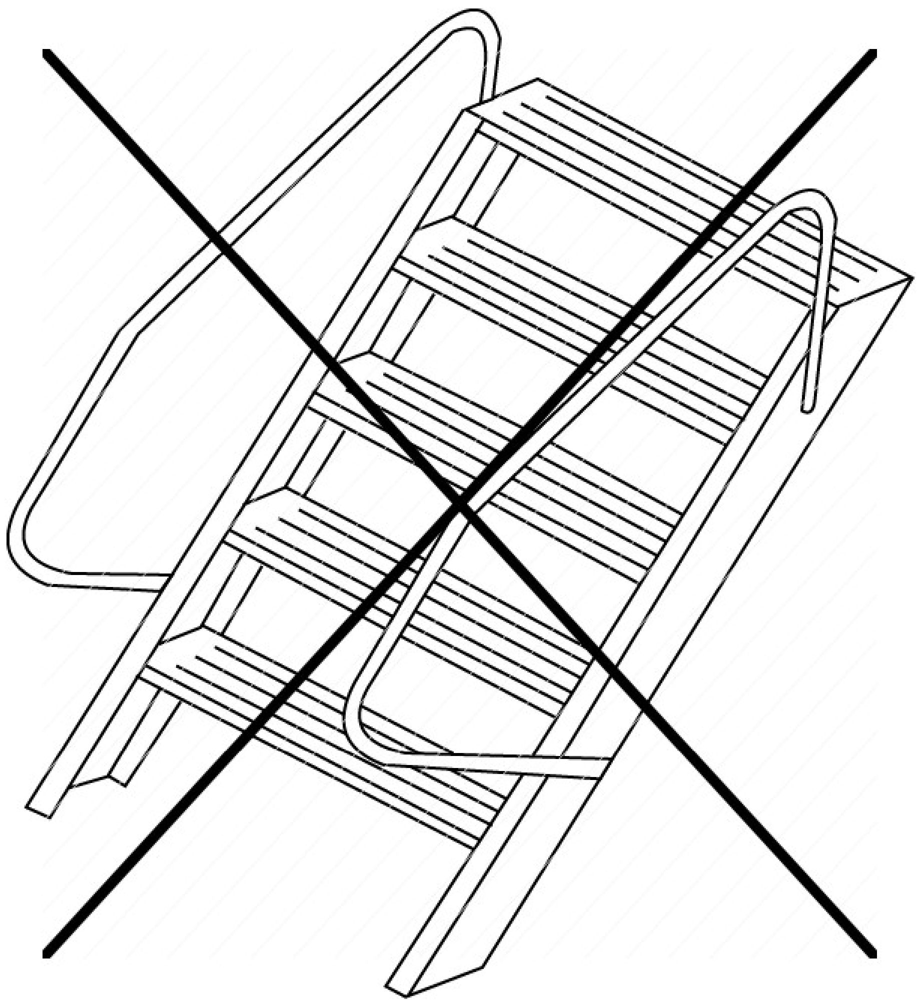
~~**702.2.4 Diameter.** The outside diameter of handrails and handholds shall be not less than 1 inch (25 mm) and not greater than 1.9 inches (48 mm).~~

~~**702.2.5 Clear distance.** The clear distance between ladder handrails shall be not less than a space of 12 inches (305 mm).~~

~~**702.2.6 Treads.** Ladder treads shall have a horizontal uniform depth of not less than 2 inches (51 mm).~~

~~**702.2.7 Riser height.** Risers, other than the bottom riser, shall be of uniform height that is not less than 7 inches (178 mm) and not greater than 12 inches (305 mm). The bottom riser height shall be not less than 7 inches (178 mm) and not greater than 12 inches (305 mm). The vertical distance from the platform or top of the pool structure to the uppermost tread shall be the same as the uniform riser heights.~~

~~**702.3 Type C staircase ladders (ground to deck).** Type C staircase ladders shall comply with Sections 702.3.1 through 702.3.6. See Figure 702.3.~~



~~**FIGURE 702.3 TYPICAL STAIRCASE LADDER, TYPE C**~~

~~**702.3.1 Handrails or handholds.** Staircase ladders shall have not less than two handrails or handholds that serve all treads. The height of the handrails and handholds shall be not less than 20 inches (508 mm) above the platform or uppermost tread, whichever is higher.~~

~~**702.3.2 Diameter.** The outside diameter of handrails and handholds shall be not less than 1 inch (25 mm) and not greater than 1.9 inches (48 mm).~~

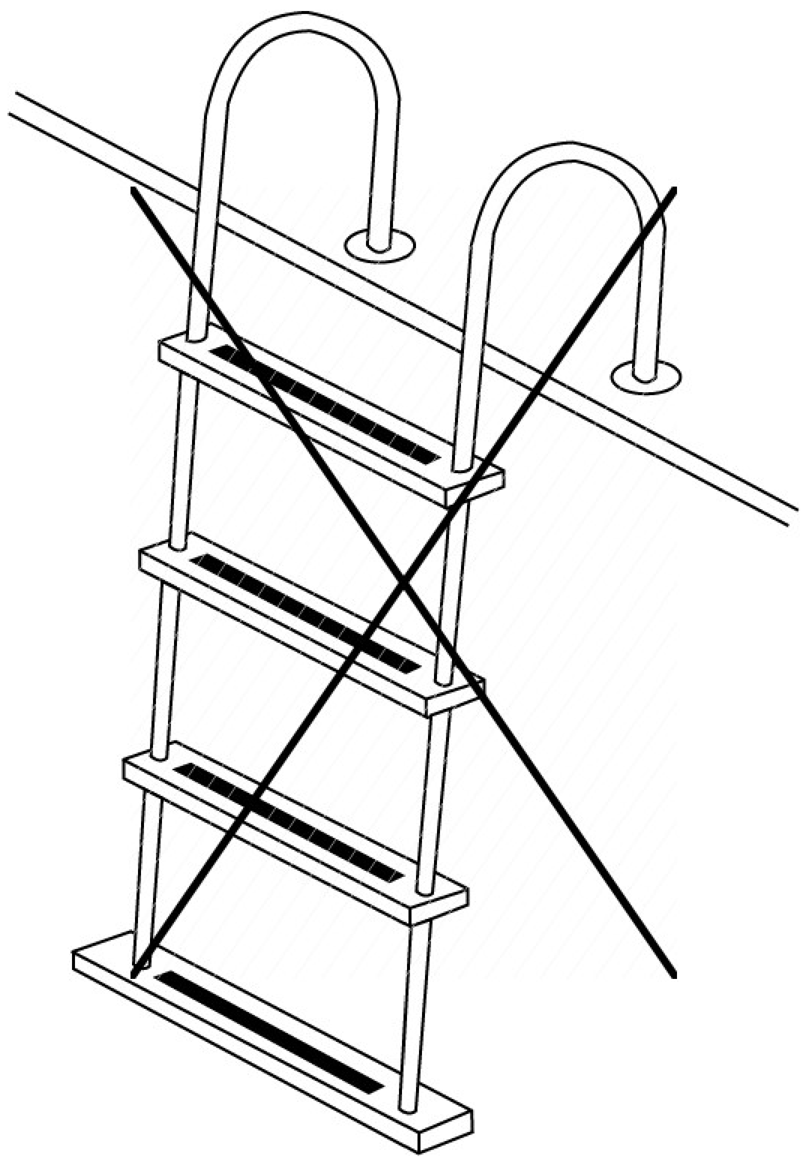
~~**702.3.3 Treads.** Ladder treads shall have a horizontal uniform depth of not less than 4 inches (102 mm).~~

~~**702.3.4 Riser height.** Risers, other than the bottom riser, shall be of uniform height that is not less than 7 inches (178 mm) and not greater than 12 inches (305 mm). The bottom riser height shall be not less than 7 inches (178 mm) and not greater than 12 inches (305 mm). The vertical distance from the platform or top of the pool structure to the uppermost tread shall be the same as the uniform riser heights.~~

~~**702.3.5 Top step.** The top step of a staircase ladder shall be flush with the deck or 7 inches (178 mm) to 12 inches (305 mm) below the deck level.~~

~~**702.3.6 Width.** Steps shall have a minimum unobstructed width of 19 inches (483 mm) between the side rails.~~

~~**702.4 Type D in-pool ladders.** Type D in-pool ladders shall be in accordance with Sections 702.4.1 through 702.4.7. See Figure 702.4.~~



~~**FIGURE 702.4 TYPICAL IN-POOL LADDER, TYPE D**~~

~~**702.4.1 Clearance.** There shall be a clearance of not less than 3 inches (76 mm) and not greater than 6 inches (152 mm) between the pool wall and the ladder.~~

~~**702.4.2 Handrails or handholds.** Ladders shall be equipped with two handrails or handholds that extend above the platform or deck not less than 20 inches (508 mm).~~

~~**702.4.3 Clear distance.** The clear distance between ladder handrails shall be not less than 12 inches (305 mm).~~

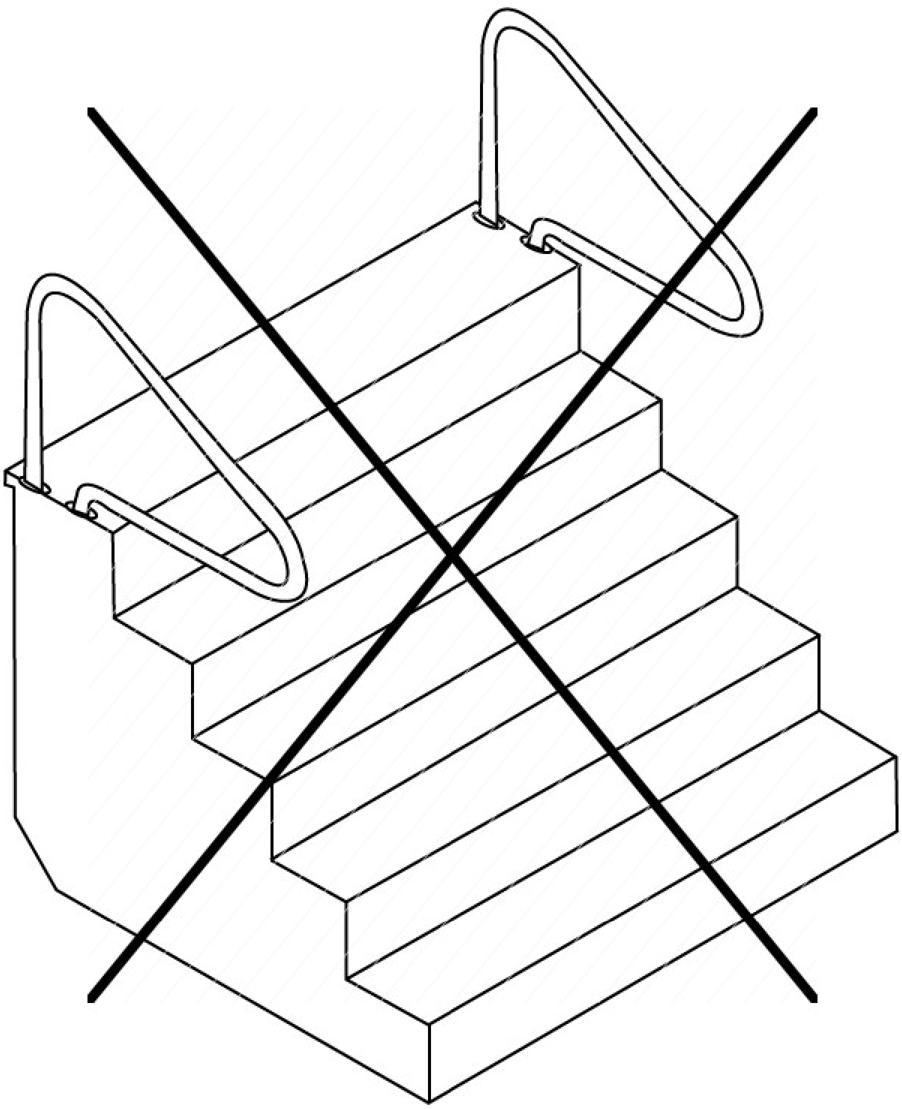
~~**702.4.4 Diameter.** The outside diameter of handrails and handholds shall be not less than 1 inch (25 mm) and not greater than 1.9 inches (48 mm).~~

~~**702.4.5 Riser height.** Risers, other than the bottom riser, shall be of uniform height that is not less than 7 inches (178 mm) and not greater than 12 inches (305 mm). The bottom riser height shall be not less than 7 inches (178 mm) and not greater than 12 inches (305 mm).~~

~~**702.4.6 Top tread.** The vertical distance from the pool coping, deck, or step surface to the uppermost tread shall be not less than 7 inches (178 mm) and not greater than 12 inches (305 mm) and uniform with other riser heights.~~

~~**702.4.7 Tread depth.** Ladder treads shall have a horizontal uniform depth of not less than 2 inches (51 mm).~~

~~**702.5 Type E protruding in-pool stairs.** Type E protruding in-pool stairs shall be in accordance with Sections 702.5.1 through 702.5.7. See Figure 702.5.~~



~~**FIGURE 702.5 TYPICAL IN-POOL STAIRCASE TYPES, E AND F**~~

~~**702.5.1 Barrier required.** In-pool stairs shall have a physical barrier to prevent children from swimming through the riser openings or behind the in-pool stairs.~~

~~**702.5.2 Handrails or handholds.** In-pool stairs shall be equipped with not less than one handrail or handhold that serves all treads with a height of not less than 20 inches (508 mm) above the platform or uppermost tread, whichever is higher.~~

~~**702.5.3 Removable handrails.** Where handrails are removable, they shall be installed such that they cannot be removed without the use of tools.~~

~~**702.5.4 Leading edge distance.** The leading edge of handrails shall be 18 inches (457 mm) ± 3 inches (± 76 mm), horizontally from the vertical plane of the bottom riser.~~

~~**702.5.5 Diameter.** The outside diameter of handrails and handholds shall be not less than 1 inch (25 mm) and not greater than 1.9 inches (48 mm).~~

~~**702.5.6 Tread width and depth.** Treads shall have an unobstructed horizontal depth of not less than 10 inches (254 mm) and an unobstructed surface area of not less than 240 square inches (0.15 m^2).~~

~~**702.5.7 Uniform riser height.** Risers, other than the bottom riser, shall be of uniform height that is not less than 7 inches (178 mm) and not greater than 12 inches (305 mm). The bottom riser height shall be not less than 7 inches (178 mm) and not greater than 12 inches (305 mm). The vertical distance from the pool coping, deck or step surface to the uppermost tread of the stairs shall be the same as the uniform riser heights.~~

~~**702.6 Type F recessed in-pool stairs.** Type F recessed in-pool stairs shall be in accordance with Sections 702.6.1 through 702.6.7. See Figure 702.5.~~

~~**702.6.1 Barrier required.** In-pool stairs shall have a physical barrier to prevent children from swimming through the riser openings or behind the in-pool stairs.~~

~~**702.6.2 Handrails or handholds.** In-pool stairs shall be equipped with not less than one handrail or handhold that serves all treads with a height of not less than 20 inches (508 mm) above the platform or uppermost tread, whichever is higher.~~

~~**702.6.3 Removable handrails.** Where handrails are removable, they shall be installed such that they cannot be removed without the use of tools.~~

~~**702.6.4 Leading edge distance.** The leading edge of handrails shall be 18 inches (457 mm) ± 3 inches (± 76 mm), horizontally from the vertical plane of the bottom riser.~~

~~**702.6.5 Diameter.** The outside diameter of handrails and handholds shall be not less than 1 inch (25 mm) and not greater than 1.9 inches (48 mm).~~

~~**702.6.6 Tread width and depth.** Treads shall have an unobstructed horizontal depth of not less than 10 inches (254 mm) at all points and an unobstructed surface area of not less than 240 square inches (0.15 m^2).~~

~~**702.6.7 Uniform riser height.** Risers, other than the bottom riser, shall be of uniform height that is not less than 7 inches (178 mm) and not greater than 12 inches (305 mm). The bottom riser height shall be not less than 7 inches (178 mm) and not greater than 12 inches (305 mm). The vertical distance from the pool coping, deck or step surface to the uppermost tread of the stairs shall be the same as the uniform riser heights.~~

SECTION 705
SAFETY SIGNS

705.1. Signs to be installed prior to final inspection. Safety signage such as "NO DIVING" signs and other safe use instruction signs that are provided by the pool and ladder manufacturer shall be posted in accordance with the manufacturer's instructions prior to final inspection.

Revise as follows:

705.2 Safety signs for ladders. Safety signage for ladders shall be in accordance with ~~Sections 705.2.1 through 705.2.3.2~~ the requirements in APSP-4.

Delete without substitution:

~~**705.2.1 A-frame ladders.** Safety signage for A-frame ladders shall be in accordance with Sections 705.2.1.1 through 705.2.1.4.1. The words on the signage shall be readable by persons standing in the pool and standing outside of the pool as applicable for the required location of each sign.~~

~~**705.2.1.1 No diving warning.** A-frame ladders shall have the following words posted on the in-pool side of the ladder and on the pool entry side of the ladder: "NO DIVING." The location of the words shall be above the elevation of the design water level of the pool.~~

~~**705.2.1.2 Entrapment warning.** A-frame ladders shall have the following words posted on the pool side of the ladder: "TO PREVENT ENTRAPMENT OR DROWNING DO NOT SWIM THROUGH, BEHIND, OR AROUND LADDER."~~

~~**705.2.1.3 Type A, A-frame ladders.** Type A double access A-frame ladders shall have the following words posted on the ladder: "REMOVE AND SECURE LADDER WHEN POOL IS NOT OCCUPIED."~~

~~**705.2.1.4 Type B, A-frame ladders.** Type B limited access A-frame ladders shall have the following words posted on the ladder: "SECURE LADDER WHEN POOL IS NOT OCCUPIED."~~

~~**705.2.1.4.1 Swing-up or slide-up secured ladders.** Type B limited access A-frame ladders that utilize swing-up or slide-up sections for limiting access to the pool shall have the following words posted on the ladder as applicable for the type of securing method:~~

1. ~~"WHEN POOL IS NOT OCCUPIED, SWING UP AND SECURE."~~
2. ~~"WHEN POOL IS NOT OCCUPIED, LIFT OFF."~~
3. ~~"WHEN POOL IS NOT OCCUPIED, SLIDE UP AND SECURE."~~

~~**705.2.2 Type C staircase ladders.** Type C staircase ladders that swing up to limit access to the pool or that are removed to limit access to the pool shall have the following words posted on the ladder: "WHEN NOT IN USE SWING UP AND SECURE OR REMOVE."~~

~~**705.2.3 Type D in-pool ladder.** Safety signage for Type D in-pool ladders shall be in accordance with Sections 705.2.3.1 and 705.2.3.2. The words on the signage shall be readable by persons standing in the pool or standing outside the pool as applicable for the required location of each sign.~~

~~**705.2.3.1 No diving warning.** Type D in-pool ladders shall have the following words posted on the in-pool side of the ladder and on the pool entry side of the ladder: "NO DIVING." The location of the words shall be above the elevation of the design water level of the pool.~~

~~**705.2.3.2 Entrapment warning.** Type D in-pool ladders shall have the following words posted on the ladder: "WARNING: TO PREVENT ENTRAPMENT OR DROWNING, DO NOT SWIM THROUGH, BEHIND, OR AROUND LADDER."~~

Revise as follows:

CHAPTER 8 PERMANENT ~~INGROUND~~ RESIDENTIAL SWIMMING POOLS

SECTION 801

GENERAL

Revise as follows:

801.1 Scope. ~~The provisions of this chapter shall govern permanent inground *residential* swimming pools.~~ Design, construction, installation, alteration, repair, and operation of p~~P~~ermanent ~~inground~~ *residential* swimming pools, which ~~shall~~ include pools that are inground, partially aboveground, or entirely aboveground ~~grade~~, shall comply with this chapter. ~~This chapter does not cover pools that are specifically manufactured for above-ground use and that are capable of being disassembled and stored. This chapter covers new construction, modification and repair of inground *residential* swimming pools.~~

Delete without substitution:

~~**801.2 General.** Permanent inground *residential* pools shall comply with the requirements of Chapter 3.~~

SECTION 802
DESIGN

Revise as follows:

802.1 Materials of components and accessories. The materials of components and accessories used for permanent ~~inground~~ *residential* swimming pools shall be suitable for the environment in which they are installed. The materials shall be capable of fulfilling the design, installation and the intended use requirements in the *International Residential Code*.

Add new text as follows:

802.3 Identification. Permanent *residential* swimming pools with a vinyl liner shall have the manufacturer's name and the liner identification number affixed to the liner.

Revise as follows:

TABLE 803.1 DESIGN WATERLINE CONSTRUCTION TOLERANCE

SURFACE	TOLERANCE
Waterline on tiled surface	± $^1/_4$ inch
Waterline on surfaces other than a tiled surface	± $^1/_2$ inch
Waterline on aboveground manufactured pool kit	±1 inch

805.1 General. Walls in the shallow area and deep area of the pool shall have a wall-to-floor transition point that is not less than 33 inches (838 mm) below the *design waterline*. Above the transition point, the walls shall be within 11 degrees (0.19 rad) of vertical.

Exception: The slope adjacent to the side walls shall not exceed 1 unit vertical in 1 unit horizontal (100 percent slope) where specified by the manufacturer for permanent aboveground pools.

809.2 Entry and exit. Pools shall have a means of entry and exit in all shallow areas where the design water depth of the shallow area at the shallowest point exceeds 24 inches (610 mm). Entries and exits shall consist of one or a combination of the following: steps, stairs, ladders, treads, ramps, beach entries, underwater seats, benches, swimouts and other *approved* designs. The means of entry and exit shall be located on the shallow side of the first slope change.

Add new text as follows:

809.2.1 Ladders and Stairs. Partially and entirely aboveground permanent non-diving pools shall meet the ladder and staircase requirements, and associated safety signage, in accordance with APSP-4.

809.10 Decks. Partially and entirely aboveground permanent non-diving pools shall meet the decking requirements in Section 703.

Staff Analysis: The proposed standards are in the current edition of the code.

Reason: The intent of this proposal is to reorganize aspects of Chapters 7 and 8 in order to provide needed clarity. Chapter 7 is titled "Onground storable residential swimming pools" and requirements within should only be relative to these specific types of pools, and only include items not addressed or that must differ from Chapter 3 General requirements. Whereas all types of permanent pools, including partially or entirely aboveground pools should be covered in Chapter 8 where permanent residential pools reside. This proposal also provides changes to eliminate duplicative provisions.

Specifically, this proposal provides the following:

- Updates scoping for both Chapters to align with what is covered within each Chapter and to align with the larger scoping proposal being addressed across all I-codes for consistency in formatting.
- Removes floor slope requirements in Chapter 7 that do not apply to onground storable pools (and is already provided within Chapter 8 where such requirements are applicable).
- Deletes the majority of Sections 702 and 705, and requires that stairs and ladders meet the requirements laid out in APSP-4, including relevant safety signage for the specific type of ladder or stairs used.
- Adds a new subsection to Chapter 8 to ensure vinyl liners used in permanent pools have the appropriate identification affixed to the liner.
- Adds a waterline tolerance for permanent aboveground manufactured pool kits to Table 803.1.
- Adds an exception under Section 805 needed for certain permanent aboveground pools.
- Adds a requirement in Section 809 for permanent aboveground non-diving pools installing ladders or stairs to follow the requirements as specified in APSP-4, including relevant safety signage.
- Adds a requirement in Section 809 for permanent aboveground non-diving pools to also follow the decking requirements in Section 703, as these types of pools may also use the types of decking laid out in Chapter 7. These requirements are not in Chapter 3 decking becuase they do not apply to all types of pools and spas.

With regard to now referring to the ANSI/APSP/ICC-4 Standard for Aboveground/Onground Residential Swimming Pools, the reasoning behind this change was these non-diving permanent aboveground or storable onground residential pools provide for pre-fabricated ladder or stair components. Other components within the ISPSC that have a standard they must follow simply reference said standard. For example, suction outlet fitting assemblies are required to comply with ANSI/APSP/ICC-16, pool and hot tub covers are required to comply with ASTM F1346, etc. Further, in one subsection of Section 702 we already refer the user to APSP-4; therefore, it makes more sense to have them go to APSP-4 for all its ladder and stair requirements. This then allows for Sections 702 and 705 to be reduced to simply requiring compliance with APSP-4. Then in Chapter 8, for permanent aboveground nondiving pools who utilize these same ladders and steps, a similar subsection is added directing the user to APSP-4 for compliance. Finally, by removing the language, this change ensures that if any changes are made to the APSP-4 requirements, the ISPSC will not be inconsistent.

This proposal is not intended to add any new requirements, but simply clarify existing requirements by properly organizing them in the appropriate chapters and sections of ISPSC and deleting duplicative language or language that comes from a standard that instead can be referenced for compliance.

Bibliography: ANSI/APSP/ICC-4 2012 (R2022) American National Standard for Aboveground/Onground Residential Swimming Pools

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposal does not change any current requirements; rather, it simply reorganizes sections to make the code clearer as to what requirements are for certain types of pools. The requirement to follow APSP-4 does not affect the cost as this standard was already required within the ISPSC.

SP31-24

SP32-24

ISPSC: 811.1

Proponents: Gregory Ceton, Pool and Hot Tub Alliance (gceton@phta.org); Jennifer Hatfield, J. Hatfield & Associates, Pool & Hot Tub Alliance (jen@jhatfieldandassociates.com)

2024 International Swimming Pool and Spa Code

Revise as follows:

811.1 ~~Rope and float~~ Slope change identification. ~~In pools where the point of first slope break occurs, a rope and float assembly shall be installed across the width of the pool. The rope assembly shall be located not less than 1 foot (305 mm) and not greater than 2 feet (610 mm) towards the shallow side of the slope break. Rope anchoring devices shall be permanently attached to the pool wall, coping or deck. Rope ends shall attach to the rope anchor devices so that the rope ends can be disconnected from the rope anchor device.~~ The point at which the shallow area changes slope to the deep area in the pool shall be identified in an approved manner.

Reason: Most pool builders do not install safety ropes and floats on residential pools with a continuous 1:7 slope or more. The transition increase of a deep end slope less than the accepted shallow end slope does necessitate an approved manner for marking the transition but that is not necessarily rope and float, which is uncommon in residential pools. Deep ends are also becoming uncommon in new residential pools.

An approved and commonly used method for depth transition may be floor or other marking used.

The slope change transition is noted in section 807 of the ISPSC.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$1-500

Estimated Immediate Cost Impact Justification (methodology and variables):

The cost of not installing rope and float anchors in pools with deep ends would be minimal -- the cost of not buying rope and float equipment or paying for installation of anchors. The cost of other forms of marking would be included in the cost of coating or tiles already part of the total cost of a pool.

Estimated Life Cycle Cost Impact:

None

Estimated Life Cycle Cost Impact Justification (methodology and variables):

None

SP32-24

SP33-24

ISPSC: 901.2

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Swimming Pool and Spa Code

Revise as follows:

901.2 General. Permanent *residential* spas and permanent *residential* exercise spas shall comply with Chapter 5 except that Sections 504 ~~504.1, 504.1.1~~ and 508 ~~508.1~~ shall not apply. Such spas shall comply with the requirements of Chapter 3.

Reason: During the 2018 Group A code development hearings, John Kelly, representing himself submitted SP39-18. This proposal added in a much-needed timer for Commercial Spas and Exercise Spas. However, this created an unintended consequence, now making the timers required on residential and commercial. This proposal will now exempt all residential spas and exercise spas from section 504 and 508 in its entirety. By exempting out all of section 504 and not just the subsections, it cleans up the code section providing clarity. Furthermore, with there no longer being section 509 in the ISPSC removing that exemption is also needed for clarity. Section 509 on safety features was moved to section 508 in the 2021 ISPSC. This was due to approval of SP19-18. In The 2024 ISPSC section 319.2 was relocated to 320.2. This renumbering was the result of the approval of SP24-21. The updated 2024 ISPSC section 320.2 makes it clear that these only apply to Public Pools and Spa, therefore no exception is needed in chapter 9 for section 320.2. By including all of section 508 we will return the code to the original intent for exempting out the safety requirements for public spas and exercise spas.

This proposal is submitted by the ICC Plumbing Mechanical Gas Code Action Committee (PMGCAC)

PMGCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 PMGCAC has held 26 virtual meetings open to any interested party. In addition, there were several virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the PMGCAC website at PMGCAC.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

About $200 per spa.

Estimated Immediate Cost Impact Justification (methodology and variables):

About 2 hours labor at $80 per hours plus $40 for wiring, timer and mounting hardware.

Estimated Life Cycle Cost Impact:

N/A

Estimated Life Cycle Cost Impact Justification (methodology and variables):

N/A

SP33-24

2024 GROUP A – PROPOSED CHANGES TO THE INTERNATIONAL FIRE CODE

FIRE CODE COMMITTEE

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TENTATIVE ORDER OF DISCUSSION
2024 PROPOSED CHANGES TO THE
INTERNATIONAL FIRE CODE

The following is the tentative order in which the proposed changes to the code will be discussed at the public hearings. Proposed changes which impact the same subject have been grouped to permit consideration in consecutive changes.

Proposed change numbers that are indented are those which are being heard out of numerical order. Indentation does not necessarily indicate that one change is related to another. Proposed changes may be grouped for purposes of discussion at the hearing at the discretion of the chair. Note that some F code change proposals may not be included on this list, as they are being heard by another committee.

IWUIC
- E1-24 Part III
- G12-24 Part V

WUIC1-24
WUIC2-24
WUIC3-24
WUIC4-24
WUIC5-24
WUIC6-24
WUIC7-24
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WUIC9-24
WUIC10-24
WUIC11-24
WUIC12-24
WUIC13-24
WUIC14-24
WUIC15-24
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WUIC1-24

IWUIC: 301.2, 401.2, 401.3, 501.2, 501.3, 601.2

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Wildland Urban Interface Code

Delete without substitution:

~~**301.2 Objective.** The objective of this chapter is to provide simple baseline criteria for determining *wildland-urban interface areas*.~~

~~**401.2 Objective.** The objective of this chapter is to establish the minimum requirements for emergency vehicle access and water supply for buildings and structures located in the *wildland-urban interface areas*.~~

Revise as follows:

~~401.3~~401.2 General safety precautions.
General safety precautions shall be in accordance with this chapter. ~~See also Appendix A.~~

Delete without substitution:

~~**501.2 Objective.**~~
~~The objective of this chapter is to establish minimum standards to locate, design and construct buildings and structures or portions thereof for the protection of life and property, to resist damage from wildfires, and to mitigate building and structure fires from spreading to wildland fuels. The minimum standards set forth in this chapter vary with the critical *fire weather*, slope and fuel type to provide increased protection, above the requirements set forth in the *International Building Code*, from the various levels of hazards.~~

Revise as follows:

~~501.3~~501.2 Fire-resistance-rated construction.
Where this code requires 1-hour *fire-resistance-rated construction*, the fire-resistance rating of building elements, components or assemblies shall be determined in accordance with the test procedures set forth in ASTM E119 or UL 263.

Exceptions:

1. The fire-resistance rating of building elements, components or assemblies based on the prescriptive designs prescribed in Section 721 of the International Building Code.
2. The fire-resistance rating of building elements, components or assemblies based on the calculation procedures in accordance with Section 722 of the International Building Code.

Delete without substitution:

~~**601.2 Objective.** The objective of this chapter is to establish minimum requirements to mitigate the risk to life and property from wildland fire exposures, exposures from adjacent structures and to prevent structure fires spreading to wildland fuels.~~

Reason: The intent of this proposal is to move/incorporate the "Objectives" to the notes at the top of each chapter. The items there describe how the chapter should apply and do not really have any substantive requirements, thus are better in the note sections. This is a companion to the Scope rewrite, and these were identified as unrelated to the enforceable requirements of the code.

There are two sections that would need to be renumbered. Section 401.2 also has an issue in that it says "See appendix A" but Appendix A only applies if adopted by a jurisdiction, and thus is inappropriate to include in the text of the code given that the appendix isn't mandatory.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This simply moves language from the body of the code to the notes, and has no regulatory effect.

WUIC1-24

WUIC2-24

IWUIC: [A] 106.3, SECTION 202, SECTION 202 (New), 402.2.2, SECTION 503, 503.1, TABLE 503.1, SECTION 504, 504.1, 504.3, 504.5, SECTION 505, 505.1, 505.5, SECTION 506, 506.1, 507.1, 602.1, G101.3.5

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Wildland Urban Interface Code

Revise as follows:

[A] 106.3 Site plan.
In addition to the requirements for plans in the *International Building Code*, site plans shall include topography, width and percent of grade of access roads, landscape and vegetation details, locations of structures or building envelopes, existing or proposed overhead utilities, occupancy classification of buildings, ~~types of ignition-resistant construction~~ *WUI construction class* of buildings, structures and their appendages, roof classification of buildings and site water supply systems. The *code official* is authorized to waive or modify the requirement for a site plan where the application for permit is for alteration or repair or where otherwise warranted.

~~**IGNITION-RESISTANT CONSTRUCTION, CLASS 1.**~~ ~~A schedule of additional requirements for construction in *wildland-urban interface areas* based on extreme fire hazard.~~

~~**IGNITION-RESISTANT CONSTRUCTION, CLASS 2.**~~ ~~A schedule of additional requirements for construction in *wildland-urban interface areas* based on high fire hazard.~~

~~**IGNITION-RESISTANT CONSTRUCTION, CLASS 3.**~~ ~~A schedule of additional requirements for construction in *wildland-urban interface areas* based on moderate fire hazard.~~

Add new definition as follows:

WUI CONSTRUCTION CLASS. One of three sets of additional requirements for construction in wildland-urban interface areas, classified as either Class 1 WUI construction, Class 2 WUI construction, or Class 3 WUI construction.

Revise as follows:

402.2.2 Water supply.
Individual structures hereafter constructed or relocated into or within *wildland-urban interface areas* shall be provided with a conforming water supply in accordance with Section 404.

Exceptions:

1. Structures constructed to meet the requirements for the ~~class of ignition-resistant construction~~ *WUI construction class* specified in Table 503.1 for a nonconforming water supply.
2. Buildings containing only private garages, carports, sheds and agricultural buildings with a floor area of not more than 600 square feet (56 m^2).

SECTION 503
~~IGNITION-RESISTANT~~ CONSTRUCTION AND MATERIAL

503.1 General.
Buildings and structures hereafter constructed, modified or relocated into or within *wildland-urban interface areas* shall meet the construction requirements in accordance with Table 503.1. Class 1, Class 2 ~~or~~ and Class 3~~, ignition-resistant construction~~ *WUI construction classes* shall be in accordance with Sections 504, 505 and 506, respectively. Materials required to be ~~ignition-resistant materials~~ *ignition-resistant building materials* shall comply with the requirements of Section 503.2.

TABLE 503.1 ~~IGNITION-RESISTANT~~ WUI CONSTRUCTION CLASSES[a]

DEFENSIBLE SPACE[c]	FIRE HAZARD SEVERITY					
	Moderate Hazard		High Hazard		Extreme Hazard	
	Water Supply[b]		Water Supply[b]		Water Supply[b]	
	Conforming[d]	Nonconforming[e]	Conforming[d]	Nonconforming[e]	Conforming[d]	Nonconforming[e]
Nonconforming	~~IR~~ Class 2	~~IR~~ Class 1	~~IR~~ Class 1	~~IR~~ Class 1 N.C.	~~IR~~ Class 1 N.C.	Not Permitted
Conforming	~~IR~~ Class 3	~~IR~~ Class 2	~~IR~~ Class 2	~~IR~~ Class 1	~~IR~~ Class 1	~~IR~~ Class 1 N.C.
1.5 × Conforming	Not Required	~~IR~~ Class 3	~~IR~~ Class 3	~~IR~~ Class 2	~~IR~~ Class 2	~~IR~~ Class 1

a. Access shall be in accordance with Section 403.

b. Subdivisions shall have a conforming water supply in accordance with Section 402.1.

~~IR~~ Class 1 = ~~Ignition-resistant~~ construction in accordance with Section 504.

~~IR~~ Class 2 = ~~Ignition-resistant~~ construction in accordance with Section 505.

~~IR~~ Class 3 = ~~Ignition-resistant~~ construction in accordance with Section 506.

N.C. = Exterior walls shall have a fire-resistance rating of not less than 1 hour and the exterior surfaces of such walls shall be noncombustible. Usage of log wall construction is allowed.

c. Conformance based on Section 603.

d. Conformance based on Section 404.

e. A nonconforming water supply is any water system or source that does not comply with Section 404, including situations where there is no water supply for structure protection or fire suppression.

SECTION 504
CLASS 1 ~~IGNITION-RESISTANT~~ WUI CONSTRUCTION

504.1 General.

~~Class 1 ignition-resistant construction~~ Class 1 WUI construction shall be in accordance with Sections 504.2 through 504.11.

504.3 Protection of eaves.

Eaves and soffits shall be protected on the exposed underside by ~~ignition-resistant materials~~ *ignition-resistant building materials* or by materials *approved* for not less than 1-hour *fire-resistance-rated construction*, 2-inch (51 mm) nominal dimension lumber, or 1-inch (25 mm) nominal fire-retardant-treated lumber or $^3/_4$-inch (19.1 mm) nominal fire-retardant-treated plywood, identified for exterior use and meeting the requirements of Section 2303.2 of the International Building Code. Fascias are required and shall be protected on the backside by ~~ignition-resistant materials~~ *ignition-resistant building materials* or by materials *approved* for not less than 1-hour *fire-resistance-rated construction* or 2-inch (51 mm) nominal dimension lumber.

504.5 Exterior walls.

Exterior walls of buildings or structures shall be constructed with one of the following methods:

1. Materials *approved* for not less than 1-hour *fire-resistance-rated construction* on the exterior side.
2. *Approved noncombustible* materials.
3. Heavy timber or *log wall construction*.
4. Fire-retardant-treated wood on the exterior side. The fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section 2303.2 of the International Building Code.
5. ~~Ignition-resistant materials~~ *Ignition-resistant building materials* complying with Section 503.2 on the exterior side.

Such material shall extend from the top of the foundation to the underside of the roof sheathing.

SECTION 505
CLASS 2 ~~IGNITION-RESISTANT~~ WUI CONSTRUCTION

505.1 General.
~~Class 2 ignition-resistant construction~~ Class 2 WUI construction shall be in accordance with Sections 505.2 through 505.11.

505.5 Exterior walls.
Exterior walls of buildings or structures shall be constructed with one of the following methods:

1. Materials *approved* for not less than 1-hour *fire-resistance-rated construction* on the exterior side.
2. *Approved noncombustible* materials.
3. *Heavy timber* or *log wall construction*.
4. Fire-retardant-treated wood on the exterior side. The fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section 2303.2 of the International Building Code.
5. ~~Ignition-resistant materials~~ *Ignition-resistant building materials* on the exterior side.

Such material shall extend from the top of the foundation to the underside of the roof sheathing.

SECTION 506
CLASS 3 ~~IGNITION-RESISTANT~~ WUI CONSTRUCTION

506.1 General.
~~Class 3 ignition-resistant construction~~ Class 3 WUI construction shall be in accordance with Sections 506.2 through 506.4.

507.1 General.
The *roof covering* on buildings or structures in existence prior to the adoption of this code that are replaced or have 25 percent or more replaced in a 12-month period shall be replaced with a *roof covering* required for new construction based on the ~~type of ignition-resistant construction~~ *WUI construction class* specified in accordance with Section 503.

602.1 General.
An *approved* automatic sprinkler system shall be installed in all occupancies in new buildings required to meet the requirements for ~~Class 1 ignition-resistant construction~~ Class 1 WUI construction in Chapter 5. The installation of the automatic sprinkler systems shall be in accordance with nationally recognized standards.

G101.3.5 Shelter in place.
Developments in the wildland-urban interface may be designed to allow occupants to “Shelter in place.” Use of this design alternative should include ~~ignition-resistant construction~~ Class 1, Class 2 or Class 3 *WUI construction class* in accordance with Chapter 5, access, water supply, automatic sprinkler systems, provisions for and maintenance of *defensible space*, and a *Fire Protection Plan*.
A *Fire Protection Plan* describes ways to minimize the fire problems created by a specific project or development. The purpose for the *Fire Protection Plan* is to reduce the burden and impact of the project or development on the community’s fire protection delivery system. The plan may utilize components of land use, building construction, vegetation management and other design techniques and technologies. It should include specific mitigation measures consistent with the unique problems resulting from the location, topography, geology, flammable vegetation and climate of the proposed site. The plan shall be consistent with this code, and approved by the fire *code official*. The cost of preparation and review is to be borne by the project or development proponent.

Reason: This proposal cleans up terminology used in the IWUIC regarding materials and construction classes. Current language in the IWUIC does not use consistent terminology throughout and some of the terms currently used are not defined. The undefined term "ignition-resistant construction" implies that such construction must be composed of *ignition-resistant building materials*, which is not necessarily the case. To address this, the undefined term "ignition-resistant construction" is replaced by the new term *WUI construction class*, for which a definition is proposed. Also, instances of the undefined term "ignition-resistant material" are consistently replaced with the defined term *ignition-resistant building material*. The intent of this proposal is to eliminate these specific instances of confusing language, improve consistency of terminology and ensure that terminology regarding materials and *WUI construction classes* is defined, where appropriate.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposal replaces undefined terms with defined terms, to improve consistency and clarity without changing code requirements.

WUIC2-24

WUIC3-24

IWUIC: 403.4

Proponents: Kevin Scott, KH Scott & Associates LLC, self (khscottassoc@gmail.com)

2024 International Wildland Urban Interface Code

Revise as follows:

403.4 Marking of roads. *Approved* signs or other *approved* notices shall be provided ~~and maintained for access roads and *driveways* to identify such roads and prohibit the obstruction thereof~~ to identify access roads. Approved signs shall be provided to prohibit the obstruction of access roads and driveways serving more than one building or structure. Required signs and notices shall be maintained and legible.

Reason: This proposal is intended to clarify this section, and indicate that it is not required to provide signs at driveways.

This current section contains several requirements in one sentence:

1. Signs identifying access roads and driveways
2. Signs to prohibit obstruction of access roads and driveways
3. Maintenance of signs.

This proposal splits the components apart and modifies it so that:

1. Signs are required to identify access roads. Signs identifying driveways are not required.
2. Signs are required to prohibit obstruction of access roads. Such signs are not required for driveways unless they serve more than one building or structure.
3. The required signs and notices must be legible and maintained.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

This proposal will reduce the cost by eliminating the requirements for signs on driveways, and "NO OBSTRUCTION" signs on driveways serving individual structures. The cost per project is estimated to be $100.

Estimated Immediate Cost Impact Justification (methodology and variables):

The cost is based on the purchase of an average of two 4 x 4 redwood posts, paint and labor.

WUIC3-24

WUIC4-24

IWUIC: 404.5

Proponents: Pierson Stoecklein, Frontline Wildfire Defense

2024 International Wildland Urban Interface Code

Revise as follows:

404.5 Adequate water supply.
Adequate water supply shall be determined for purposes of initial attack, ember control and flame front control as follows:

1. One- and two-family dwellings. The required water supply for one- and two-family dwellings having a *fire flow calculation area* that does not exceed 3,600 square feet (334 m^2) shall be 1,000 gallons per minute (63.1 L/s) for a minimum duration of 30 minutes. The required water supply for one- and two-family dwellings having a *fire flow calculation area* in excess of 3,600 square feet (334 m^2) shall be 1,500 gallons per minute (95 L/s) for a minimum duration of 30 minutes.

   Exception: A reduction in required flow rate of 50 percent, as *approved* by the *code official*, is allowed where the building is provided with an *approved* automatic sprinkler system, or an approved exterior wildfire sprinkler system, or both.

2. Buildings other than one- and two-family dwellings. The water supply required for buildings other than one- and two-family dwellings shall be as *approved* by the *code official* but shall be not less than 1,500 gallons per minute (95 L/s) for a duration of 2 hours.

   Exception: A reduction in required flow rate of up to 75 percent, as *approved* by the *code official*, is allowed where the building is provided with an *approved* automatic sprinkler system, or an approved exterior wildfire sprinkler system, or both. The resulting water supply shall not be less than 1,500 gallons per minute (94.6 L/s).

Reason: This modification facilitates (but does not require) the potential installation of a exterior wildfire sprinkler system while ensuring that water supply is addressed. It would subject each exterior system to the same water supply and flow rate requirements applicable to interior sprinkler systems without making any changes to existing precedent.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposed modifications incorporate an exterior wildfire sprinkler system into the code as optional equipment that can be installed on a structure at the discretion of the owner/s and the local code official. Because installation is not mandated, nor do the proposed modifications alter any construction requirements, the proposed modifications have no cost impact.

WUIC4-24

WUIC5-24

IWUIC: 502.2

Proponents: Pierson Stoecklein, Frontline Wildfire Defense

2024 International Wildland Urban Interface Code

Revise as follows:

502.2 Fire hazard severity reduction.
The fire hazard severity identified in Table 502.1 is allowed to be reduced by implementing a vegetation management plan in accordance with Appendix B or by installing an approved exterior wildfire sprinkler system.

Reason: This proposal would allow (but not require) a code official to reduce the fire hazard severity where an approved exterior wildfire sprinkler system is installed. This simply means that, where an exterior sprinkler system is capable of providing the same or greater benefits relative to a vegetation management plan, the sprinkler system would warrant the same consideration with regard to reducing the fire hazard severity.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposed modifications incorporate an exterior wildfire sprinkler system into the code as optional equipment that can be installed on a structure at the discretion of the owner/s and the local code official. Because installation is not mandated, nor do the proposed modifications alter any construction requirements, the proposed modifications have no cost impact.

WUIC5-24

WUIC6-24

IWUIC: 503.1

Proponents: Pierson Stoecklein, Frontline Wildfire Defense

2024 International Wildland Urban Interface Code

Revise as follows:

503.1 General.
Buildings and structures hereafter constructed, modified or relocated into or within *wildland-urban interface areas* shall meet the construction requirements in accordance with Table 503.1. Class 1, Class 2 or Class 3, ignition-resistant construction shall be in accordance with Sections 504, 505 and 506, respectively. Materials required to be ignition-resistant materials shall comply with the requirements of Section 503.2.

> **Exception:**Where a building or structure constructed in the nonconforming defensible space category is provided with an approved exterior wildfire sprinkler system, the defensible space shall be deemed conforming and construction shall be in accordance with the requirements applicable to the conforming defensible space category.

Reason: An exterior wildfire sprinkler system significantly increases the effectiveness of the defensible space and warrants this modification.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposed modifications incorporate an exterior wildfire sprinkler system into the code as optional equipment that can be installed on a structure at the discretion of the owner/s and the local code official. Because installation is not mandated, nor do the proposed modifications alter any construction requirements, the proposed modifications have no cost impact.

WUIC6-24

WUIC7-24

IWUIC: SECTION 602, 602.1, 602.2 (New), 602.3 (New), 602.3.1 (New), 602.3.2 (New), 602.4 (New), 602.4.1 (New), 602.4.2 (New), 602.4.3 (New), 602.4.4 (New), 602.4.5 (New), 602.4.6 (New)

Proponents: Pierson Stoecklein, Frontline Wildfire Defense

2024 International Wildland Urban Interface Code

Revise as follows:

SECTION 602
~~AUTOMATIC~~FIRE SPRINKLER SYSTEMS

602.1 General.
An *approved* automatic sprinkler system shall be installed in all occupancies in new buildings required to meet the requirements for Class 1 ignition-resistant construction in Chapter 5. The installation of the automatic sprinkler systems shall be in accordance with nationally recognized standards. Where permitted by the fire code official, an exterior wildfire sprinkler system shall be installed permanently in accordance with Sections 602.2 through 602.4.

Add new text as follows:

602.2 Exterior wildfire sprinkler system coverage. Where approved by the code official, an exterior wildfire sprinkler system shall provide coverage of the entire defensible space required per Table 603.2, as well as any exterior horizontal or vertical surface that is less than 67.5 degrees in angle and is within the perimeter of the defensible space.

602.3 Water supply. Where connected to a public water supply, an exterior wildfire sprinkler system shall include a mechanism, in a conspicuously marked location, accessible to the fire service, which allows immediate manual termination of system operation. Where approved by the code official, alternative sources of water supply, including fire department connections, shall be permitted to supply water to an exterior wildfire sprinkler system. The code official shall be authorized to require an exterior wildfire sprinkler system to utilize a specified percentage of biodegradable, Class A firefighting foam in order to reduce the amount of water consumed by the system.

602.3.1 Duration. An approved exterior wildfire sprinkler system shall be equipped with a resettable shutoff device that activates automatically after 90 minutes of continuous operation and can be reset without manual intervention to resume the flow of water through the system.

602.3.2 Freeze protection. Any exterior wildfire sprinkler system in an area subject to freezing shall be a dry pipe system or winterized by alternative means where approved by the code official.

602.4 Exterior wildfire sprinkler system components. An exterior wildfire sprinkler system shall consist of approved equipment and devices.

602.4.1 Sprinkler-type devices. An exterior wildfire sprinkler system shall be equipped with approved open sprinkler-type devices at approved locations

602.4.2 Control valves. An exterior wildfire sprinkler system shall have a control valve equipped with an automatic system shutoff mechanism that is capable of being controlled remotely to activate, pause, and deactivate the system. Where permitted, additional control valves shall be identified by signage at the main control valve.

> **Exception:** The code official is authorized to permit a manually controlled exterior wildfire sprinkler system only where constant supervision will be present.

-

602.4.3 **Drain valves.** An *exterior wildfire sprinkler system* shall have a separate drain valve installed on the system-side of each control valve, except where an open sprinkler-type device, top-fed system is arranged to facilitate drainage.

602.4.4 **Pressure gauges.** Each *exterior wildfire sprinkler system* shall be equipped with one or more digital pressure gauges and at least one analog pressure gauge, each of which shall be capable of monitoring static and dynamic system and water supply pressures.

602.4.5 **Pipes and fittings.** All *exterior wildfire sprinkler system* pipes and fittings installed on the exterior of the building or structure shall be non-photodegradable, corrosion resistant, permanently connected to a water supply, and designed to drain upon deactivation of the system.

602.4.6 **Backflow device.** Where any potable water source is connected to or used to supply the exterior wildfire sprinkler system, an approved backflow preventer shall be installed in the riser or feed main.

Reason: 90% of structure ignitions during a wildfire are caused by embers (Wildland Fire Embers and Flames: Home Mitigations That Matter, at p6, IBHS). Embers can travel in excess of 24 miles outside of a wildfire perimeter—the distance being subject to wind and convective heat—as well as ember parent material (IBHS, NIST). Given the distance of ember travel and the quantity of structures simultaneously exposed to embers, it is often impossible for firefighters to actively defend all structures, all at once.

Both regulated and non-regulated fuels are often present within the defensible space perimeter. Although regulated fuels, such as plant fuels and building materials, are subject to regulation under the IWUIC and IBC, non-regulated fuels, such as patio furniture, door mats, accumulated pine needles and leaves, firewood, toys, and other household items and natural materials are not. Regardless, when fuels of either type are subjected to ember cast and subsequently reach combustion, heat transfer from these fuels contributes to structure combustion.

Exterior wildfire sprinkler systems provide added protection for structures and are uniquely effective when used in conjunction with fire-resistant construction materials and defensible space (*see* Fire Sprinklers Technical Fact Sheet #15, *Federal Emergency Management Agency*) (Protect Your Property from Wildfire, California Edition, IBHS). Automatic interior fire sprinkler systems activate from contact with direct heat (i.e., after a fire has already begun and reached the immediate vicinity of the system) and are designed primarily to prevent flashover inside the home while allowing the occupants to escape and the fire department to arrive. In contrast, exterior wildfire sprinkler systems are deployed with a focus on mitigation/prevention, the primary objective being to hydrate combustible materials that comprise or are within a certain distance of a structure, well before the structure is exposed to ignition sources (e.g., air borne embers); exterior wildfire sprinkler systems do not activate from contact with direct heat contact.

Building and maintaining a saturation level of optimal hydration is vital to prevention of ember ignition and, by hydrating the exterior surfaces of a structure and increasing the moisture content of regulated and non-regulated fuels located within the relevant defensible space, exterior wildfire sprinkler systems can prevent or significantly reduce ignition risk (*see* Factsheet: FireSmart Exterior Home Sprinklers and Structure Protection Units, British Columbia FireSmart). This reduces the fire hazard severity of building sites for buildings constructed, modified or relocated into wildland-urban interface areas and can substantially increase the effectiveness of defensible space (whether conforming or nonconforming).

The proposed modifications incorporate exterior wildfire sprinklers into the IWUIC and thereby offer a new self-defense mechanism independent of active firefighter defense. Reducing the number of active defense actions that must be taken by firefighters results in a safer firefighting environment and enables more focused and therefore effective use of limited firefighting resources.

The addition of this new section identifies critical features and functionality of an ideal exterior wildfire sprinkler system.

Bibliography:

1. Wildland Fire Embers and Flames: Home Mitigations That Matter, *IBHS* (April 2023).
2. Fire Sprinklers, Home Builder's Guide to Construction in Wildfire Zones, Technical Fact Sheet #15, *Federal Emergency Management Agency.*
3. Protect Your Property from Wildfire, California Edition, IBHS.
4. Factsheet: FireSmart Exterior Home Sprinklers and Structure Protection Units, British Columbia FireSmart.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposed modifications incorporate an exterior wildfire sprinkler system into the code as optional equipment that can be installed on a structure at the discretion of the owner/s and the local code official. Because installation is not mandated, nor do the proposed modifications alter any construction requirements, the proposed modifications have no cost impact.

WUIC7-24

WUIC8-24

IWUIC: 603.2

Proponents: Pierson Stoecklein, Frontline Wildfire Defense (pierson@pioneerpublicaffairs.com)

2024 International Wildland Urban Interface Code

Revise as follows:

603.2 Fuel modification.
Buildings or structures, constructed in compliance with the conforming *defensible space* category of Table 503.1, shall comply with the *fuel modification* distances contained in Table 603.2. For all other purposes the *fuel modification* distance shall be not less than 30 feet (9144 mm) or to the lot line, whichever is less. Distances specified in Table 603.2 shall be measured on a horizontal plane from the perimeter or projection of the building or structure as shown in Figure 603.2. Distances specified in Table 603.2 are allowed to be increased by the *code official* because of a site-specific analysis based on local conditions and the *fire protection plan*.

Exception: Where a building or structure is equipped with an approved exterior wildfire sprinkler system and constructed in compliance with the conforming defensible space category of Table 503.1, the code official is permitted to decrease the distances specified in Table 603.2 when utilizing a site-specific analysis accounting for local conditions and the fire protection plan.

Reason: An exterior wildfire sprinkler system substantially increases the effectiveness of defensible space and allows the code official (but does not require) to reduce the minimum area distance/required.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposed modifications incorporate an exterior wildfire sprinkler system into the code as optional equipment that can be installed on a structure at the discretion of the owner/s and the local code official. Because installation is not mandated, nor do the proposed modifications alter any construction requirements, the proposed modifications have no cost impact.

WUIC8-24

WUIC9-24

IWUIC: SECTION 202 (New)

Proponents: Pierson Stoecklein, Frontline Wildfire Defense

2024 International Wildland Urban Interface Code

Add new definition as follows:

EXTERIOR WILDFIRE SPRINKLER SYSTEM

.
An approved system of piping, devices, and equipment which is automatically or manually activated to discharge water or an approved fire-extinguishing agent onto the exterior surfaces of a structure and the adjacent grade to hydrate the defensible space area required by Section 603.2.

Reason: There is no existing definition in the IWUIC for "exterior wildfire sprinkler system" although there is reference to such a system in the appendices. Including a definition in the code merely establishes a foundation for all related modifications submitted by this proponent and/or any future proposals related to exterior wildfire sprinkler systems without imposing any requirements.

90% of structure ignitions during a wildfire are caused by embers (Wildland Fire Embers and Flames: Home Mitigations That Matter, at p6, IBHS). Embers can travel in excess of 24 miles outside of a wildfire perimeter—the distance being subject to wind and convective heat—as well as ember parent material (IBHS, NIST). Given the distance of ember travel and the quantity of structures simultaneously exposed to embers, it is often impossible for firefighters to actively defend all structures, all at once.

Both regulated and non-regulated fuels are often present within the defensible space perimeter. Although regulated fuels, such as plant fuels and building materials, are subject to regulation under the IWUIC and IBC, non-regulated fuels, such as patio furniture, door mats, accumulated pine needles and leaves, firewood, toys, and other household items and natural materials are not. Regardless, when fuels of either type are subjected to ember cast and subsequently reach combustion, heat transfer from these fuels contributes to structure combustion.

Exterior wildfire sprinkler systems provide added protection for structures and are uniquely effective when used in conjunction with fire-resistant construction materials and defensible space (*see* Fire Sprinklers Technical Fact Sheet #15, *Federal Emergency Management Agency*) (Protect Your Property from Wildfire, California Edition, IBHS). Automatic interior fire sprinkler systems activate from contact with direct heat (i.e., after a fire has already begun and reached the immediate vicinity of the system) and are designed primarily to prevent flashover inside the home while allowing the occupants to escape and the fire department to arrive. In contrast, exterior wildfire sprinkler systems are deployed with a focus on mitigation/prevention, the primary objective being to hydrate combustible materials that comprise or are within a certain distance of a structure, well before the structure is exposed to ignition sources (e.g., air borne embers); exterior wildfire sprinkler systems do not activate from contact with direct heat contact.

Building and maintaining a saturation level of optimal hydration is vital to prevention of ember ignition and, by hydrating the exterior surfaces of a structure and increasing the moisture content of regulated and non-regulated fuels located within the relevant defensible space, exterior wildfire sprinkler systems can prevent or significantly reduce ignition risk (*see* Factsheet: FireSmart Exterior Home Sprinklers and Structure Protection Units, British Columbia FireSmart). This reduces the fire hazard severity of building sites for buildings constructed, modified or relocated into wildland-urban interface areas and can substantially increase the effectiveness of defensible space (whether conforming or nonconforming).

The proposed modifications incorporate exterior wildfire sprinklers into the IWUIC and thereby offer a new self-defense mechanism independent of active firefighter defense. Reducing the number of active defense actions that must be taken by firefighters results in a safer firefighting environment and enables more focused and therefore effective use of limited firefighting resources.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposed modifications incorporate an exterior wildfire sprinkler system into the code as optional equipment that can be installed on a structure at the discretion of the owner/s and the local code official. Because installation is not mandated, nor do the proposed modifications alter any construction requirements, the proposed modifications have no cost impact.

WUIC9-24

WUIC10-24

IWUIC: TABLE C101.1

Proponents: Pierson Stoecklein, Frontline Wildfire Defense (pierson@pioneerpublicaffairs.com)

2024 International Wildland Urban Interface Code

Revise as follows:

TABLE C101.1 FIRE HAZARD SEVERITY FORM

A. Subdivision Design Points	
1. Ingress/Egress	
Two or more primary roads	1___
One road	3___
One-way road in, one-way road out	5___
2. Width of Primary Road	
20 feet (6096 mm) or more	1___
Less than 20 feet (6096 mm)	3___
3. Accessibility	
Road grade 5% or less	1___
Road grade more than 5%	3___
4. Secondary Road Terminus	
Loop roads, cul-de-sacs with an outside turning radius of 45 feet (13 716 mm) or greater	1___
Cul-de-sac turnaround	2___
Dead-end roads 200 feet (60 960 mm) or less in length	3___
Dead-end roads greater than 200 feet (60 960 mm) in length	5___
5. Street Signs	
Present	1___
Not present	3___
B. Vegetation (IWUIC Definitions)	
1. Fuel Types	
Light	1___
Medium	5___
Heavy	10___
2. Defensible Space	
70% or more of site	1___
30% or more, but less than 70% of site	10___

Less than 30% of site	20___
C. Topography	
8% or less	1___
More than 8%, but less than 20%	4___
20% or more, but less than 30%	7___
30% or more	10___
D. Roofing Material	
Class A Fire Rated	1___
Class B Fire Rated	5___
Class C Fire Rated	10___
Nonrated	20___
E. Fire Protection—Water Source	
500 GPM (1892.5 L/min) hydrant within 1,000 feet (304.8 m) or an approved exterior wildfire sprinkler system	1___
Hydrant farther than 1,000 feet (304.8 m) or draft site	2___
Water source 20 min. or less, round trip	5___
Water source farther than 20 min., and 45 min. or less, round trip	7___
Water source farther than 45 min., round trip	10___
F. Existing Building Construction Materials	
Noncombustible siding/deck	1___
Noncombustible siding/combustible deck	5___
Combustible siding and deck	10___
G. Utilities (gas and/or electric)	
All underground utilities	1___
One underground, one above ground	3___
All above ground	5___
Total for Subdivision	
Moderate Hazard	40–59
High Hazard	60–74
Extreme Hazard	75+

Reason: Installation of an exterior wildfire sprinkler system provides similar impact to hazard severity as proximity to a water source.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposed modifications incorporate an exterior wildfire sprinkler system into the code as optional equipment that can be installed on a structure at the discretion of the owner/s and the local code official. Because installation is not mandated, nor do the proposed modifications alter any construction requirements, the proposed modifications have no cost impact.

WUIC10-24

WUIC11-24

IWUIC: G101.3.1

Proponents: Pierson Stoecklein, Frontline Wildfire Defense

2024 International Wildland Urban Interface Code

Delete without substitution:

~~**G101.3.1 Exterior sprinkler systems.**~~

~~Currently, there is no nationally accepted standard for the design and installation of exterior fire sprinkler systems. Interior sprinkler systems are regulated by nationally recognized standards that have specific requirements. However, exterior sprinkler systems lack such uniformity. What is generally proposed is a type of sprinkler system, placed on the roofs or eaves of a building, whose primary purpose is to wet down the roof. These types of systems can be activated either manually or automatically. However, the contemporary thought on exterior sprinkler systems is that if the roof classification is of sufficient fire resistance, exterior sprinklers are of little or no value. Another option and alternative with exterior sprinklers is to use them to improve the relative humidity and fuel moisture in the *defensible space*. In this case, the exterior sprinkler is not used to protect the structure as much as it attempts to alter the fuel situation. However, studies do not support the idea that merely spraying water into the air in the immediate vicinity of a rapidly advancing wildland-urban fire does much good. Clearly, irrigation systems that keep plants healthy and fire-resistive plants that resist convection and radiated heat can accomplish the same purpose.~~

Reason: Outdated and inaccurate.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposed modifications incorporate an exterior wildfire sprinkler system into the code as optional equipment that can be installed on a structure at the discretion of the owner/s and the local code official. Because installation is not mandated, nor do the proposed modifications alter any construction requirements, the proposed modifications have no cost impact.

WUIC11-24

WUIC12-24

IWUIC: SECTION 405, 405.1, 405.2, 405.3, 405.4, 602.3 (New), 602.3.1 (New), 602.3.2 (New)

Proponents: Crystal Sujeski, CAL FIRE/Office of the State Fire Marshal (crystal.sujeski@fire.ca.gov); Darcy Davidson, Carlsbad Fire Department, California Fire Prevention Officers (darcy.davidson@carlsbadca.gov); Kevin Scott, KH Scott & Associates LLC, self (khscottassoc@gmail.com)

2024 International Wildland Urban Interface Code

Revise as follows:

SECTION ~~405~~ 602 FIRE PROTECTION PLANS

~~405.1~~ 602.1 General. ~~Where required by the *code official*, a *fire protection plan* shall be prepared.~~
The code official is authorized to require the owner or owner's authorized agent to provide a fire protection plan. The fire protection plan shall be prepared to determine the acceptability of fire protection and life safety measures designed to mitigate wildfire hazards presented for the property under consideration.

The fire protection plan shall be prepared by a registered design professional, qualified landscape architect, qualified fire safety specialist or similar specialist acceptable to the code official and shall analyze the wildfire risk of the building, project, premises or region to recommend necessary changes.

The code official is authorized to require a preliminary fire protection plan prior to the submission of a final fire protection plan.

~~405.2~~ 602.2 Contents. ~~The plan shall be based on a site-specific wildfire risk assessment that includes considerations of location, topography, aspect, flammable vegetation, climatic conditions and fire history. The plan shall address water supply, access, building ignition and fire-resistance factors, fire protection systems and equipment, *defensible space* and vegetation management.~~
The fire protection plan shall be based on a project-specific wildfire hazard assessment that includes considerations of location, topography, aspect, climatic and fire history.

The plan shall identify conformance with all applicable wildfire protection regulations.

The plan shall address fire department access, egress, road and address signage, water supply, and the applicable building codes and standards for wildfire safety. The plan shall identify mitigation measures to address the project's specific wildfire risk and shall include the information required in Sections 602.3 through 602.3.2.

Delete without substitution:

~~**405.3 Cost.** The cost of *fire protection plan* preparation and review shall be the responsibility of the applicant.~~

~~**405.4 Plan retention.** The *fire protection plan* shall be retained by the *code official*.~~

Add new text as follows:

602.3 Project information. . The final fire protection plan shall be reviewed and approved prior to start of construction.

602.3.1 Preliminary fire protection plan. When a preliminary fire protection plan is submitted, it shall include, at a minimum, the following:

1. Total size of the project.
2. Information on the adjoining properties on all sides, including current land uses, and if known, existing structures and densities, planned construction, natural vegetation, environmental restoration plans, roads and parks.

3. A map with all project boundary lines, property lines, slope contour lines, proposed structure foundation footprints, and proposed roads and driveways. The map shall identify project fuel modification zones and method of identifying the fuel modification zone boundaries.

602.3.2 Final fire protection plan. Final fire protection plan shall include items listed in Section 602.3.1 and the following:

1. A map identifying all proposed plants in the fuel modification zones with a legend that includes a symbol for each proposed plant species. The plan shall include specific information on each species proposed, including but not limited to:
   1.1. The plant life-form

   1.2. The scientific and common name

   1.3. The expected height and width for mature growth

2. Identification of irrigated and non-irrigated zones.
3. Requirements for vegetation reduction around emergency access and evacuation routes.
4. Identification of points of access for equipment and personnel to maintain vegetation in common areas.
5. Legally binding statements regarding community responsibility for maintenance of fuel modification zones.
6. Legally binding statements to be included in covenants, conditions and restrictions regarding property owner responsibilities for vegetation maintenance.

Reason: This proposal accomplishes two goals: 1) to relocate the Fire Protection Plan requirements to an appropriate location, and 2) enhance the provisions for the fire protection plan to provide guidance to those developing the fire protection plan.

The scope for Chapter 4 states that the chapter contains regulations for water supply and access. The Fire Protection Plan, currently in Section 405, does not fit under either of the Chapter 4 categories. Chapter 6 contains general requirements for fire protection. The provisions for a Fire Protection Plan fit more appropriately in Chapter 6, so they are mover to Section 602.

The California State Fire Marshal's office (SFM) workgroup 2020 was assembled to take on the task of creating a statewide approach for requiring a fire protection plan for any property under consideration to mitigate the wildfire hazards that may exist. This proposal is being submitted to the IWUIC, because the overall response from the design community has been positive. Nationwide consistency leads to further success in application of the code.

The proposal sets a framework for the elements of a fire protection plan to include. This proposal is a baseline of what a general plan shall consist of for evaluating the associated risks with a property and its location within a wildland-urban interface area. A proposed fire protection plan shall be approved before the start of any construction. This will ensure compliance with the requirements in this code. The enforcement of the protection plan starts at the beginning. The Fire Protection Plan is a document that can be referred to at any stage of a project.

Often, a preliminary Fire Protection Plan is submitted to help move a project along and save money for the owner during the different phases of construction. The preliminary Fire Protection Plan sets the groundwork and foundation for the boundaries of the project. This information is vital for planning departments and for cost analysis to be considered early on.

A final Fire Protection Plan includes all the requirements of the preliminary plan with the added landscaping details that may not have been completed in the early phase of a project. The code official will now have a complete document of the project and the planned fire protection to ensure the safety of the community, neighbors, and first responders. These documents and information will help first responders pre-plan for an incident.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The choice to require a fire protection plan is at the discretion of the code official. The design professional will typically incorporate any design criteria in the project cost. This is already a typical practice.

WUIC13-24

IWUIC: 501.1

Proponents: Milad Shabanian, Insurance Institute for Business & Home Safety (mshabanian@ibhs.org); T. Eric Stafford, Insurance Institute for Business and Home Safety (testafford@charter.net)

2024 International Wildland Urban Interface Code

Revise as follows:

501.1 Scope.
Buildings and structures shall be constructed in accordance with the *International Building Code* and this code.

Exceptions:

~~1.~~ Accessory structures ~~not exceeding 120 square feet (11 m^2) in floor area~~ and agricultural buildings ~~where~~ located ~~not less than~~ 50 feet (15 240 mm) or more from buildings containing habitable spaces are not required to comply with this code.

~~2. Agricultural buildings not less than 50 feet (15 240 mm) from buildings containing habitable spaces.~~

Reason: Based on the current language, detached accessory structures can essentially be categorized into four groups. These groups are illustrated in Figure 1:

- Group A: Detached accessory structures with a floor area of 120 sq ft and less, located less than 50 feet of the primary structure.
- Group B: Detached accessory structures with a floor area greater than 120 sq ft, located less than 50 feet of the primary structure.
- Group C: Detached accessory structures with a floor area of 120 sq ft and less, located 50 feet or more from the primary structure.
- Group D: Detached accessory structures with a floor area greater than 120 sq ft, located at 50 feet or more from the primary structure.

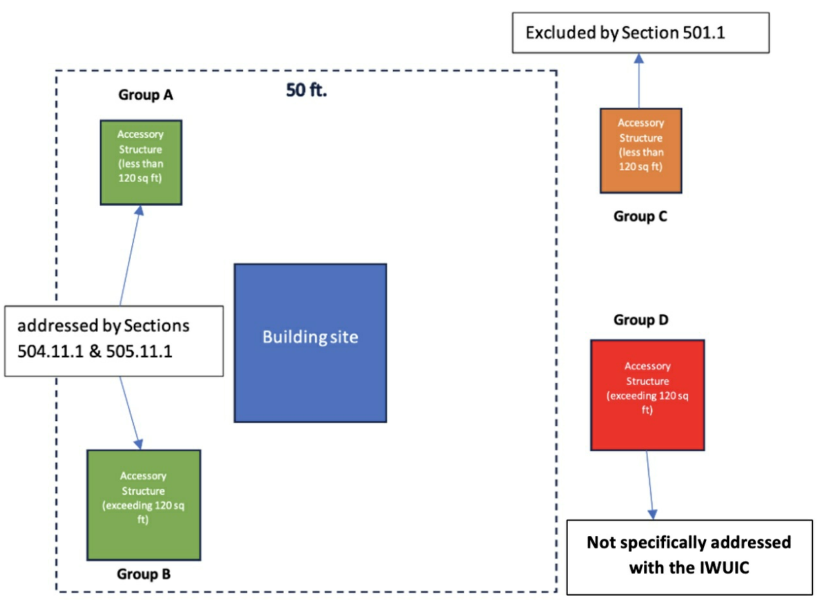


Figure 1. Detached accessory structures condition in 2024 IWUIC Scope.

Section 501.1 exempts Group C from the IWUIC, but all other structures must comply with the IBC and the IWUIC. Furthermore, Sections 504.11 and 505.11 of the IWUIC specifically address Group A and Group B detached accessory structures. Sections 504.11 and 505.11 require exterior walls of detached accessory structures located less than 50 feet from a building containing habitable space to be constructed consistent with the required construction of the exterior walls of primary structure. Group D (located 50 feet or more from the primary building and a floor area exceeding 120 square feet) is not specifically addressed by the IWUIC. The lack of specificity could lead to uncertainty regarding the construction of Group D detached accessory structures. A strict reading of the charging paragraph of Section

501.1, would necessitate compliance with all the requirements detailed in both the IBC and the IWUIC for Group D structures. This would mean that Group D structures would have to meet all the requirements related to ignition resistance class 1 or 2, resulting in construction that is more stringent than Group A and B structures even though Group D structures pose a much lower risk. This is counterintuitive.

504.11 Detached accessory structures. Detached accessory structures located less than 50 feet (15 240 mm) from a building containing habitable space shall have exterior walls constructed with materials approved for not less than 1-hour fire-resistance-rated construction, heavy timber, log wall construction, or constructed with approved noncombustible materials or fire-retardant-treated wood on the exterior side. The fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section 2303.2 of the International Building Code.

504.11.1 Underfloor areas. Where the detached structure is located and constructed so that the structure or any portion thereof projects over a descending slope surface greater than 10 percent, the area below the structure shall have underfloor areas enclosed to within 6 inches (152 mm) of the ground, with exterior wall construction in accordance with Section 504.5 or underfloor protection in accordance with Section 504.6.

Exception: The enclosure shall not be required where the underside of exposed floors and exposed structural columns, beams and supporting walls are protected as required for exterior 1-hour *fire-resistance-rated construction* or *heavy timber construction* or fire-retardant-treated wood on the exterior side. The fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section 2303.2 of the *International Building Code*.

Figure 2. Detached accessory structures requirements for IR Construction classes 1.

To address this issue, the proposed language recommends exempting all detached accessory structures located more than 50 feet away from a habitable building from the scope of IWUIC. This suggestion is supported by the findings of structure separation experiments conducted by the IBHS and NIST. These experiments indicate that when the separation distance between structures exceeds 50 feet, the risk of conflagration and structure ignition is significantly lower [1-3]. Chapter 7A of the California Building Code also includes similar requirements in Section 710A.3 (Figure 3) and this change will align these two codes from this perspective [4].

> ***710A.3 Where required.*** *Miscellaneous structures that require a permit, and accessory buildings of any size, when separated from an applicable building on the same lot by a distance of less than 3 feet (914 mm), shall comply with Section 710A.3.1. Accessory buildings that are greater than 120 square feet (11.15 m²), when separated from an applicable building on the same lot by a distance of 3 feet (914 mm) or more but less than 50 feet (15 240 mm) shall comply with Section 710A.3.2.*

When required by the enforcing agency, miscellaneous structures that require a permit, and accessory buildings that are 120 square feet (11.15 m²) or less, when separated from an applicable building on the same lot by a distance of 3 feet (914 mm) or more but less than 50 feet (15 240 mm), shall comply with either Section 710A.3.4 or Section 710A.3.3, respectively.

No requirements shall apply to accessory buildings or miscellaneous structures when located 50 feet (15 240 mm) or more from an applicable building on the same lot.

Figure 3. 2022 California Building Code, Chapter 7A, Section 710A, Accessory Buildings and Miscellaneous Structures [4].

Bibliography:

1. Maranghides, A., Link, E. D., Nazare, S., Hawks, S., McDougald, J., Quarles, S. L., & Gorham, D. J. (2022). *WUI Structure/Parcel/Community Fire Hazard Mitigation Methodology*. Department of Commerce. National Institute of Standards and Technology. https://doi.org/10.6028/NIST.TN.2205

2. Maranghides, A., Nazare, S., Hedayati, F., Gorham, D., Link, E., Hoehler, M., ... & Walton, W. (2022). *Structure Separation Experiments: Shed Burns without Wind*. National Institute of Standards and Technology, US Department of Commerce. https://doi.org/10.6028/NIST.TN.2235

3. Maranghides, A., Nazare, S., Butler, K. M., Johnsson, E. L., Link, E., Bundy, M., ... & Frievalt, F. (2023). *NIST Outdoor Structure*

Separation Experiments (NOSSE) with Wind. https://doi.org/10.6028/NIST.TN.2253

4. 2022 California Building Code, California code of regulation, Title 24, Part 2 (Volumes 1 & 2) with Jan 2023 Errata, Section 710A.3.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0 or less. This proposed code change provides clarity for detached accessory structures with floor areas exceeding 120 square feet and located 50 feet or more from the main building. Existing language currently requires these detached accessory structures to comply with the IWUIC. This proposed code change will exclude these structures from these requirements. Consequently, detached accessory structures exceeding 120 square feet in floor area and located more than 50 feet away from the main building will no longer need to comply with all the stipulated conditions of IR Class 1 or 2.

Estimated Immediate Cost Impact Justification (methodology and variables):

This will result in a decrease in the cost of construction for detached accessory structures that have a floor area exceeding 120 square feet and are located 50 feet or more from a building containing habitable space.

WUIC13-24

WUIC14-24

IWUIC: SECTION 202 (New), 501.1, 501.1.1 (New)

Proponents: Crystal Sujeski, CAL FIRE/Office of the State Fire Marshal (crystal.sujeski@fire.ca.gov); Cary Yballa, Central County Fire Department, Cal FPO (cyballa@ccfd.org)

2024 International Wildland Urban Interface Code

Add new definition as follows:

APPLICABLE BUILDING. A building that has residential, commercial, educational, institutional, or similar occupancy type use.

Revise as follows:

501.1 Scope.
Buildings and structures in a wildland urban interface area shall be constructed in accordance with the *International Building Code* and this code.

Exceptions:

1. Group U ~~A~~accessory structures not exceeding 120 square feet (11 m^2) in floor area where located not less than 50 feet (15 240 mm) from applicable buildings ~~containing habitable spaces~~.
2. Group U ~~A~~agricultural buildings not less than 50 feet (15 240 mm) from applicable buildings ~~containing habitable spaces~~.

Add new text as follows:

501.1.1 Other codes. The construction requirements in the *International Building Code* or in the *International Residential Code*, as applicable, shall be supplemented by the construction requirements in this chapter. Where there is a conflict between provisions of this code and those of the *International Building Code* or of the *International Residential Code*, the provisions of this code shall apply.

Reason: The definition was added for comprehensibility of what an applicable building is regarding the WUI regulations. Since “applicable building” is only used in the scope, adding a definition can confidently be done without interfering with the meaning of the rest of the publication.

Group U is the only accessory structured allowed exceptions.

Other codes, is a reminder that this code is an overlay to the building or residential code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposal is clean up for the intent of where the Wildland code is to be used and that it is an overlay to the building or residential code.

WUIC14-24

WUIC15-24

IWUIC: 501.3, ICC Chapter 07 (New)

Proponents: Milad Shabanian, Insurance Institute for Business & Home Safety (mshabanian@ibhs.org); T. Eric Stafford, Insurance Institute for Business and Home Safety (testafford@charter.net)

2024 International Wildland Urban Interface Code

Revise as follows:

501.3 Fire-resistance-rated construction.
Where this code requires 1-hour *fire-resistance-rated construction*, the fire-resistance rating of building elements, components or assemblies shall be determined in accordance with the test procedures set forth in ASTM E119 or UL 263.

Exceptions:

1. The fire-resistance rating of building elements, components or assemblies based on the prescriptive designs prescribed in Section 721 of the International Building Code.
2. The fire-resistance rating of building elements, components or assemblies based on the calculation procedures in accordance with Section 722 of the International Building Code.
3. The fire-resistance rating of log wall construction shall be calculated in accordance with the provisions of Section 303 of ICC 400.

Add new standard(s) as follows:

ICC

International Code Council, Inc.
200 Massachusetts Avenue, NW, Suite 250
Washington, DC 20001

400-2022	Standard on the Design and Construction of Log Structures

Staff Analysis: The proposed referenced standard, ***Standard on the Design and Construction of Log Structures (ICC 400-2022)***, is currently referenced in the ***IBC***.

Reason: This code change simply intends to provide more clarity on fire-performance of log wall construction by requiring the fire-resistance rating of log wall construction to be determined in accordance with ICC 400- Standard for the Design and Construction of Log Structures.

Fire-resistant rated construction is a concept by which to evaluate the fire performance of various assemblies that have been tested in accordance with ASTM E119 or UL263 fire tests [2, 3]. Notably, Section 501.3 includes two exceptions to testing in accordance with ASTM E119 or UL 263 by referring to sections 721 and 722 of the 2024 IBC [4]. These sections in the IBC provide prescriptive construction details and calculation methods to establish the fire resistance of a range of assemblies. However, log wall assemblies are not addressed in either of these sections of the IBC. Considering that the IWUIC references log wall construction in several locations, adding an exception referring to section 303 of ICC 400 will provide needed clarity for determining the fire-resistance rating of log wall construction.

In accordance with the definition provided in Chapter 2, "log wall construction" pertains to construction in which the exterior walls consist of solid wood members, and each of these members has a minimum horizontal dimension of at least 6 inches (152 mm). According to Section 303.2.1 of the ICC400, log wall construction with a minimum dimension of 6 inches can be equated to 1-hour fire-resistant rated construction. Referencing Section 303 of the ICC 400 is important as it validates that these assemblies can achieve a 1-hour fire-resistant rating. By referencing Section 303 of ICC 400, key information about the fire-resistant rating of columns and beams constructed with logs, a common practice in log wall construction, is also included.

Background:
Code change WUIC2-9/10, submitted by Marcelo M. Hirschler [5], added Section 501.3 Fire-resistance-rated construction to the 2012 IWUIC.

Code change WUIC1-13, submitted by Jason Thompson [6], added the Exceptions 1 and 2 to section 501.3 of 2015 IWUIC.

Bibliography:

1. International Code Council, 2022, ICC 400—2022 Standard on the Design and Construction of Log Structures, ISBN: 978-1-955636-38-4. https://codes.iccsafe.org/content/ICC4002022P1

2. ASTM E119-20, Standard test methods for fire tests of building construction and material.

3. ANSI/UL 263. (2011). Standard for Fire Tests of Building Construction and Materials.

4. International Code Council, 2024, International building code, ISBN: 978-1-955636-38-4. https://codes.iccsafe.org/content/ICC4002022P1

5. Marcelo M. Hirschler, GBH International, representing American Fire Safety Council, WUIC2–09/10

6. Jason Thompson, National Concrete Masonry Association, representing Masonry Alliance for Codes and Standards, WUIC1-13

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This code change proposal adds a reference to ICC 400 in Section 501.3 and provides to provide clarity to the code regarding log wall construction. ICC 400 is available to the public through the ICC website. This code change will not result any additional cost.

WUIC15-24

WUIC16-24

IWUIC: SECTION 202, 501.4 (New), 501.4.1 (New), 501.4.2 (New), 503.2.1, ASTM Chapter 07 (New)

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Wildland Urban Interface Code

Delete without substitution:

~~**NONCOMBUSTIBLE.** As applied to building construction material means a material that, in the form in which it is used, is either one of the following:~~

1. ~~Material of which no part will ignite and burn when subjected to fire. Any material conforming to ASTM E136 shall be considered noncombustible within the meaning of this section.~~
2. ~~Material having a structural base of noncombustible material as defined in Item 1 above, with a surfacing material not over $^1/_8$ inch (3.2 mm) thick, which has a flame spread index of 50 or less. Flame spread index as used herein refers to a flame spread index obtained according to tests conducted as specified in ASTM E84 or UL 723.~~

~~"Noncombustible" does not apply to surface finish materials. Material required to be noncombustible for reduced clearances to flues, heating appliances or other sources of high temperature shall refer to material conforming to Item 1. No material shall be classified as noncombustible that is subject to increase in combustibility or flame spread index, beyond the limits herein established, through the effects of age, moisture or other atmospheric condition.~~

Add new text as follows:

501.4 Noncombustibility tests. The tests indicated in Section 501.4.1 shall serve as criteria for acceptance of building materials. The term noncombustible does not apply to the flame spread characteristics of interior finish or trim materials. A material shall not be classified as a noncombustible building construction material if it is subject to an increase in combustibility or flame spread beyond the limitations herein established through the effects of age, moisture or other atmospheric conditions.

501.4.1 Testing. Materials required to be noncombustible shall be tested in accordance with ASTM E136 and pass the test. Alternately, materials required to be noncombustible shall be tested in accordance with ASTM E2652 using the acceptance criteria prescribed by ASTM E136.

Exception: Materials having a structural base of noncombustible material as determined in accordance with ASTM E136, or with ASTM E2652 using the acceptance criteria prescribed by ASTM E136, with a surfacing of not more than 0.125 inch (3.18 mm) in thickness having a flame spread index not greater than 50 when tested in accordance with ASTM E84 or UL 723 shall be acceptable as noncombustible.

501.4.2 Additional requirements. The term noncombustible does not apply to surface finish materials. Material required to be noncombustible for reduced clearances to flues, heating appliances or other sources of high temperature shall refer to material conforming to the requirements of ASTM E136.

Revise as follows:

503.2.1 Noncombustible material.
Material shall comply with the requirements for noncombustible materials in Section 501.4 ~~definition of *noncombustible* materials in Section 202~~.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428-2959

E2652-2018	Test Method for Assessing Combustibility of Materials Using a Tube Furnace with a Cone-shaped Airflow Stabilizer, at 750°C

Staff Analysis: The proposed referenced standard, ***Test Method for Assessing Combustibility of Materials Using a Tube Furnace with a Cone-shaped Airflow Stabilizer, at 750°C, 2022 (ASTM E2652-18)***, is currently referenced in the IBC.

Reason: FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

It has been a recent practice in ICC codes that definitions should not contain requirements but just concepts. This proposal does exactly that.

This proposal deletes the definition of noncombustible from section 202 of the IWUIC and adds the exact requirements for noncombustibility from section 703 of the IBC into a new section. This makes the requirements for noncombustible materials consistent with those in the IBC (with the same language). Additionally, this proposal retains the added requirements from the IWUIC regarding surface finish materials and materials close to flues or heating appliances.

This proposal is also consistent with other ICC codes and with the requirements of ASTM E136. Note that materials can be noncombustible in accordance with ASTM E136 and yet exhibit some limited flaming.

This proposal also deletes a definition with requirements and incorporates the requirements into the section of the code that deals with Special Building Construction Regulations (Chapter 5) in the General section.This proposal also revises section 503.2.1 that sends the code user to section 202 for the “requirements” got noncombustible materials, now sending the user to the new section 501.4

Comment: Since neither “flues, heating appliances and sources of high temperature” nor “interior finish” are regulated by the IWUIC, a simpler solution would be not to add proposed new section 501.4.2.

See the following from other ICC codes.

1. The IBC does not have a definition for noncombustible material but section 703.3 states as shown below, which is exactly what this proposal does. It is based on
2. The IRC defines as follows: “NONCOMBUSTIBLE MATERIAL. A material that passes ASTM E136.”
3. The IFC does not have a definition.
4. The IMC defines as follows: “NONCOMBUSTIBLE MATERIAL. A material that passes ASTM E136.”

If a material is tested to ASTM E136 it will pass the test requirements even if it ignites (a bit) and has some burning and some mass loss (see the actual language below). Therefore, saying (as the IWUIC says now in item 1) that “no part will ignite or burn” is inconsistent with many materials that pass ASTM E136.

Two different pieces of equipment are used to pass ASTM E136. The first one (now called Option A) is the equipment that was always in ASTM E136. The second one, called Option B, uses the equipment in ASTM E2652 but the acceptance criteria are the same for both pieces of equipment and are in section 15 of ASTM E136. The language from the IBC and ASTM E136 is shown below.

IBC section 703 states as follows (and a change will be proposed to add the words "and pass the test"):

703.3 Noncombustibility tests. The tests indicated in Section 703.3.1 shall serve as criteria for acceptance of building materials as set forth in Sections 602.2, 602.3 and 602.4 in Types I, II, III and IV construction. The term “noncombustible” does not apply to the *flame spread* characteristics of *interior finish* or *trim* materials. A material shall not be classified as a noncombustible building construction material if it is subject to an increase in combustibility or *flame spread* beyond the limitations herein established through the effects of age, moisture or other atmospheric conditions.

703.3.1 Noncombustible materials. Materials required to be noncombustible shall be tested in accordance with ASTM E136. Alternately, materials required to be noncombustible shall be tested in accordance with ASTM E2652 using the acceptance criteria prescribed by ASTM E136.

Exception: Materials having a structural base of noncombustible material as determined in accordance with ASTM E136, or with ASTM E2652 using the acceptance criteria prescribed by ASTM E136, with a surfacing of not more than 0.125 inch (3.18 mm) in thickness having a flame spread index not greater than 50 when tested in accordance with ASTM E84 or UL 723 shall be acceptable as noncombustible.

ASTM E136 states as follows when it requires that a material pass the test:15. Report

15.1 Report the material as passing the test if at least three of the four test specimens tested meet the individual test specimen criteria detailed either in 15.2 or in 15.3. The three individual test specimens do not need to meet the same individual test specimen criteria.

15.2 If the weight loss of an individual test specimen is 50 % or less, that test specimen is considered as having met the individual test specimen criteria when all the criteria in 15.2.1 through 15.2.3 are met:

15.2.1 For the duration of the test, the recorded temperature of the surface thermocouple does not rise more than 30 °C (54 °F) above the stabilized furnace temperature established at T2 prior to the test.

15.2.2 For the duration of the test, the recorded temperature of the interior thermocouple does not rise more than 30 °C (54 °F) above the stabilized furnace temperature established at T2 prior to the test.

15.2.3 There is no flaming from the test specimen after the first 30 s.

15.3 If the weight loss of an individual test specimen exceeds 50 %, that test specimen is considered as having met the individual test specimen criteria when all the criteria in 15.3.1 through 15.3.3 are met:

15.3.1 For the duration of the test, the recorded temperature of the surface thermocouple does not rise above the stabilized furnace temperature established at T2 prior to the test.

15.3.2 For the duration of the test, the recorded temperature of the interior thermocouple does not rise above the stabilized furnace temperature established at T2 prior to the test.

15.3.3 There is no flaming from the test specimen at any time during the test.

15.4 Report whether the apparatus for Option A or the apparatus for Option B was used.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal will not have any cost impact. It simply moves a definition with requirements into an appropriate section in the chapter that deals with materials.

WUIC16-24

WUIC17-24

IWUIC: 503.1, 503.2, 503.2.3, 503.2.4, 503.2.4.1, 503.2.4.2, 503.2.4.3, 503.2.4.3.1, 503.2.4.3.2, 503.2.4.3.3, 503.3 (New)

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Wildland Urban Interface Code

Revise as follows:

503.1 General. Buildings and structures hereafter constructed, modified or relocated into or within *wildland-urban interface areas* shall meet the construction requirements in accordance with Table 503.1. Class 1, Class 2 or Class 3, ignition-resistant construction shall be in accordance with Sections 504, 505 and 506, respectively. Materials required to be ignition-resistant building materials shall comply with the requirements of Section 503.2. Materials required to be fire-retardant-treated wood roof coverings shall comply with the requirements of Section 503.3.

503.2 Ignition-resistant building material.
Ignition-resistant building materials shall comply with any one of the requirements in Section 503.2.1 through 503.2.3 ~~503.2.4~~.

~~**503.2.3 Fire-retardant-treated wood roof coverings.**~~
~~Roof assemblies containing fire-retardant-treated wood shingles and shakes shall comply with the requirements of Section 1505.6 of the *International Building Code* and shall be classified as Class A roof assemblies as required in Section 1505.2 of the *International Building Code.*~~

~~**503.2.4**~~ **503.2.3 Ignition-resistant building material.**
Material shall be tested on the front and back faces in accordance with the extended ASTM E84 or UL 723 test, for a total test period of 30 minutes, or with the ASTM E2768 test. The materials shall bear identification showing the fire test results. Panel products shall be tested with a ripped or cut longitudinal gap of $^1/_8$ inch (3.2 mm). The materials, when tested in accordance with the test procedures set forth in ASTM E84 or UL 723 for a test period of 30 minutes, or with ASTM E2768, shall comply with Sections 503.2.3.1 through 503.2.3.3 ~~503.2.4.1 through 503.2.4.3~~.

> **Exception:** Materials composed of a combustible core and a noncombustible exterior covering made from either aluminum at a minimum 0.019 inch (0.48 mm) thickness or corrosion-resistant steel at a minimum 0.0149 inch (0.38 mm) thickness shall not be required to be tested with a ripped or cut longitudinal gap.

~~**503.2.4.1**~~ **503.2.3.1 Flame spread.**
The material shall exhibit a flame spread index not exceeding 25.

~~**503.2.4.2**~~ **503.2.3.2 Flame front.**
The material shall exhibit a flame front that does not progress more than 10 feet 6 inches (3200 mm) beyond the centerline of the burner at any time during the test.

~~**503.2.4.3**~~ **503.2.3.3 Weathering.**
Ignition-resistant building materials shall maintain their performance in accordance with this section under conditions of use. The materials shall meet the performance requirements for weathering (including exposure to temperature, moisture and ultraviolet radiation) contained in Sections 503.2.3.3.1 through 503.2.3.3.3 ~~503.2.4.3.1 through 503.2.4.3.3~~, as applicable to the materials and conditions of use.

~~**503.2.4.3.1**~~ **503.2.3.3.1 Evaluation requirements for weathering.**
Fire-retardant-treated wood, wood-plastic composite materials and plastic lumber materials shall be evaluated after weathering in accordance with Method A “Test Method for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing” in ASTM D2898.

~~**503.2.4.3.2**~~ **503.2.3.3.2 Wood-plastic composite materials.**
Wood-plastic composite materials shall also demonstrate acceptable fire performance after weathering by the following procedure: first

testing in accordance with ASTM E1354 at an incident heat flux of 50 kW/m^2 in the horizontal orientation, then weathering in accordance with ASTM D7032 and then retesting in accordance with ASTM E1354 and exhibiting an increase of no more than 10 percent in peak rate of heat release when compared to the peak heat release rate of the nonweathered material.

~~503.2.4.3.3~~ 503.2.3.3.3 Plastic lumber materials.
Plastic lumber materials shall also demonstrate acceptable fire performance after weathering by the following procedure: first testing in accordance with ASTM E1354 at an incident heat flux of 50 kW/m^2 in the horizontal orientation, then weathering in accordance with ASTM D6662 and then retesting in accordance with ASTM E1354 and exhibiting an increase of no more than 10 percent in peak rate of heat release when compared to the peak heat release rate of the nonweathered material.

Add new text as follows:

503.3 Fire-retardant-treated wood roof coverings. Roof assemblies containing coverings comprised of fire-retardant-treated wood shingles and shakes shall comply with the requirements of Section 1505.6 of the *International Building Code* and shall be classified as Class A roof assemblies as required in Section 1505.2 of the *International Building Code*.

Reason: Fire-retardant-treated wood roof coverings are a different class of materials than the other ignition resistant building materials in section 503.2 since they cannot be used for exterior walls or exterior appendages and projections, but are intended explicitly for roofs. However, sections 504.5, 504.7, 505.5, and 505.7, all allow the use of “Ignition-resistant building materials in accordance with Section 503.2.” for those applications. That is incorrect. This change would not affect any requirement for fire-retardant-treated wood roof coverings, since they are not explicitly called for anywhere in the IWUIC.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is simply clarification. See also the proponent’s reason statement.

WUIC17-24

WUIC18-24

IWUIC: 501.3, SECTION 503, 503.1, 503.2, 503.2.1, 503.2.2, 503.2.3, 503.2.4, 503.2.4.1, 503.2.4.2, 503.2.4.3, 503.2.4.3.1, 503.2.4.3.2, 503.2.4.3.3, 503.3 (New)

Proponents: Milad Shabanian, Insurance Institute for Business & Home Safety (mshabanian@ibhs.org); T. Eric Stafford, Insurance Institute for Business and Home Safety (testafford@charter.net)

2024 International Wildland Urban Interface Code

Delete without substitution:

~~501.3 Fire-resistance-rated construction~~.
~~Where this code requires 1-hour *fire-resistance-rated construction* , the fire-resistance rating of building elements, components or assemblies shall be determined in accordance with the test procedures set forth in ASTM E119 or UL 263.~~

~~Exceptions:~~

1. ~~The fire-resistance rating of building elements, components or assemblies based on the prescriptive designs prescribed in Section 721 of the International Building Code.~~
2. ~~The fire-resistance rating of building elements, components or assemblies based on the calculation procedures in accordance with Section 722 of the International Building Code.~~

Revise as follows:

SECTION 503
~~IGNITION-RESISTANT~~ CONSTRUCTION AND ~~MATERIAL~~ <u>MATERIALS</u>

503.1 General.
Buildings and structures hereafter constructed, modified or relocated into or within *wildland-urban interface areas* shall meet the construction requirements in accordance with Table 503.1. Class 1, Class 2 or Class 3, ignition-resistant construction shall be in accordance with Sections 504, 505 and 506, respectively. Materials required <u>for the ignition-resistant construction classes</u> ~~to be ignition-resistant materials~~ shall comply with the requirements of ~~Section 503.2~~<u>this section</u>.

503.2 Ignition-resistant building material.
Ignition-resistant building materials shall comply with any one of the requirements in Section 503.2.1 through 503.2.4.

503.2.1 Noncombustible material.
Material shall comply with the definition of *noncombustible* materials in Section 202.

503.2.2 Fire-retardant-treated wood.
Fire-retardant-treated wood shall be identified for exterior use and shall meet the requirements of Section 2303.2 of the *International Building Code*.

503.2.3 Fire-retardant-treated wood roof coverings.
Roof assemblies containing fire-retardant-treated wood shingles and shakes shall comply with the requirements of Section 1505.6 of the *International Building Code* and shall be classified as Class A roof assemblies as required in Section 1505.2 of the *International Building Code*.

503.2.4 Ignition-resistant building material.
Material shall be tested on the front and back faces in accordance with the extended ASTM E84 or UL 723 test, for a total test period of 30 minutes, or with the ASTM E2768 test. The materials shall bear identification showing the fire test results. Panel products shall be tested

with a ripped or cut longitudinal gap of $^1/_8$ inch (3.2 mm). The materials, when tested in accordance with the test procedures set forth in ASTM E84 or UL 723 for a test period of 30 minutes, or with ASTM E2768, shall comply with Sections 503.2.4.1 through 503.2.4.3.

Exception: Materials composed of a combustible core and a noncombustible exterior covering made from either aluminum at a minimum 0.019 inch (0.48 mm) thickness or corrosion-resistant steel at a minimum 0.0149 inch (0.38 mm) thickness shall not be required to be tested with a ripped or cut longitudinal gap.

503.2.4.1 Flame spread.
The material shall exhibit a flame spread index not exceeding 25.

503.2.4.2 Flame front.
The material shall exhibit a flame front that does not progress more than 10 feet 6 inches (3200 mm) beyond the centerline of the burner at any time during the test.

503.2.4.3 Weathering.
Ignition-resistant building materials shall maintain their performance in accordance with this section under conditions of use. The materials shall meet the performance requirements for weathering (including exposure to temperature, moisture and ultraviolet radiation) contained in Sections 503.2.4.3.1 through 503.2.4.3.3, as applicable to the materials and conditions of use.

503.2.4.3.1 Evaluation requirements for weathering.
Fire-retardant-treated wood, wood-plastic composite materials and plastic lumber materials shall be evaluated after weathering in accordance with Method A "Test Method for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing" in ASTM D2898.

503.2.4.3.2 Wood-plastic composite materials.
Wood-plastic composite materials shall also demonstrate acceptable fire performance after weathering by the following procedure: first testing in accordance with ASTM E1354 at an incident heat flux of 50 kW/m^2 in the horizontal orientation, then weathering in accordance with ASTM D7032 and then retesting in accordance with ASTM E1354 and exhibiting an increase of no more than 10 percent in peak rate of heat release when compared to the peak heat release rate of the nonweathered material.

503.2.4.3.3 Plastic lumber materials.
Plastic lumber materials shall also demonstrate acceptable fire performance after weathering by the following procedure: first testing in accordance with ASTM E1354 at an incident heat flux of 50 kW/m^2 in the horizontal orientation, then weathering in accordance with ASTM D6662 and then retesting in accordance with ASTM E1354 and exhibiting an increase of no more than 10 percent in peak rate of heat release when compared to the peak heat release rate of the nonweathered material.

Add new text as follows:

503.3 Fire-resistance-rated construction. Where this code requires 1-hour fire-resistance-rated construction, the fire-resistance rating of building elements, components or assemblies shall be determined in accordance with the test procedures set forth in ASTM E119 or UL 263 for exposure from the exterior side of the assembly

Exceptions:

1.	The fire-resistance rating of building elements, components or assemblies based on the prescriptive designs prescribed in Section 721 of the *International Building Code* for exposure from the exterior side of the assembly.
2.	The fire-resistance rating of building elements, components or assemblies based on the calculation procedures in accordance with Section 722 of the *International Building Code* for exposure from the exterior side of the assembly.

Reason: This proposal relocates a construction method to a more appropriate section and refines the code language to ensure its seamless integration in the new location. In the 2024 IWUIC, Section 501.3, onwhich addresses the qualification of fire-resistance-rated construction, is located in Section 501, the general section of Chapter 5. Typically, these general sections focus primarily on the scope and purpose of each chapter. Listing construction methods within Section 501 is not consistent with the other general sections of the IWUIC. For clarification purposes, this proposal relocates Section 501.3 to new Section 503.3. Section 503 is specifically dedicated to matters related to construction and materials. The title of section 503 is proposed to be changed from ignition-resistant construction and material to construction and material to construction and materials. The charging paragraph in Section 503.1 has been refined to ensure that the relocation of Section 501.3 to new Section 503.3 will be correlated with this relocation.

Background

In 2012, Section 501.3 was introduced to IWUIC as part of WUIC2-9/10 [1]. Then, in 2015, exceptions 1 and 2 were incorporated into this section via a proposal brought forth by WUIC1-13 [2].

Bibliography:

1. Marcelo M. Hirschler, GBH International, representing American Fire Safety Council, WUIC2–09/10, https://www.iccsafe.org/wp-content/uploads/IWUIC1.pdf

2. Jason Thompson, National Concrete Masonry Association, representing Masonry Alliance for Codes and Standards, WUIC1-13, https://www.iccsafe.org/wp-content/uploads/11-IWUIC.pdf

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This code change proposal is strictly a clarification. Relocating existing Section 501.3 to new Section 503.3 pertaining to construction and material will not result in a technical changes to the code. As a result, the proposal will not have an impact on construction costs, either positively or negatively.

WUIC18-24

WUIC19-24

IWUIC: SECTION 503, 503.1, 503.2, 503.2.1, 503.2.2, 503.2.3, 503.2.4, 503.2.4.1, 503.2.4.2, 503.2.4.3, 503.2.4.3.1, 503.2.4.3.2, 503.2.4.3.3

Proponents: Milad Shabanian, Insurance Institute for Business & Home Safety (mshabanian@ibhs.org); T. Eric Stafford, Insurance Institute for Business and Home Safety (testafford@charter.net)

2024 International Wildland Urban Interface Code

Revise as follows:

SECTION 503
~~IGNITION-RESISTANT~~ CONSTRUCTION AND ~~MATERIAL~~ MATERIALS

503.1 General.
Buildings and structures hereafter constructed, modified or relocated into or within *wildland-urban interface areas* shall meet the construction requirements in accordance with Table 503.1. Class 1, Class 2 or Class 3, ignition-resistant construction shall be in accordance with Sections 504, 505 and 506, respectively. Materials required for ignition-resistant construction classes ~~to be ignition-resistant materials~~ shall comply with the requirements of ~~Section 503.2~~ this section.

Delete without substitution:

~~**503.2 Ignition-resistant building material.**~~
~~Ignition-resistant building materials shall comply with any one of the requirements in Section 503.2.1 through 503.2.4.~~

Revise as follows:

~~503.2.1~~ 503.2 Noncombustible material.
Material shall comply with the definition of *noncombustible* materials in Section 202.

~~503.2.2~~ 503.3 Fire-retardant-treated wood.
Fire-retardant-treated wood shall be identified for exterior use and shall meet the requirements of Section 2303.2 of the *International Building Code*.

~~503.2.3~~ 503.4 Fire-retardant-treated wood roof coverings.
Roof assemblies containing fire-retardant-treated wood shingles and shakes shall comply with the requirements of Section 1505.6 of the *International Building Code* and shall be classified as Class A roof assemblies as required in Section 1505.2 of the *International Building Code*.

~~503.2.4~~ 503.5 Ignition-resistant building material.
Material shall be tested on the front and back faces in accordance with the extended ASTM E84 or UL 723 test, for a total test period of 30 minutes, or with the ASTM E2768 test. The materials shall bear identification showing the fire test results. Panel products shall be tested with a ripped or cut longitudinal gap of $^1/_8$ inch (3.2 mm). The materials, when tested in accordance with the test procedures set forth in ASTM E84 or UL 723 for a test period of 30 minutes, or with ASTM E2768, shall comply with Sections 503.2.4.1 through 503.2.4.3.

> **Exception:** Materials composed of a combustible core and a noncombustible exterior covering made from either aluminum at a minimum 0.019 inch (0.48 mm) thickness or corrosion-resistant steel at a minimum 0.0149 inch (0.38 mm) thickness shall not be required to be tested with a ripped or cut longitudinal gap.

~~503.2.4.1~~ 503.5.1 Flame spread.
The material shall exhibit a flame spread index not exceeding 25.

~~503.2.4.2~~ 503.5.2 Flame front.
The material shall exhibit a flame front that does not progress more than 10 feet 6 inches (3200 mm) beyond the centerline of the burner at any time during the test.

~~503.2.4.3~~ 503.5.3 Weathering.
Ignition-resistant building materials shall maintain their performance in accordance with this section under conditions of use. The materials shall meet the performance requirements for weathering (including exposure to temperature, moisture and ultraviolet radiation) contained in Sections 503.2.4.3.1 through 503.2.4.3.3, as applicable to the materials and conditions of use.

~~503.2.4.3.1~~ 503.5.3.1 Evaluation requirements for weathering.
Fire-retardant-treated wood, wood-plastic composite materials and plastic lumber materials shall be evaluated after weathering in accordance with Method A “Test Method for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing” in ASTM D2898.

~~503.2.4.3.2~~ 503.5.3.2 Wood-plastic composite materials.
Wood-plastic composite materials shall also demonstrate acceptable fire performance after weathering by the following procedure: first testing in accordance with ASTM E1354 at an incident heat flux of 50 kW/m^2 in the horizontal orientation, then weathering in accordance with ASTM D7032 and then retesting in accordance with ASTM E1354 and exhibiting an increase of no more than 10 percent in peak rate of heat release when compared to the peak heat release rate of the nonweathered material.

~~503.2.4.3.3~~ 503.5.3.3 Plastic lumber materials.
Plastic lumber materials shall also demonstrate acceptable fire performance after weathering by the following procedure: first testing in accordance with ASTM E1354 at an incident heat flux of 50 kW/m^2 in the horizontal orientation, then weathering in accordance with ASTM D6662 and then retesting in accordance with ASTM E1354 and exhibiting an increase of no more than 10 percent in peak rate of heat release when compared to the peak heat release rate of the nonweathered material.

Reason: This code change is intended to provide some clarification on the types of materials permitted for the various ignition resistant construction classes. The current language in Section 503.2 is problematic for the following reasons:

1. Inconsistent usage of the term "ignition-resistant building material":

The term "Ignition-resistant building material" is used both for section and subsection titles, causing confusion when the code refers to materials with ignition-resistant properties. For instance, "Ignition-resistant material" is mentioned twice in Section 504.3 and once in Section 505.5 without specific references to any section. Given the context and the extensive list of materials in each section, it is apparent that the code refers to Section 503.2.4. However, in all other instances with a similar situation, Section 503.2 is referenced for ignition-resistant materials, which leads to confusion.

2. Inclusion of Noncombustible Materials Under "Ignition-resistant building material":

From an ignition perspective, materials can be categorized into two distinct groups: combustible vs noncombustible materials. Combining these two groups under a single category and labeling them all as "Ignition-resistant building material" appears to compromise the classification of noncombustible building materials. According to definitions provided in Section 202 of 2024 IWUIC and Section X1.2 of ASTM E136 [1], noncombustible materials are material of which no part "will ignite" and burn when subjected to fire. Section 202 also defines Ignition-resistant building material. Although the definition doesn't explicitly say the material “can ignite” and burn, it is implied that these materials can ignite and burn.

3. Redundancy in Reference to Fire-retardant-treated Wood Material:

Fire-retardant-treated wood material has a well-established definition provided in Section 2303.2 of the IBC which is also referenced in Section 503.2.2 for Fire-retardant-treated wood. Additionally, the IWUI code references Section 2303.2 of the IBC 18 times. In many of these cases, ignition-resistant building material is presented as an alternative according to the code. Merging these two types of materials and referencing Section 503.2 for ignition-resistant building material would introduce redundancy in the code. Fire-retardant-treated wood has had a defined status in the IBC since 2003, primarily related to wood products impregnated with chemicals, whereas the definition of ignition-resistant building materials was introduced only in IWUIC since 2009 and pertains to composite materials. They should be maintained as separate categories.

4. Discrepancy Between Section 503.2.3 and definition of building materials:

Section 503.2.3 references "fire-retardant-treated wood roof covering" as a roof "assembly" comprising fire-retardant-treated wood shingles and shakes. It also requires compliance with the International Building Code Section 1505.6 and classification as Class A roof assemblies, as mandated in Section 1505.2. This assembly concept conflicts with the definition of building materials.

The proposed language changes do not introduce any technical alterations but rather tackle the listed concerns by recommending individual sections for each one of these materials and refining the code language to ensure its smooth incorporation into the new format.

Bibliography:

1. ASTM Standard E136, 2022, " Standard Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750 °C," ASTM International, DOI: 10.1520/E0136-22, www.astm.org.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is administrative cleanup language and does not propose technical alterations to the code provisions. As a result, the proposal will not have an impact on construction costs, either positively or negatively.

WUIC19-24

WUIC20-24

IWUIC: TABLE 503.1

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Wildland Urban Interface Code

Revise as follows:

TABLE 503.1 IGNITION-RESISTANT CONSTRUCTION CLASSIFICATION[~~a~~]

DEFENSIBLE SPACE[~~e~~a]	FIRE HAZARD SEVERITY					
	Moderate Hazard		High Hazard		Extreme Hazard	
	Water Supply[~~b~~]		Water Supply[~~b~~]		Water Supply[~~b~~]	
	Conforming[~~a~~b]	Nonconforming[~~e~~c]	Conforming[~~d~~b]	Nonconforming[~~e~~c]	Conforming[~~d~~b]	Nonconforming[~~e~~c]
Less than required by Table 603.2	~~IR~~Class 2	~~IR~~Class 1	~~IR~~Class 1	~~IR 1~~ ~~N.C.~~ Rated[d]	~~IR 1~~ ~~N.C.~~ Class 1[d]	~~Not Permitted~~NP
~~Conforming~~Complies with Table 603.2	~~IR~~Class 3	~~IR~~Class 2	~~RI~~Class 2	~~IR~~Class 1	~~IR~~Class 1	~~IR 1~~ ~~N.C.~~Class 1[d]
~~1.5 × Conforming~~150% or more of distance required in Table 603.2	~~Not Required~~ NR	~~IR~~Class 3	~~IR~~Class 3	~~IR~~Class 2	~~IR~~Class 2	~~IR~~Class 1

NP = Not Permitted; NR = Not Required; Class 1 = Ignition-resistant construction in accordance with Section 504; Class 2 = Ignition-resistant construction in accordance with Section 505; Class 3 = Ignition-resistant construction in accordance with Section 506.

a. ~~Access shall be in accordance with Section 403.~~ Distance of defensible space provided on all sides of structure as required in Table 603.2.

b. ~~Subdivisions shall have a conforming water supply in accordance with Section 402.1.~~ A conforming water supply complying with Section 404.

~~IR 1 = Ignition-resistant construction in accordance with Section 504.~~

~~IR 2 = Ignition-resistant construction in accordance with Section 505.~~

~~IR 3 = Ignition-resistant construction in accordance with Section 506.~~

~~N.C. = Exterior walls shall have a fire-resistance rating of not less than 1 hour and the exterior surfaces of such walls shall be noncombustible. Usage of log wall construction is allowed.~~

c. ~~Conformance based on Section 603.~~ A nonconforming water supply is any water system or source that does not comply with Section 404, including situations where there is no water supply for structure protection or fire suppression.

d. ~~Conformance based on Section 404.~~ In addition to Class 1 construction, the exterior walls shall comply with any of the following:

1. Exterior walls having a fire-resistance rating of 1 hour or more with a noncombustible exterior wall covering.
2. Exterior walls constructed of heavy timber members.
3. Exterior walls of log wall construction.

~~e. A nonconforming water supply is any water system or source that does not comply with Section 404, including situations where there is no water supply for structure protection or fire suppression.~~

Reason: FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the FCAC

Website

This proposal intends to clarify the application of Table 503.1.

IR 1 through IR 3 are replaced with Class 1 through Class 3. This is consistent with the terminology in the charging section, Section 503.1, and Sections 504, 505 and 506.

Nonconforming and conforming under defensible space is clarified as to what the conformance is referencing—the width of defensible space, or the distance from the structure.

The “IR 1 N.C.” term is replaced with “rated”. Footnote d specifies that rated construction consists of Class 1 ignition-resistant construction and the protection of the exterior walls is increased to one of the 3 options in Footnote d.

For additional clarification, the designation “NP” is intended to mean that any construction in areas with these risk factors is not permitted.

The designation “NR” is intended to mean that ignition resistant construction is not required for exterior walls. All other applicable requirements still apply.

There are three separate code changes dealing with IWUIC Table 503.1. Attached PDF shows the end goal for Table 503.1.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is an editorial clairification that does not impact cost. See also the proponent’s reason statement.

WUIC20-24

WUIC21-24

IWUIC: TABLE 503.1

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Wildland Urban Interface Code

Revise as follows:

TABLE 503.1 IGNITION-RESISTANT CONSTRUCTION[a]

DEFENSIBLE SPACE[c]	FIRE HAZARD SEVERITY					
	Moderate Hazard		High Hazard		Extreme Hazard	
	Water Supply[b]		Water Supply[b]		Water Supply[b]	
	Conforming[d]	Nonconforming[e]	Conforming[d]	Nonconforming[e]	Conforming[d]	Nonconforming[e]
Nonconforming	IR 2	IR 1	IR 1	IR 1 N.C.	IR 1 N.C.	Not Permitted
Conforming	IR 3	IR 2	IR 2	IR 1	IR 1	IR 1 N.C.
1.5 × Conforming[f]	~~Not Required~~ IR 3	IR 3	IR 3	IR 2	IR 2	IR 1

a. Access shall be in accordance with Section 403.

b. Subdivisions shall have a conforming water supply in accordance with Section 402.1.

IR 1 = Ignition-resistant construction in accordance with Section 504.

IR 2 = Ignition-resistant construction in accordance with Section 505.

IR 3 = Ignition-resistant construction in accordance with Section 506.

N.C. = Exterior walls shall have a fire-resistance rating of not less than 1 hour and the exterior surfaces of such walls shall be noncombustible. Usage of log wall construction is allowed.

c. Conformance based on Section 603.

d. Conformance based on Section 404.

e. A nonconforming water supply is any water system or source that does not comply with Section 404, including situations where there is no water supply for structure protection or fire suppression.

f In accordance with an *approved* Vegetation Management Plan in accordance with Section 502.2

Reason: FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

This proposal changes the requirement for ignition-resistant construction where the site has 1.5x required defensible space, a conforming water supply in a Moderate Hazard zone from “not required” to a requirement for IR3 construction. The IWUIC has been updated over the past several cycles to enhance the requirements for ignition-resistant construction to achieve a minimum level of building fire resistance/endurance from WUI fires. The Table needs to be updated to require a minimum level of ignition-resistance construction for all conditions and not simply exempt such minimum requirements based on a conforming water supply, as is currently the IWUIC allowance.

Where a dwelling is located in the Moderate Hazard area, the “not required” currently means it has no ignition-resistant construction.

There are three separate code changes dealing with IWUIC Table 503.1. The PDF attached shows the end goal for Table 503.1.

Cost Impact: Increase

Estimated Immediate Cost Impact:

The cost for construction in a Moderate Hazard Fire Severity zone with a conforming water supply provided with the 1.5x required defensible space is estimated to add approximately 1% to the total cost of construction materials for the building.

Estimated Immediate Cost Impact Justification (methodology and variables):

This proposal will increase the cost of construction by the cost of providing IR 3 construction in a moderate hazard zone, but only for structures which would have benefited from providing the 150% distance.

WUIC21-24

WUIC22-24

IWUIC: 402.2.2, 404.1, 503.1, TABLE 503.1

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Wildland Urban Interface Code

Revise as follows:

402.2.2 Water supply.
Individual structures hereafter constructed or relocated into or within *wildland-urban interface areas* shall be provided with a ~~conforming~~ water supply in accordance with Section 404.

Exception ~~Exceptions~~:

~~1.~~ ~~Structures constructed to meet the requirements for the class of ignition-resistant construction specified in Table 503.1 for a nonconforming water supply.~~

~~2~~1. Buildings containing only private garages, carports, sheds and agricultural buildings with a floor area of not more than 600 square feet (56 m^2).

404.1 General.
~~Where provided in order to qualify as a conforming water supply for the purpose of Table 503.1 or as required for new subdivisions in accordance with Section 402.1.2, an~~ An *approved* water source shall have an adequate water supply for the use of the fire protection service to protect buildings and structures from exterior fire sources or to suppress structure fires within the *wildland-urban interface area* of the jurisdiction in accordance with this section.

Exception: Buildings containing only private garages, carports, sheds and agricultural buildings with a floor area of not more than 600 square feet (56 m^2).

503.1 General.
Buildings and structures hereafter constructed, modified or relocated into or within *wildland-urban interface areas* shall meet the construction requirements in accordance with Table 503.1. Class 1, Class 2 or Class 3, ignition-resistant construction shall be in accordance with Sections 504, 505 and 506, respectively. Materials required to be ignition-resistant building materials shall comply with the requirements of Section 503.2.

TABLE 503.1 IGNITION-RESISTANT CONSTRUCTION~~[a]~~

Portions of table not shown remain unchanged.

DEFENSIBLE SPACE~~[e]~~[a]	FIRE HAZARD SEVERITY					
	Moderate Hazard		High Hazard		Extreme Hazard	
	~~Water Supply[b]~~		~~Water Supply[b]~~		Water Supply[b]	
	~~Conforming[d]~~	~~Nonconforming[e]~~	~~Conforming[d]~~	~~Nonconforming[e]~~	~~Conforming[d]~~	~~Nonconforming[e]~~
Nonconforming	IR 2	~~IR 1~~	IR 1	~~IR 1~~ ~~N.C.~~	IR 1 N.C.	~~Not Permitted~~
Conforming	IR 3	~~IR 2~~	IR 2	~~IR 1~~	IR 1	~~IR 1~~ ~~N.C.~~
1.5 × Conforming	Not Required	~~IR 3~~	IR 3	~~IR 2~~	IR 2	~~IR 1~~

~~a.~~ ~~Access shall be in accordance with Section 403.~~

IR 1 = Ignition-resistant construction in accordance with Section 504; IR 2 = Ignition-resistant construction in accordance with Section 505; IR 3 = Ignition-resistant construction in accordance with Section 506.

~~b.~~ ~~Subdivisions shall have a conforming water supply in accordance with Section 402.1.~~

~~IR 1 =~~ ~~Ignition-resistant construction in accordance with Section 504.~~

~~IR 2 =~~ ~~Ignition-resistant construction in accordance with Section 505.~~

~~IR 3 =~~ ~~Ignition-resistant construction in accordance with Section 506.~~

N.C. = Exterior walls shall have a fire-resistance rating of not less than 1 hour and the exterior surfaces of such walls shall be noncombustible. Usage of log wall construction is allowed.

~~c~~a. Conformance based on Section 603.

~~d.~~ ~~Conformance based on Section 404.~~

~~e.~~ ~~A nonconforming water supply is any water system or source that does not comply with Section 404, including situations where there is no water supply for structure protection or fire suppression.~~

Reason: FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

The footnote reference to Section 403 (Access) is removed as not necessary. Compliance with Section 403 is required and a footnote "pointer" is redundant.

The footnote reference to Section 404 (Water Supply) is deleted in accordance with deletion of the Water Supply references in the TableWater supply in accordance with Section 404 should be provided for all new construction. As a tool for fire suppression and structure hazard mitigation during a WUI fire, firefighters may not be available to protect structures, so in that instance water supply would not reduce the fire risks or be an effective mitigation. Removing water supply puts the emphasis for protection of structures from wildland fire onto the constriction of the building to be ignition resistant and the defensible space.

There are three separate code changes dealing with IWUIC Table 503.1. The PDF attached shows the end goal for Table 503.1.

Cost Impact: Increase

Estimated Immediate Cost Impact:

Chapter 5 and Table 503.1 are the requirements for newly built structures and subdivisions in areas regulated by the IWUIC. Accordingly, a compliant water supply should always be provided or addressed through approved alternative methods or materials as allowed by the code. The application of this Table as currently written allows for a reduction in required IR Construction materials when the water supply complies with what is already required by this code,

The cost of construction will be increased based on this proposal as compared to the cost reduction (allowance) that is currently provided. That cost will be based on the difference of IR 3 construction vs. IR 2 or IR 2 vs IR1.

Estimated Immediate Cost Impact Justification (methodology and variables):

The cost of construction will be increased based on this proposal as compared to the cost reduction (allowance) that is currently provided. That cost will be based on the difference of IR 3 construction vs. IR 2 or IR 2 vs IR1. That cost would typically not exceed 1-2% of overall construction cost, but is variable based on the size of the building and the choice of building materials chosen to comply.

WUIC22-24

WUIC23-24

IWUIC: TABLE 503.1

Proponents: Kevin Scott, KH Scott & Associates LLC, self (khscottassoc@gmail.com)

2024 International Wildland Urban Interface Code

Revise as follows:

TABLE 503.1 IGNITION-RESISTANT CONSTRUCTION[a]

DEFENSIBLE SPACE[c]	FIRE HAZARD SEVERITY					
	Moderate Hazard		High Hazard		Extreme Hazard	
	Water Supply[b]		Water Supply[b]		Water Supply[b]	
	Conforming[d]	Nonconforming[e]	Conforming[d]	Nonconforming[e]	Conforming[d]	Nonconforming[e]
Nonconforming	IR 2	IR 1	IR 1	IR 1 N.C.	IR 1 N.C.	Not Permitted
Conforming	IR 3	IR 2	IR 2	IR 1	IR 1	IR 1 N.C.
~~1.5 × Conforming~~	~~Not Required~~	~~IR 3~~	~~IR 3~~	~~IR 2~~	~~IR 2~~	~~IR 1~~

a. Access shall be in accordance with Section 403.

b. Subdivisions shall have a conforming water supply in accordance with Section 402.1.

IR 1 = Ignition-resistant construction in accordance with Section 504.

IR 2 = Ignition-resistant construction in accordance with Section 505.

IR 3 = Ignition-resistant construction in accordance with Section 506.

N.C. = Exterior walls shall have a fire-resistance rating of not less than 1 hour and the exterior surfaces of such walls shall be noncombustible. Usage of log wall construction is allowed.

c. Conformance based on Section 603.

d. Conformance based on Section 404.

e. A nonconforming water supply is any water system or source that does not comply with Section 404, including situations where there is no water supply for structure protection or fire suppression.

Reason: This proposal eliminates the last row in Table 503.1. The deleted row only applies where a structure provides a defensible space distance that is 150% or more of a conforming defensible space. Section 503.1 states that the requirements in Table 503.1 only apply to new construction or new structures. Therefore, existing structures which may not have any ignition-resistant construction are not affected by this table.

But for new construction, this provision is at minimum vague and confusing; and then it creates a situation which is nearly impossible to properly enforce for the life of the structure. The provision in the table is based on 150% times a conforming defensible space, and Footnote c directs the user to Section 603. However, this is not clear whether the provision applies to defensible space being 150% of the width required in Table 603.2; or if it means the trees within the defensible space are separated 150% of the distance required in Section 603.2.2; or both.

As far as enforcing this provision for the life of the structure, consider Structure X in the WUI. Structure X is located in the Moderate Hazard area with a conforming water supply. Structure X provides a 150% increase in the distances required in both Table 603.2 and Section 603.2.2, so at the time of construction ignition-resistant building materials are not required. This design complies with Table 503.1 at the time of construction. Three years later, the code official is conducting an inspection of the area for maintenance of the defensible space. The code official will not be aware of the fact that the structure was required to maintain a 45' defensible space, so the code official will require the 30' defensible space requirement similar to all other structures in the Moderate Hazard area.

The only way to determine whether an owner must provide 150% of defensible space is to go back to the original plans and research the applicable code at the time of construction, then determine if the construction of the structure complies or not. While this is a valid avenue for enforcement, we all know that this amount of effort will not be put into every inspection. In fact, I would not be surprised if it is not put into **any** inspection. Most likely, the inspector will simply require the conforming distance as he/she did on every adjacent neighbor. In this fashion, it is an easier inspection; it looks acceptable; and the inspector moves on to next property.

Each year during the spring and early summer, a single WUI inspector can perform hundreds of inspections daily. If the information for a specific lot is not readily available, the provision will be lost. In doing so, the structure now should have been constructed of Class 3 ignition-resistant construction.

Additionally, Structure A is located in the Moderate Hazard area, but was allowed to be constructed with no ignition-resistant construction, not even a fire-resistance-rated roof. The rating of the roof covering is required for Classes 1, 2 and 3 ignition-resistant construction, but Dwelling A did not have to comply since 150% of the defensible space was provided. It is a frequent occurrence that structures are ignited ahead of the fire front by burning embers pushed ahead of the fire and landing on the rooftop. But Dwelling A does not have a rated roof. The 45' defensible space protects from radiant heat and direct flame impingement. The roof is not protected, and Dwelling A is lost when the roof ignites from burning embers.

Some may argue that Dwelling A will be saved because there is a conforming water supply. However, even the best water supply is of no benefit when there are no firefighters available to utilize it. When there are multiple structures needing protection, the Incident Commander will decide where to deploy the firefighters because there are more structures than firefighters and fire engines. Structure A has a 45' defensible space, while others only have the required 30' distance. It is likely that it will be decided that Structure A is less vulnerable because of the increased defensible space and firefighters will be sent to other structures. The water supply does not improve the survivability of Structure A at all in this case.

The concept to allow credit for 150% of the defensible space is flawed and difficult to maintain throughout the life of the structure. The entire row and this allowance should be removed from the code.

Cost Impact: Increase

Estimated Immediate Cost Impact:

This proposal will increase the cost of construction, but only for structures which would have benefited from providing the 150% increase in the defensible space requirements. However, the construction increase will be offset by the one-third reduction in labor for annual pruning and trimming of the vegetation within the defensible space.

Estimated Immediate Cost Impact Justification (methodology and variables):

Utilizing ignition-resistant construction materials will increase the construction cost for the exterior walls, deck and roof by 15%.

WUIC23-24

WUIC24-24

IWUIC: TABLE 503.1

Proponents: Milad Shabanian, Insurance Institute for Business & Home Safety (mshabanian@ibhs.org); T. Eric Stafford, Insurance Institute for Business and Home Safety (testafford@charter.net)

2024 International Wildland Urban Interface Code

Revise as follows:

TABLE 503.1 IGNITION-RESISTANT CONSTRUCTION[a]

DEFENSIBLE SPACE[c]	FIRE HAZARD SEVERITY					
	Moderate Hazard		High Hazard		Extreme Hazard	
	Water Supply[b]		Water Supply[b]		Water Supply[b]	
	Conforming[d]	Nonconforming[e]	Conforming[d]	Nonconforming[e]	Conforming[d]	Nonconforming[e]
Nonconforming	IR 2	IR 1	IR 1	IR 1 N.C.	IR 1 N.C.	Not Permitted
Conforming	IR 3	IR 2	IR 2	IR 1	IR 1	IR 1 N.C.
1.5 × Conforming	Not Required	IR 3	IR 3	IR 2	IR 2	IR 1

a. Access shall be in accordance with Section 403.

b. Subdivisions shall have a conforming water supply in accordance with Section 402.1.

IR 1 = Ignition-resistant construction in accordance with Section 504.

IR 2 = Ignition-resistant construction in accordance with Section 505.

IR 3 = Ignition-resistant construction in accordance with Section 506.

N.C. = Exterior walls shall have a fire-resistance rating of not less than 1 hour on the exterior and the exterior surfaces of such walls shall be noncombustible. ~~Usage of log wall construction is allowed.~~

c. Conformance based on Section 603.

d. Conformance based on Section 404.

e. A nonconforming water supply is any water system or source that does not comply with Section 404, including situations where there is no water supply for structure protection or fire suppression.

Reason: The intent of this proposal is to provide clarity regarding Note b of Table 503.1 to prevent potential misinterpretation.

New text is proposed to be added to clarify that the required 1-hour fire-resistance rating (FRR) specified in Note b must be applied on the exterior side of the wall assembly. This is consistent with the language in Section 504.5 (IR1) and Section 505.5 (IR2) and will provide consistency across instances where a 1-hour FRR is used to protect exterior walls.

The second proposed change intends to clarify the use of log wall construction in Note b. In extreme wildfire hazard condition, where defensible space is nonconforming, Table 503.1 neccesiates both a 1-hour FRR "and" a noncombustible exterior surface for exterior walls. Nonconforming defensible space denotes a situation where, in addition to exposure to embers and radiant heat, the structure faces a direct flame exposure risk from adjacent fuel loads during a wildfire. In such instances, the code mandates that wall assemblies fulfill two sets of criteria:

1. A 1-hour fire-resistant rating to shield exterior walls against fire impingement.
2. A noncombustible exterior surface to impede the spread of fire on the external wall surfaces.

Acknowledging that log wall construction, as defined, can attain a 1-hour fire resistance rating, this proposal seeks to make clear that "all" wall assemblies meeting the 1-hour fire-resistant rating, including those employing log wall construction, are acceptable, if they are protected by noncombustible exterior siding.

Construction incorporating heavy timber elements boasts a rich global history.

Figure 1 illustrates five types of construction typical of such elements [1]:

1. Log wall construction,
2. Heavy timber construction,
3. Post and beam construction,
4. Panelized construction, and,
5. Hybrid construction.

Log wall construction historically originated in the northern European region where a Nordic climate, characterized by cold, humid winters and mild, humid summers, made log wall construction desireable. Over time, advancements in the wood industry and environmental considerations led to the introduction of engineered wood products like glue laminated timber (Glulam), laminated veneer lumber (LVL), and cross laminated timber (CLT). This marked a shift from traditional heavy timber and log wall construction to contemporary post and beam, panelized construction, and hybrid construction. Consequently, log wall construction is now primarily practiced in wildland areas of United States facing varying degrees of wildfire hazard. Numerous studies conclude that heavy timber members, including logs thicker than 6 inches, are inherently fire-resistant and can withstand fires by charring [1]. However, concerns exist about the safety of these combustible materials regarding flame spread on their exterior surfaces. Flame spread on the exterior surfaces of combustible materials, including different wood species, poses a risk of fire spreading to other parts of buildings at varying rates. The requirement for a noncombustible exterior surface in Table 503.1 for IR1 N.C. eliminates the possibility of flame spread on exterior walls. The International Building Code (IBC) also addresses this concern and mandates noncombustible exterior protection in sections 602.4.1 through 602.4.4 for all Type IV buildings (A, B, C, and HT) constructed with heavy timber members, as shown in Figure 2.

Log wall construction

Heavy timber construction

Post and Beam construction

Panelized construction

Hybrid construction

Figure 1. Different types of construction with heavy timber members [1].

Numerous reports of fire incidents around the country confirm the flame spread risk on the exterior surface of log wall construction.The 2013 IBHS post-fire investigation on a fire that occurred in Sevier County, Tennessee with moderate fire hazard severity revealed valuable information on fire characteristics of log wall construction [2]. In this fire incident, the average side-to-side cabin spacing (of those measured on-site and exposed to fire conditions) was 32 feet. While the report states that the buildings observed were not constructed in accordance with WUI requirements, Figure 3 clearly shows how fire can spread quickly on the exterior of log wall construction.

602.4.1 Type IV-A. Building elements in Type IV-A construction shall be protected in accordance with Sections 602.4.1.1 through 602.4.1.6. The required fire resistance rating of noncombustible elements and protected mass timber elements shall be determined in accordance with Section 703.2.

602.4.1.1 Exterior protection. The outside face of exterior walls of mass timber construction shall be protected with noncombustible protection with a minimum assigned time of 40 minutes, as specified in Table 722.7.1(1). Components of the exterior wall covering shall be of noncombustible material except water-resistive barriers having a peak heat release rate of less than 150kW/m$_2$, a total heat release of less than 20 MJ/m$_2$ and an effective heat of combustion of less than 18MJ/kg as determined in accordance with ASTM E1354 and having a flame spread index of 25 or less and a smoke-developed index of 450 or less as determined in accordance with ASTM E84 or UL 723. The ASTM E1354 test shall be conducted on specimens at the thickness intended for use, in the horizontal orientation and at an incident radiant heat flux of 50 kW/m$_2$.

602.4.2 Type IV-B. Building elements in Type IV-B construction shall be protected in accordance with Sections 602.4.2.1 through 602.4.2.6. The required fire resistance rating of noncombustible elements or mass timber elements shall be determined in accordance with Section 703.2.

602.4.2.1 Exterior protection. The outside face of exterior walls of mass timber construction shall be protected with noncombustible protection with a minimum assigned time of 40 minutes, as specified in Table 722.7.1(1). Components of the exterior wall covering shall be of noncombustible material except water-resistive barriers having a peak heat release rate of less than 150kW/m2, a total heat release of less than 20 MJ/m2 and an effective heat of combustion of less than 18MJ/kg as determined in accordance with ASTM E1354, and having a flame spread index of 25 or less and a smoke-developed index of 450 or less as determined in accordance with ASTM E84 or UL 723. The ASTM E1354 test shall be conducted on specimens at the thickness intended for use, in the horizontal orientation and at an incident radiant heat flux of 50 kW/m2.

602.4.3 Type IV-C. Building elements in Type IV-C construction shall be protected in accordance with Sections 602.4.3.1 through 602.4.3.6. The required fire resistance rating of building elements shall be determined in accordance with Section 703.2.

602.4.3.1 Exterior protection. The exterior side of walls of combustible construction shall be protected with noncombustible protection with a minimum assigned time of 40 minutes, as determined in Table 722.7.1(1). Components of the exterior wall covering shall be of noncombustible material except water resistive barriers having a peak heat release rate of less than 150 kW/m$_2$, a total heat release of less than 20 MJ/m$_2$ and an effective heat of combustion of less than 18 MJ/kg as determined in accordance with ASTM E1354 and having a flame spread index of 25 or less and a smoke-developed index of 450 or less as determined in accordance with ASTM E84 or UL 723. The ASTM E1354 test shall be conducted on specimens at the thickness intended for use, in the horizontal orientation and at an incident radiant heat flux of 50 kW/m$_2$.

602.4.4 Type IV-HT. Type IV-HT (Heavy Timber) construction is that type of construction in which the exterior walls are of noncombustible materials and the interior building elements are of solid wood, laminated heavy timber or structural composite lumber (SCL), without concealed spaces or with concealed spaces complying with Section 602.4.4.3. The minimum dimensions for permitted materials including solid timber, glued-laminated timber, SCL and cross-laminated timber (CLT) and the details of Type IV construction shall comply with the provisions of this section and Section 2304.11. Exterior walls complying with Section 602.4.4.1 or 602.4.4.2 shall be permitted. Interior walls and partitions not less than 1- hour fire-resistance rated or heavy timber conforming with Section 2304.11.2.2 shall be permitted.

Figure 2. IBC requirements for noncombustible protection of Type IV constructions.

According to the IBHS report, “combination of road and fire behavior characteristics created hazardous working conditions for firefighters due to the absence of escape routes, safety zones, and defensible space around buildings. At times, firefighters found themselves in situations where buildings were simply too hazardous to protect and had to be abandoned for their own personal safety.”

Figure 3. Two sequence photos taken by firefighters showing the growth of the fire at a cabin. Photo d has been taken 6 minutes after photo a. Photo credit: Chris Knutsen, Training Captain, Pigeon Forge Fire Department.

Failure to specify that the exterior surface of log wall construction must be noncombustible introduces an inconsistency with heavy timber construction. As currently written it is clear that the code requires heavy timber construction to have a 1-hour fire resistance rating and a noncombustible exterior surface. An incorrect interpretation of Note b in Table 503.1 could imply that log wall construction doesn't require a noncombustible exterior surface. This would be in conflict with how heavy timber (HT) construction is treated.

Fire incident reports indicate that log wall construction does not provide more resistance against fire spread and flame propagation than other heavy timber members such as Glulam beams and CLT panels. It is also clear that log wall construction does not perform better during a wildfire than other exterior wall assemblies that include noncombustible walls.

Based on current requirements in the IBC and by considering available reports on fire performance of heavy timber, mass timber and log wall construction, the proposed changes to Note b in Table 503.1 clarifies that all different construction methods including log wall construction are permitted if they are protected on the exterior side with a noncombustible surface.

Bibliography:

1. Milad Shabanian, 2020, *thermos-mechanical performance of dowelled connections in tall timber structures.* PhD thesis, University of North Carolina at Charlotte.

2. Stephen Quarles, Leon Konz (2016), *Black bear cub fire: March 17, 2013*, Insurance Institute for Business & Home Safety, https://ibhs.org/wp-content/uploads/member_docs/Black-Bear-Cub-Fire-Report_IBHS.pdf

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This code change proposal is administrative cleanup language, with the sole purpose of enhancing code clarity. As a result, the proposal will not have an impact on construction costs, either positively or negatively.

WUIC24-24

WUIC25-24

IWUIC: 503.2.2

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Wildland Urban Interface Code

Revise as follows:

503.2.2 Fire-retardant-treated wood.
Fire-retardant-treated wood shall be labeled ~~identified~~ for exterior use and shall meet the requirements of Section 2303.2 of the *International Building Code*.

Reason: This proposal makes a simple change. Chapter 5 refers in some instances to fire-retardant-treated wood as having to be labeled (sections 504.5 and 505.5) and in some instances as having to be identified (sections 503.2.2, 504.7 and 505.7). This proposal simply provides consistency and changes so that all sections state "labeled". Other proposals deal with sections 504.7 and 505.7.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Provides consistency and does not effext cost in any way.

WUIC25-24

WUIC26-24

IWUIC: 503.2.4

Proponents: David Bueche, Hoover Treated Wood Products (dbueche@frtw.com)

2024 International Wildland Urban Interface Code

Revise as follows:

503.2.4 Ignition-resistant building material.
Material shall be tested on the front and back faces in accordance with the extended ASTM E84 or UL 723 test, for a total test period of 30 minutes, or with the ASTM E2768 test. The materials shall bear identification showing the fire test results. Panel products shall be tested with a ripped or cut longitudinal gap of $^{1}/_{8}$ inch (3.2 mm). The materials, when tested in accordance with the test procedures set forth in ASTM E84 or UL 723 for a test period of 30 minutes, or with ASTM E2768, shall comply with Sections 503.2.4.1 through 503.2.4.3. <u>The use of paints, coating, stains, or other surface treatments is not an approved method of protection as required in this section.</u>

> **Exception:** Materials composed of a combustible core and a noncombustible exterior covering made from either aluminum at a minimum 0.019 inch (0.48 mm) thickness or corrosion-resistant steel at a minimum 0.0149 inch (0.38 mm) thickness shall not be required to be tested with a ripped or cut longitudinal gap.

Reason: Efforts are being made by manufacturers seeking approval for painted, coated, stains, or other surface-treated wood that require continuous maintenance in lieu of ignition-resistant building materials. This proposed addition will clarify that paints, coating, stains, and other types of products with vulnerable surface coatings are not approved for use as ignition-resistant building materials in the wildland-urban interface (WUI).

This language already exists in the International Building Code in Section 2303.2.2 for fire-retardant-treated wood (FRTW), which is one of the categories of ignition-resistant building materials in IWUIC (503.2.2). It is also in the 2021 IRC, Section R802.1.5.2. This language is in NFPA 1140 Standard for Wildland Fire Protection for FRTW and is also in Chapters 7A and 23 of the California Building Code.

Finally, note that the required testing referenced in 503.2#1 would require ignition-resistant building materials to undergo the same testing as FRTW.

Adding this proposed language to 503.2 adds clarity and conformity to codes affecting WUI communities and ensures that any ignition-resistant material will perform as well as FRTW.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The code is silent on use of coatings and clarification is important.

WUIC26-24

WUIC27-24

IWUIC: SECTION 202 (New), 504.2, 504.2.1 (New), 504.8, 505.2, 505.2.1 (New), 505.8, 506.2, 506.2.1 (New), 506.5 (New), NFPA (New), UL Chapter 07 (New)

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Wildland Urban Interface Code

Add new definition as follows:

EXTERIOR GLAZED DOOR. An operable opening in the building envelope that contains fixed glazing.

Revise as follows:

504.2 Roof assembly.
Roofs shall have a *roof assembly* that complies with a Class A rating when tested in accordance with ASTM E108 or UL 790. For *roof assemblies* where the profile allows a space between the *roof covering* and *roof deck*, the space at the eave ends shall be fire-stopped to preclude entry of flames or embers or have one layer of 72-pound (32.4 kg) mineral-surfaced, nonperforated cap sheet complying with ASTM D3909 installed over the combustible *roof deck*.

Exceptions:

1. Class A *roof assemblies* include those with coverings of brick, masonry or an exposed concrete *roof deck*.
2. Class A *roof assemblies* also include ferrous or copper shingles or sheets, metal sheets and shingles, clay or concrete roof tile or slate installed on noncombustible decks or ferrous, copper or metal sheets installed without a *roof deck* on noncombustible framing.
3. Class A *roof assemblies* include minimum 16 oz/sq ft (0.0416 kg/m^2) copper sheets installed over combustible *roof decks*.

Add new text as follows:

504.2.1 Skylights. Skylights, including tubular daylighting devices and sloped glazing shall comply with Section 504.8.

Revise as follows:

504.8 Exterior glazing.
Exterior windows, window walls and *exterior glazed doors* ~~glazed door~~ having a glazed area of 25 percent or greater of the door area, windows within exterior doors, and skylights shall be ~~tempered glass,~~ one of the following:
1. Multilayered ~~*multilayered*~~ *glazed panels* containing at least one tempered pane or dome~~,~~; or
2. Glass ~~glass~~ block units; or
3. Have ~~have~~ a minimum fire protection rating of ~~not less than~~ 20 minutes when tested in accordance with NFPA 257 or UL 9, and shall be exempt from the hose stream test..

505.2 Roof assembly.
Roofs shall have a *roof assembly* that complies with not less than a Class A rating when tested in accordance with ASTM E108 or UL 790, or an *approved noncombustible roof covering*. For *roof assemblies* where the profile allows a space between the *roof covering* and *roof deck*, the space at the eave ends shall be fire-stopped to preclude entry of flames or embers, or have one layer of cap sheet complying with ASTM D3909 installed over the combustible *roof deck*.

Add new text as follows:

505.2.1 Skylights. Skylights, including tubular daylighting devices and sloped glazing shall comply with section 505.8.

Revise as follows:

505.8 Exterior glazing.
Exterior windows, window walls and ~~glazed doors~~ *exterior glazed doors* having 25 percent or greater of the door area, windows within exterior doors, and skylights shall be ~~tempered glass,~~ one of the following:
1. *Multilayered* ~~*multilayered*~~ *glazed panels* *containing at least one tempered panel or dome*~~,~~ ; or
2. Glass ~~glass~~ block units; or
3. Have ~~have~~ a fire protection rating of ~~not less than~~ 20 minutes when tested in accordance with NFPA 257 or UL 9, and shall be exempt from the hose stream test..

506.2 Roof assembly.
Roofs shall have a *roof assembly* that complies with not less than a Class B rating when tested in accordance with ASTM E108 or UL 790 or an *approved noncombustible roof covering*. For *roof assemblies* where the profile allows a space between the *roof covering* and *roof deck*, the space at the eave ends shall be fire-stopped to preclude entry of flames or embers, or have one layer of cap sheet complying with ASTM D3909 installed over the combustible *roof deck*.

Add new text as follows:

506.2.1 Skylights. Skylights, including tubular daylighting devices and sloped glazing shall comply with section 506.5.

506.5 Exterior Glazing. Exterior windows, window walls and e*xterior glazed doors* having a glazed area of 25 percent or greater of the door area, windows within exterior doors, and skylights shall be one of the following:

1. *Multilayered glazed panels* contain at least one tempered pane; or
2. Glass block units; or
3. Have a minimum fire protection rating of 20 minutes when tested in accordance with NFPA 257 or UL 9, and shall be exempt from the hose stream test.

Add new standard(s) as follows:

NFPA

National Fire Protection Association
1 Batterymarch Park
Quincy, MA 02169-7471

257-2022	Standard on Fire Test for Window and Glass Block Assemblies

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062-2096

9-2009	Fire Tests of Window Assemblies, with Revisions through March 2020

Staff Analysis: The proposed referenced standards, are currently referenced in the ***IBC***:

- ***Standard on Fire Test for Window and Glass Block Assemblies (NFPA 257-22)***
- ***Fire Tests of Window Assemblies--with Revisions through March 2020 (UL 9--2009)***

Reason: This proposal provides a definition for “exterior glazed door” to clearly explain this is an exterior door with fixed glazing, commonly referred to as a door lite. Within the Class fire-ignition requirements, the minimum percentage of glazing that would trigger certain requirements is then provided in the sections 504.8, 505.8 and 506.8. Fixed glazing relates to the glazing itself and does not imply that the door is not operable. Further, a glazed door includes various types of doors, including sliding glass doors, side hinged doors, or folding door systems.

In all WUI classes of construction, this proposed requires a least one pane of tempered glass, which has been shown to be effective in the performance to resist fire intrusion. It also adds the NFPA 257 and UL 9 when testing to the fire protection rating but for exempting the hose stream test, which is also exempted in the IBC. The markings to determine NFPA or UL compliance are found within the IBC. The proposal then adds the same exterior glazing requirements Class 3 WUI construction, which currently has no exterior glazing requirements.

The remaining editorial changes are intended to provide needed clarity to prevent misinterpretations of what is required. Those changes are as follows:

1. Adds a pointer under roof assembly for skylights, tubular daylighting devices and sloped glazing, in order to prevent any confusion that these products fall under roof assembly compliance.

2. Makes formatting edits to the exterior glazing sections so it is clear that one of the three options must be chosen.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: Increase

Estimated Immediate Cost Impact:

Eliminating the option of allowing single-pane tempered that has been in the IWUIC since 2003, will increase costs for manufacturers shifting to provide multilayered glazed panels with at least one tempered pane. Multilayered glazed panels are readily available in the industry and being installed to meet other code requirements. However, this proposal will increase the cost per lite of glass (minimum of on tempered pane); and, when that cost is aggregated to the overall cost of the window, it is estimated to be at least 20% more than annealed glass and the actual cost depends on the size and complexity of the fenestration project.

Further, multilayered glazed panels (i.e. insulating glazing), with at least one tempered pane is a makeup that is not designed for meeting full safety glazing requirements in hazardous locations. This new makeup for the IWUIC is available from only some manufacturers that have been meeting California Code requirements for the last five California code cycles.

The proposal provides for options to meet the exterior glazing requirements laid out. If the NFPA or UL testing option is chosen, there will be an increase in cost associated with this testing because it is not currently a common approach that manufacturers utilize.

Estimated Immediate Cost Impact Justification (methodology and variables):

For manufacturers who have not been manufacturing product for California requirements, the cost will be higher to comply with multilayered glazed panels with at least one tempered pane than for those manufacturers who have been producing this product at a greater rate for California compliance.

One of the options to meet the exterior glazing requirements will be an increase in cost for manufacturers to proceed with the testing to either the UL or NFPA standard; however, many may choose to utilize the other options that are currently in the IWUIC, eliminating that cost increase.

WUIC27-24

WUIC28-24

IWUIC: SECTION 202 (New), 504.2.1 (New), 504.8, 505.2.1 (New), 505.8, 506.2.1 (New), 506.5 (New), NFPA (New), UL Chapter 07 (New)

Proponents: Jennifer Hatfield, J. Hatfield & Associates, Fenestration & Glazing Industry Alliance (formerly AAMA) (jen@jhatfieldandassociates.com); Cesar Lujan, Window & Door Manufacturers Association (clujan@wdma.com)

2024 International Wildland Urban Interface Code

Add new definition as follows:

GLAZED DOOR. Exterior door having a glazed area of 25 percent or greater of the area of the door.

Add new text as follows:

504.2.1 Skylights. Skylights, including tubular daylighting devices and sloped glazing shall comply with Section 504.8

Revise as follows:

504.8 Exterior glazing.
Exterior windows, window walls and glazed doors, windows within exterior doors, and skylights shall be one of the following: ~~tempered glass, *multilayered glazed panels*, glass block or have a fire protection rating of not less than 20 minutes.~~

1. *Multilayered glazed panels* containing at least one tempered pane.
2. Glass block units.
3. Have a fire protection rating of not less than 20 minutes when tested in accordance with NFPA 257 or UL 9, and shall be exempt from the hose stream test.

Add new text as follows:

505.2.1 Skylights. Skylights, including tubular daylighting devices and sloped glazing shall comply with Section 505.8

Revise as follows:

505.8 Exterior glazing.
Exterior windows, window walls and *glazed doors*, windows within exterior doors, and skylights shall be one of the following: ~~tempered glass, *multilayered glazed panels*, glass block or have a fire protection rating of not less than 20 minutes.~~

1. *Multilayered glazed panels* containing at least one tempered pane.
2. Glass block units.
3. Have a fire protection rating of not less than 20 minutes when tested in accordance with NFPA 257 or UL 9, and shall be exempt from the hose stream test.

Add new text as follows:

506.2.1 Skylights. Skylights, including tubular daylighting devices and sloped glazing shall comply with Section 506.5.

506.5 Exterior glazing. Exterior windows, window walls and *glazed doors*, windows within exterior doors, and skylights shall be one of the following:

1. *Multilayered glazed panels* containing at least one tempered pane.

2. Glass block units.

3. Have a fire protection rating of not less than 20 minutes when tested in accordance with NFPA 257 or UL 9, and shall be exempt from the hose stream test.

Add new standard(s) as follows:

NFPA

National Fire Protection Association
1 Batterymarch Park
Quincy, MA 02169-7471

257--22	Standard on Fire Test for Window and Glass Block Assemblies

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062-2096

9--2009	Fire Tests of Window Assemblies--with Revisions through March 2020

Staff Analysis: The proposed referenced standards, are currently referenced in the IBC:

- ***Standard on Fire Test for Window and Glass Block Assemblies (NFPA 257-22)***
- ***Fire Tests of Window Assemblies--with Revisions through March 2020 (UL 9--2009)***

Reason: This proposal adds a definition for a glazed door in order to provide needed clarity and consistency in what is considered a glazed door, for the purposes of the exterior glazing requirements found in Class 1 and 2, as well as the new Class 3 requirements being proposed. This definition stems from the California Code.

In Class 1 and 2 ignitition-resistant construction, this proposed change eliminates a single pane tempered glass, which has been shown to not be as effective in fire barrier performance. It also adds the NFPA 257 Standard on Fire Test for Window and Glass Block Assemblies and UL 9 Fire Tests of Window Assemblies Standard when testing to the fire protection rating, but for exempting the hose stream test that is included in both standards. The hose stream test is also exempted in section 716.2.5.3 of the IBC. The markings to determine NFPA or UL compliance are found within the IBC, as both of these standards are already referenced and utilized in the IBC.

The proposal then adds the same revised exterior glazing requirements for Class 1 and 2 to Class 3 ignitition-resistant construction, which currently has no exterior glazing requirements. These Class revisions stem from the California Building and Residential Code and requirements in their Wildland Urban Interface Chapter.

The remaining changes are intended to provide needed clarity to prevent misinterpretations of what is required. Those changes are as follows:

- Adds a new subsection under Class 1, 2 and 3 roof assembly sections for skylights, tubular daylighting devices and sloped glazing. This pointer is to prevent any confusion that these products fall under roof assembly compliance.
- Makes formatting edits to the exterior glazing sections so it is clear that ONE of the now three options must be chosen.

Cost Impact: Increase

Estimated Immediate Cost Impact:

Eliminating the option of allowing single-pane tempered that has been in the IWUIC sine 2003, will increase the costs for manufacturers shifting to provide multilayered glazed panels with at least one tempered pane. However, multilayered glazed panels are readily available in the industry and being installed to meet other code requirements. This proposal will increase the cost per lite of glass (minimum of one tempered pane); and, when that cost is aggregated to the overall cost of the window, it is estimated to be at least 20% more than annealed glass and the actual cost depends on the size and complexity of the fenestration project.

Further, multilayered glazed panels (i.e. insulating glazing), with at least one tempered pane is a makeup that is not designed for meeting full safety glazing requirements in hazardous locations. This new makeup for the IWUIC is available from only some manufacturers that have been meeting California Code requirements for the last five California code cycles.

The proposal provides for options to meet the exterior glazing requirements laid out. If the NFPA standard or UL standard testing option is chosen, there will be an increase in cost associated with this testing because it is not currently a common approach that manufacturers utilize.

Estimated Immediate Cost Impact Justification (methodology and variables):

For manufacturers who have not been manufacturing product for California requirements, the cost will be higher to comply with multilayered glazed panels with at least one tempered pane than for those manufacturers who have been producing this product at a greater rate for California compliance.

One of the options to meet the exterior glazing requirements will be an increase in cost for manufacturers to proceed with the testing to either the UL 9 or NGPA 257 standard; however, many may choose to utilize the other options that are currently in the IWUIC, eliminating that cost increase.

WUIC28-24

WUIC29-24

IWUIC: 504.2.1, 505.2.1, 506.2.1

Proponents: Aaron Phillips, Asphalt Roofing Manufacturers Association (ARMA), Asphalt Roofing Manufacturers Association (aphillips@asphaltroofing.org)

2024 International Wildland Urban Interface Code

Revise as follows:

504.2.1 Roof valleys.
Where provided, valley flashings shall run the full length of the valley and be not less than 0.019 inch (0.48 mm) (No. 26 galvanized sheet gage) corrosion-resistant metal installed over a minimum 36-inch-wide (914 mm) underlayment consisting of one layer of 72-pound (32.4 kg) mineral-surfaced, nonperforated cap sheet complying with ASTM D3909 or a *roof assembly* classified as Class A when tested in accordance with ASTM E108 or UL 790~~running the full length of the valley~~.

505.2.1 Roof valleys.
Where provided, valley flashings shall run the full length of the valley and be not less than 0.019-inch (0.48 mm) (No. 26 galvanized sheet gage) corrosion-resistant metal installed over a minimum 36-inch-wide (914 mm) underlayment consisting of one layer of 72-pound (32.4 kg) mineral-surfaced, nonperforated cap sheet complying with ASTM D3909 or a *roof assembly* classified as Class A when tested in accordance with ASTM E108 or UL 790 ~~running the full length of the valley~~.

506.2.1 Roof valleys.
Where provided, valley flashings shall run the full length of the valley and be not less than 0.019-inch (0.44 mm) (No. 26 galvanized sheet gage) corrosion-resistant metal installed over a minimum 36-inch-wide (914 mm) underlayment consisting of one layer of 72-pound (32.4 kg) mineral-surfaced, nonperforated cap sheet complying with ASTM D3909 or a *roof assembly* classified as not less than Class B when tested in accordance with ASTM E108 or UL 790~~running the full length of the valley~~.

Reason: Currently, the IWUIC provides only one prescriptive option for constructing roof valleys. The existing prescriptive valley flashing requirement is restrictive and may present long-term issues with function of the installed valley due to abrasion of the corrosion resistant valley metal by granules on the underlying D3909 sheet. The proposal retains the existing option and introduces a performance option which permits a valley to be constructed with an ASTM E108 or UL 790 classified roof assembly equivalent to that required for the roof assembly used in the field of the roof, based on the ignition resistant construction class.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0 or less. The proposal may reduce initial cost of construction in some cases by providing additional options for valley construction.

Estimated Immediate Cost Impact Justification (methodology and variables):

Analogy method. Availability of additional options supports choice.

Estimated Life Cycle Cost Impact:

No change in life cycle cost is anticipated.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

Analogy method. Service life of the alternative valley is expected to equal or exceed that of the existing prescriptive option.

WUIC29-24

WUIC30-24

IWUIC: 504.2, 504.2.2 (New), 505.2, 505.2.2 (New), 506.2, 506.2.2 (New)

Proponents: Aaron Phillips, Asphalt Roofing Manufacturers Association (ARMA), Asphalt Roofing Manufacturers Association (aphillips@asphaltroofing.org)

2024 International Wildland Urban Interface Code

Revise as follows:

504.2 Roof assembly.
Roofs shall have a *roof assembly* that complies with a Class A rating when tested in accordance with ASTM E108 or UL 790. ~~For *roof assemblies* where the profile allows a space between the *roof covering* and *roof deck*, the space at the eave ends shall be firestopped to preclude entry of flames or embers or have one layer of 72-pound (32.4 kg) mineral-surfaced, nonperforated cap sheet complying with ASTM D3909 installed over the combustible *roof deck*.~~

Exceptions:

1. Class A *roof assemblies* include those with coverings of brick, masonry or an exposed concrete *roof deck*.
2. Class A *roof assemblies* ~~also~~ include ferrous or copper shingles or sheets, metal sheets and shingles, clay or concrete roof tile or slate installed on noncombustible decks or ferrous, copper or metal sheets installed without a *roof deck* on noncombustible framing.
3. Class A *roof assemblies* include minimum 16 oz/sq ft (0.0416 kg/m^2) copper sheets installed over combustible *roof decks*.

Add new text as follows:

504.2.2 Flame and ember protection at eaves. For *roof assemblies* where the profile allows a space between the *roof covering* and *roof deck*, the space at the eave ends shall resist flames and embers by one or more of the following methods:

1. Firestopping of the space between the *roof covering* and the *roof deck.*
2. Installation of one layer of 72 pound (32.4 kg) mineral-surfaced, nonperforated cap sheet complying with ASTM D3909 over the combustible *roof deck*.

Revise as follows:

505.2 Roof assembly.
Roofs shall have a *roof assembly* that complies with not less than a Class A rating when tested in accordance with ASTM E108 or UL 790, or an *approved noncombustible roof covering*. ~~For *roof assemblies* where the profile allows a space between the *roof covering* and *roof deck*, the space at the eave ends shall be firestopped to preclude entry of flames or embers, or have one layer of cap sheet complying with ASTM D3909 installed over the combustible *roof deck*.~~

Add new text as follows:

505.2.2 Flame and ember protection at eaves. For *roof assemblies* where the profile allows a space between the *roof covering* and *roof deck*, the space at the eave ends shall resist flames and embers by one or more of the following methods:

1. Firestopping of the space between the *roof covering* and the *roof deck.*
2. Installation of one layer of cap sheet complying with ASTM D3909 over the combustible *roof deck*.

Revise as follows:

506.2 Roof assembly.

Roofs shall have a *roof assembly* that complies with not less than a Class B rating when tested in accordance with ASTM E108 or UL 790 or an *approved noncombustible roof covering*. ~~For *roof assemblies* where the profile allows a space between the *roof covering* and *roof deck*, the space at the eave ends shall be firestopped to preclude entry of flames or embers, or have one layer of cap sheet complying with ASTM D3909 installed over the combustible *roof deck*.~~

Add new text as follows:

506.2.2 Flame and ember protection at eaves. For *roof assemblies* where the profile allows a space between the *roof covering* and the *roof deck*, the space at the eave ends shall resist flames and embers by one or more of the following methods:

1. Firestopping of the space between the *roof covering* and the *roof deck*.
2. Installation of one layer of cap sheet complying with ASTM D3909 over the combustible *roof deck*.

Reason: As currently configured, roof assembly sections 504.2, 505.2, and 506.2 include two distinct provisions. The first is a requirement for a roof assembly classified as Class A. The second offers two options for addressing flame and ember entry at eaves when the roof covering profile has a space between the roof covering and the roof deck. Including both these requirements in the same section is potentially confusing. In the case of 504.2, these two distinct provisions are followed by a list of exceptions. The exceptions are intended to apply solely to the first provision, i.e., a Class A roof assembly classification. However, based on the current construction of Section 504.2, the exceptions could be interpreted as applying to the second provision as well, which is not the intent.

This proposal places the second provision from 504.2, 505.2, and 506.2 into new subsections for flame and ember protection at eaves. The new subsections incorporate a numbered list of options which can be expanded if other approaches for eave protection are developed. As a final, minor cleanup, an unnecessary "also" is removed from the list of exceptions in section 504.2.

Please note that the discrepancy in the description of D3909 product between existing sections 505.2/506.2 and 504.2 is addressed in a separate proposal. If that separate proposal is successful, the desire is for ICC staff to carry the change to 504.2 offered in that proposal forward into new section 504.2.2 of this proposal.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal rearranges and clarifies existing provisions without an intent to make technical changes. Therefore, no change in construction cost is anticipated if this proposal is approved.

WUIC30-24

WUIC31-24

IWUIC: 504.2

Proponents: Mark S. Graham, National Roofing Contractors Association (NRCA) (mgraham@nrca.net)

2024 International Wildland Urban Interface Code

Revise as follows:

504.2 Roof assembly.
Roofs shall have a *roof assembly* that complies with a Class A rating when tested in accordance with ASTM E108 or UL 790. For *roof assemblies* where the profile allows a space between the *roof covering* and *roof deck*, the space at the eave ends shall be firestopped to preclude entry of flames or embers or have one layer of ~~72-pound (32.4 kg) mineral-surfaced, nonperforated~~ cap sheet complying with ASTM D3909 installed over the combustible *roof deck*.

Exceptions:

1. Class A *roof assemblies* include those with coverings of brick, masonry or an exposed concrete *roof deck*.
2. Class A *roof assemblies* also include ferrous or copper shingles or sheets, metal sheets and shingles, clay or concrete roof tile or slate installed on noncombustible decks or ferrous, copper or metal sheets installed without a *roof deck* on noncombustible framing.
3. Class A *roof assemblies* include minimum 16 oz/sq ft (0.0416 kg/m^2) copper sheets installed over combustible *roof decks*.

Reason: This code change proposal is intended to clarify the existing code and facilitate compliance and enforcement.

The designation "72-pound (32.4 kg)..." is proposed to be struck here as it is an outdated nominal designator for the product already designated product standard, ASTM D3909. ASTM D3909's Table 1-Dimensinons and Masses of Asphalt Roll Roofing (Glass Felt) Surfaced with Mineral Granules," provides minimum average mass per roll and minimum mass per unit area of mineral granule-surfaced cap sheet. Products complying with ASTM D3909 are required to be labeled with the ASTM D3909 designation to assist in identifying the product and enforcement.

Identifying this product by its ASTM designation and not its outdated nominal designation has already been incorporated into Section 504.2.1-Roof Valleys, Section 505.2-Roof Assembly, Section 505.2.1-Roof Valleys, Section 506.2-Roof Assembly and Section 506.2.1-Roof Valleys.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal removes an outdated nominal product designator and does not increase or decrease the stringency of the code.

WUIC31-24

WUIC32-24

IWUIC: 504.2, 504.2.1, 505.2.1, 506.2.1

Proponents: Aaron Phillips, Asphalt Roofing Manufacturers Association (ARMA), Asphalt Roofing Manufacturers Association (aphillips@asphaltroofing.org)

2024 International Wildland Urban Interface Code

Revise as follows:

504.2 Roof assembly.
Roofs shall have a *roof assembly* that complies with a Class A rating when tested in accordance with ASTM E108 or UL 790. For *roof assemblies* where the profile allows a space between the *roof covering* and *roof deck*, the space at the eave ends shall be firestopped to preclude entry of flames or embers or have one layer of ~~72-pound (32.4 kg) mineral-surfaced, nonperforated~~cap sheet complying with ASTM D3909 installed over the combustible *roof deck*.

Exceptions:

1. Class A *roof assemblies* include those with coverings of brick, masonry or an exposed concrete *roof deck*.
2. Class A *roof assemblies* also include ferrous or copper shingles or sheets, metal sheets and shingles, clay or concrete roof tile or slate installed on noncombustible decks or ferrous, copper or metal sheets installed without a *roof deck* on noncombustible framing.
3. Class A *roof assemblies* include minimum 16 oz/sq ft (0.0416 kg/m^2) copper sheets installed over combustible *roof decks*.

504.2.1 Roof valleys.
Where provided, valley flashings shall be not less than 0.019 inch (0.48 mm) (No. 26 galvanized sheet gage) corrosion-resistant metal installed over a minimum 36-inch-wide (914 mm) underlayment consisting of one layer of ~~72-pound (32.4 kg) mineral-surfaced, nonperforated~~ cap sheet complying with ASTM D3909 running the full length of the valley.

505.2.1 Roof valleys.
Where provided, valley flashings shall be not less than 0.019-inch (0.48 mm) (No. 26 galvanized sheet gage) corrosion-resistant metal installed over a minimum 36-inch-wide (914 mm) underlayment consisting of one layer of ~~72-pound (32.4 kg) mineral-surfaced, nonperforated~~ cap sheet complying with ASTM D3909 running the full length of the valley.

506.2.1 Roof valleys.
Where provided, valley flashings shall be not less than 0.019-inch (0.44 mm) (No. 26 galvanized sheet gage) corrosion-resistant metal installed over a minimum 36-inch-wide (914 mm) underlayment consisting of one layer of ~~72-pound (32.4 kg) mineral-surfaced, nonperforated~~ cap sheet complying with ASTM D3909 running the full length of the valley.

Reason: The provisions for roof valleys in sections 504.2.1, 505.2.1, and 506.2.1 were added into the 2009 IWUIC through action by the California Office of the State Fire Marshal (WUIC22-06/07, WUIC32-06/07, and WUIC45-06/07). The sections 504.2, 505.2, and 506.2 provisions for use of a D3909 product as an eave protection for roof coverings with a space between the roof covering and the roof deck were added into the 2009 IWUIC by the same proponent (WUIC21-06/07, WUIC31-06/07, and WUIC44-06/07). In all cases, the original proposals were modified by the Committee to change the description from "No. 72 ASTM cap sheet" to "72 pound (32.4 kg) mineral-surfaced, nonperforated cap sheet complying with ASTM D3909." It appears the intent of the Committee was to replace a generic description of an acceptable material with a reference to an ASTM standard specification. Unfortunately, the generic "No. 72" reference of the original proposal was transformed into a requirement for a "72-pound" product, which may conflict with the weight limits contained in ASTM D3909.

ASTM D3909 sets a minimum mass per unit area of the granule-surfaced product at 63.2 lbs/100 square feet. It further requires an average mass per roll of 68 lbs/108 square feet for products with a 2-inch selvage width, 69 lbs/108 square feet for products with no selvage, and 70 lbs/114 square feet for products with a 4-inch selvage. These requirements were in place when the standard was added in these sections of the 2009 IWUIC and remains the same in the current edition of D3909.

The IWUIC requirement that D3909 products used for either valley lining or eave protection be exactly 72 pounds resulted from the transformation of the original proponent's "No. 72" to "72-pound." The code development record provides no technical substantiation for the weight requirement in addition to D3909 compliance to function effectively as either a valley lining or an eave protection material. In fact, presence of the "72 pound" requirement makes compliance with these provisions unlikely if interpreted literally, since 72 pounds is established as an absolute value instead of a minimum or maximum.

During the cycle which generated the 2021 IWUIC, the Committee modified proposals WUIC11-18 and WUIC16-18 to strike the phrase "72 pound (32.4 kg) mineral-surfaced, nonperforated" from sections 505.2 and 506.2, respectively. During that cycle, there were no proposals which included sections 504.2, 504.2.1, 505.2.1, or 506.2.1, so the Committee had no opportunity to make the same change in those sections for D3909. This proposal provides an opportunity to remove the weight limit associated with use of D3909 product.

In addition to removing the prescription that acceptable D3909 products be exactly 72 pounds, this proposal removes the unnecessary descriptive language "mineral-surfaced, nonperforated" to align with the changes to 505.2 and 506.2 which were made in the prior cycle. Products which comply with D3909 are mineral-surfaced and are nonperforated.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal may be seen as not strictly editorial, since it removes an existing weight requirement that is in addition to compliance with ASTM D3909. The absence of an area associated with the current weight requirement makes a comparison of the effect of its removal on construction cost challenging. The expectation, based on review of several products present in the market, is that removal of the current weight provision will not cause significant changes in available products. No change in installation costs should occur.

WUIC32-24

WUIC33-24

IWUIC: 504.2, 505.2, 506.2, TABLE C101.1; IFC: 1207.9.5

Proponents: Aaron Phillips, Asphalt Roofing Manufacturers Association (ARMA), Asphalt Roofing Manufacturers Association (aphillips@asphaltroofing.org)

2024 International Wildland Urban Interface Code

Revise as follows:

504.2 Roof assembly.
Roofs shall have a *roof assembly* ~~that complies with a~~ <u>classified as</u> Class A ~~rating~~ when tested in accordance with ASTM E108 or UL 790. For *roof assemblies* where the profile allows a space between the *roof covering* and *roof deck*, the space at the eave ends shall be firestopped to preclude entry of flames or embers or have one layer of 72-pound (32.4 kg) mineral-surfaced, nonperforated cap sheet complying with ASTM D3909 installed over the combustible *roof deck*.

Exceptions:

1. Class A *roof assemblies* include those with coverings of brick, masonry or an exposed concrete *roof deck*.
2. Class A *roof assemblies* also include ferrous or copper shingles or sheets, metal sheets and shingles, clay or concrete roof tile or slate installed on noncombustible decks or ferrous, copper or metal sheets installed without a *roof deck* on noncombustible framing.
3. Class A *roof assemblies* include minimum 16 oz/sq ft (0.0416 kg/m^2) copper sheets installed over combustible *roof decks*.

505.2 Roof assembly.
Roofs shall have a *roof assembly* ~~that complies withnot less than a~~ <u>classified as</u> Class A ~~rating~~ when tested in accordance with ASTM E108 or UL 790, or an *approved noncombustible roof covering*. For *roof assemblies* where the profile allows a space between the *roof covering* and *roof deck*, the space at the eave ends shall be firestopped to preclude entry of flames or embers, or have one layer of cap sheet complying with ASTM D3909 installed over the combustible *roof deck*.

506.2 Roof assembly.
Roofs shall have a *roof assembly* ~~that complies with~~ <u>classified as</u> not less than ~~a~~ Class B ~~rating~~ when tested in accordance with ASTM E108 or UL 790 or an *approved noncombustible roof covering*. For *roof assemblies* where the profile allows a space between the *roof covering* and *roof deck*, the space at the eave ends shall be firestopped to preclude entry of flames or embers, or have one layer of cap sheet complying with ASTM D3909 installed over the combustible *roof deck*.

TABLE C101.1 FIRE HAZARD SEVERITY FORM

A. Subdivision Design Points	
1. Ingress/Egress	
Two or more primary roads	1___
One road	3___
One-way road in, one-way road out	5___
2. Width of Primary Road	
20 feet (6096 mm) or more	1___
Less than 20 feet (6096 mm)	3___
3. Accessibility	
Road grade 5% or less	1___
Road grade more than 5%	3___

4. Secondary Road Terminus	
Loop roads, cul-de-sacs with an outside turning radius of 45 feet (13 716 mm) or greater	1___
Cul-de-sac turnaround	2___
Dead-end roads 200 feet (60 960 mm) or less in length	3___
Dead-end roads greater than 200 feet (60 960 mm) in length	5___
5. Street Signs	
Present	1___
Not present	3___
B. Vegetation (IWUIC Definitions)	
1. Fuel Types	
Light	1___
Medium	5___
Heavy	10___
2. Defensible Space	
70% or more of site	1___
30% or more, but less than 70% of site	10___
Less than 30% of site	20___
C. Topography	
8% or less	1___
More than 8%, but less than 20%	4___
20% or more, but less than 30%	7___
30% or more	10___
D. Roofing Material	
Class A Fire Classification~~Rated~~	1___
Class B Fire Classification~~Rated~~	5___
Class C Fire Classification~~Rated~~	10___
Nonrated	20___
E. Fire Protection—Water Source	
500 GPM (1892.5 L/min) hydrant within 1,000 feet (304.8 m)	1___
Hydrant farther than 1,000 feet (304.8 m) or draft site	2___
Water source 20 min. or less, round trip	5___
Water source farther than 20 min., and 45 min. or less, round trip	7___
Water source farther than 45 min., round trip	10___
F. Existing Building Construction Materials	
Noncombustible siding/deck	1___
Noncombustible siding/combustible deck	5___
Combustible siding and deck	10___

G. Utilities (gas and/or electric)	
All underground utilities	1___
One underground, one above ground	3___
All above ground	5___
Total for Subdivision	
Moderate Hazard	40–59
High Hazard	60–74
Extreme Hazard	75+

2024 International Fire Code

Revise as follows:

1207.9.5 Rooftop installations.
ESS and associated equipment that are located on rooftops and not enclosed by building construction shall comply with the following:

1. Stairway access to the roof for emergency response and fire department personnel shall be provided either through a bulkhead from the interior of the building or a stairway on the exterior of the building.
2. Service walkways at least 5 feet (1524 mm) in width shall be provided for service and emergency personnel from the point of access to the roof to the system.
3. ESS and associated equipment shall be located from the edge of the roof a distance equal to at least the height of the system, equipment or component but not less than 5 feet (1524 mm).
4. The roofing materials under and within 5 feet (1524 mm) horizontally from an ESS or associated equipment shall be noncombustible or shall be ~~have~~ a Class A *roof assembly* ~~rating~~ when tested in accordance with ASTM E108 or UL 790.
5. A Class I standpipe outlet shall be installed at an *approved* location on the roof level of the building or in the stairway bulkhead at the top level.
6. The ESS shall be the minimum of 10 feet (3048 mm) from the fire service access point on the rooftop. [material based on NFPA 855 (2023)]

Reason: ASTM E108 or UL 790 tests are performed on *roof assemblies* to establish a classification (Class A, B, or C) based on exposure to simulated fire sources originating outside the building. The outcome of the test is a classification of the roof assembly. In contrast, ASTM E119 or UL 263 tests evaluate the duration for which building elements contain a fire, retain their structural integrity, or exhibit both properties during a predetermined test exposure. The result of these tests is expressed as a *fire resistance rating.*

This proposal adjusts language in several sections to clarify the distinction between these important fire tests. Specifically, it corrects cases where E108 or UL 790 tests results are characterized as a "rating" by changing those instances to "classified" or "classification." In IFC Section 1207.9.5, proposed changes remove the description of E108/UL 790 test results as a rating and recognize that an E108/UL 790 fire classification is applicable to the *roof assembly* instead of the roof materials.

As a minor cleanup, the phrase "not less than" is removed from 505.2, because there are no E108/UL790 classifications greater than Class A.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This change corrects language used to describe ASTM E108 or UL 790 test results without making any technical change to existing language. No impact on cost of construction should occur.

WUIC33-24

WUIC34-24

IWUIC: 504.5, 505.5

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Wildland Urban Interface Code

Revise as follows:

504.5 Exterior walls.
Exterior walls of buildings or structures shall be constructed with one of the following methods:

1. Materials *approved* for not less than 1-hour *fire-resistance-rated construction* on the exterior side.
2. *Approved noncombustible* materials.
3. Heavy timber or *log wall construction*.
4. ~~Fire-retardant-treated wood on the exterior side. The fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section 2303.2 of the International Building Code.~~

~~5.~~4. Ignition-resistant building materials complying with Section 503.2 on the exterior side.

Such material shall extend from the top of the foundation to the underside of the roof sheathing.

505.5 Exterior walls.
Exterior walls of buildings or structures shall be constructed with one of the following methods:

1. Materials *approved* for not less than 1-hour *fire-resistance-rated construction* on the exterior side.
2. *Approved noncombustible* materials.
3. *Heavy timber* or *log wall construction*.
4. ~~Fire-retardant-treated wood on the exterior side. The fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section 2303.2 of the International Building Code.~~

~~5~~ 4. Ignition-resistant building materials complying with Section 503.2 on the exterior side.

Such material shall extend from the top of the foundation to the underside of the roof sheathing.

Reason: This proposal addresses the fact that Section 503.2 describes the requirements for “ignition resistant building materials”. Therefore, the important distinction for the requirements on exterior walls is whether the entire assembly (the exterior wall assembly) is addressed or just the exterior side (the exterior wall covering). Therefore, there are four categories of materials to be addressed, namely exterior wall assemblies (materials providing 1 hour fire resistance rating, approved noncombustible materials making up the entire exterior wall assembly, or heavy timber or log wall construction) and exterior wall coverings, as represented by ignition-resistant building materials on the exterior side. Note that the word "building" between "ignition-resistant" and "materials" is missing in comparison with the defined term (also used in Section 503.2).

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is an editorial cleanup. There are no changes in technical requirements.

WUIC35-24

IWUIC: 504.5, 504.5.1 (New), 504.5.1, ASTM Chapter 07 (New)

Proponents: William Koffel, Koffel Associates, Inc., Fire Safe North America (wkoffel@koffel.com)

2024 International Wildland Urban Interface Code

Revise as follows:

504.5 Exterior walls.
Exterior walls of buildings or structures shall be constructed of materials that comply with one or more of the following methods:

1. Materials *approved* for not less than 1-hour *fire-resistance-rated construction* on the exterior side.
2. *Approved noncombustible* materials.
3. Heavy timber or *log wall construction*.
4. Fire-retardant-treated wood on the exterior side. The fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section 2303.2 of the International Building Code.
5. Ignition-resistant materials complying with Section 503.2 on the exterior side.
6. Exterior wall coverings or exterior wall assemblies complying with Section 504.5.1

Such materials shall extend from the top of the foundation to the underside of the roof sheathing.

Add new text as follows:

504.5.1 Flame Propagation and Flame Impingement. *Approved wall coverings* or *exterior wall assemblies* that have been tested in accordance with the test procedures for a 10-minute direct flame contact exposure test set forth in ASTM E2707 meeting the following conditions of acceptance:

1. No flame propagation to the top of the test specimen during the full duration of the test when tested with a modified flame exposure of 75 kW.
2. For *exterior wall assemblies*, no evidence of glowing combustion on the interior surface of the assembly during the full duration of the test.
3. For *exterior wall assemblies*, no evidence of flame penetration through the wall assembly during the full duration of the test.

Revise as follows:

504.5.~~1~~2 Flashing.
A minimum of 6 inches (152 mm) of metal flashing or noncombustible material applied vertically on the exterior of the wall shall be installed at the ground, decking and roof intersections.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428-2959

E2707-22	Standard Test Method for Determining Fire Penetration of Exterior Wall Assemblies Using a Direct Flame Impingement Exposure

Staff Analysis: A review of the standard proposed for inclusion in the code, ***Standard Test Method for Determining Fire Penetration of Exterior Wall Assemblies Using a Direct Flame Impingement Exposure (ASTM E2707-22)***, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: During the last revision cycle, the additional option included in this proposal was proposed to be the mandatory requirement, with some exceptions that recognized the existing five methods. The Committee was not convinced that the existing five methods needed to be changed. Therefore, the flame propagation and flame impingement test approach is being proposed as an additional compliance approach.

The new performance option addresses the potential for flame propagation on an exterior wall. It recognizes the need to evaluate two separate and distinct aspects of fire safety pertaining to exterior walls. The proposed language maintains the provisions that address fire mitigating to the interior of an exterior wall, while adding language that addresses the tendency for flames to spread across the exterior of an exterior wall. The proposed test standard, ASTM E2707, was adopted by the California State Fire Marshal Standard 7A, Materials and Construction Methods for Exterior Wildfire Exposure, that is referenced in the California Building Code. A modified ASTM E2707 test is used to address flame propagation. Testing was conducted both in a 2011 research project conducted at UL, as well as in 2019 and 2020 as part of work being done through the ASTM Committee E05 on Fire Standards. Multiple assemblies have been successfully tested to date, including some with wood and vinyl siding. The UL research report is available at https://fsri.org/research-update/wall-fire-experiments-examine-exterior-fire-spread-changes

It should be noted that Subcommittee ASTM E05.14, External Fire Exposures, is working on a new standard test method to determine fire propagation of exterior wall assemblies using a direct flame. The proposal is consistent with the current draft of the new standard, including reducing the fire exposure from the 100 kW that was proposed last cycle to 75kW. If the new standard is completed in time, it is our intent to revise the proposed language to reference the new ASTM standard.

Bibliography: https://fsri.org/research-update/wall-fire-experiments-examine-exterior-fire-spread-changes

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposal provides an additional compliance option without changing or deleting the existing compliance option.

WUIC35-24

WUIC36-24

IWUIC: SECTION 202 (New), 504.5, 504.5.1 (New), 504.5.2 (New), 504.5.1

Proponents: Milad Shabanian, Insurance Institute for Business & Home Safety (mshabanian@ibhs.org); T. Eric Stafford, Insurance Institute for Business and Home Safety (testafford@charter.net)

2024 International Wildland Urban Interface Code

Add new definition as follows:

EXTERIOR SURFACES. Weather-exposed surfaces.

EXTERIOR WALL. A wall, bearing or nonbearing, that is used as an enclosing wall for a building, other than a fire wall, and that has a slope of 60 degrees (1.05 rad) or greater with the horizontal plane.

Revise as follows:

504.5 Exterior walls.
Where defensible space conforms to the provisions of Section 603, exterior~~Exterior~~ walls of buildings or structures shall be constructed in accordance with Section 504.5.1 or Section 504.5.2.
Where defensible space does not conform to the provisions of Section 603, exterior walls of buildings or structures shall be constructed in accordance with Section 504.5.1 and Section 504.5.2.

Flashing shall be applied in accordance with Section 504.5.3. ~~one of the following methods:~~

1. ~~Materials *approved* for not less than 1-hour *fire-resistance-rated construction* on the exterior side.~~
2. ~~*Approved noncombustible* materials.~~
3. ~~Heavy timber or *log wall construction*.~~
4. ~~Fire-retardant-treated wood on the exterior side. The fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section 2303.2 of the International Building Code.~~
5. ~~Ignition-resistant materials complying with Section 503.2 on the exterior side.~~

~~Such material shall extend from the top of the foundation to the underside of the roof sheathing.~~

Add new text as follows:

504.5.1 Exterior wall assemblies. Exterior wall assemblies of buildings or structures shall have a minimum of 1-hour fire-resistance-rating, rated for exposure on the exterior side in accordance with Section 501.3.
The exposed bottom edge of combustible sheathing shall be protected with noncombustible building material with a minimum assigned protection time of 40 minutes, or the sheathing shall be inset to rest directly on the foundation.

> **Exception:** The bottom edge of exposed combustible sheathing is permitted to be covered with corrosion-resistant metal flashing provided there is an air gap of at least 1 inch between the metal flashing and the bottom edge of the combustible sheathing. Both legs of the flashing shall be attached a maximum of 6 inches (152.4 mm) on center.

504.5.2 Exterior surfaces. The exterior surfaces shall be constructed in accordance with one or more of the followings:

1. Approved noncombustible materials complying with Section 503.2.1.
2. Fire-retardant-treated wood complying with Section 503.2.2.

3. Ignition-resistant building materials complying with Section 503.2.4.

Revise as follows:

~~504.5.1~~ 504.5.3 Flashing.
A minimum of 6 inches (152 mm) of metal flashing or noncombustible material applied vertically on the exterior of the wall shall be installed at the ground, decking and roof intersections.

Reason: Table 503.1 requires the use of Ignition Resistant Construction Class 1 (IR1) in situations where defensible space is nonconforming. In such scenarios during a wildfire, the exterior walls of the structure may be exposed to embers, radiation heat, and direct flame exposures. Accordingly, the exterior wall assembly needs to provide a minimum resistance against these exposures. intermediate-scale, and full-scale experiments performed at the IBHS Research Center illustrate that the current requirements do not provide the needed resistance against wildfire exposures. Section 504.5 provides 5 alternatives for construction of exterior walls:

1. Materials approved for not less than 1-hour fire-resistance-rated (FRR) construction on the exterior side.
2. Approved noncombustible materials.
3. Heavy timber or log wall construction.
4. Fire-retardant-treated wood on the exterior side. The fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section 2303.2 of the International Building Code.
5. Ignition-resistant materials complying with Section 503.2 on the exterior side. According to section 503.2 ignition-resistant materials include the followings: noncombustible, FRTW and IR building materials.

There is a notable inconsistency in the current alternatives for exterior walls of this class of construction, particularly in terms of resistance against fire impingement and flame spread. The first method permits 1-hour FRR construction when tested in accordance with ASTM E119 or UL 263. In this test the wall assembly is tested without a siding material, and it is possible to have 1-hour FRR wall assembly with different combustible siding materials and different rates of flame spread on the exterior surface. Therefore, there is significant risk of fire spreading to other sections of the building, including eaves, roofs, and openings (vents, windows, doors), with less restrictive fire resistance requirements. Figure 1 displays a moment captured during the wind-driven fire spread tests conducted at the IBHS research center at the separation distance of 20 ft. The "source structure" comprises metal and wooden sheds containing 15, 6-A wood cribs (UL 711 standard cribs). The “target structure” is a one-and-a-half-story residential structure featuring an open eave, double-pane tempered windows, and a one-hour-rated exterior wall. The cladding consists of a combination of combustible engineered wood siding material on left side and fiber cement panels on the right. Both structures face a nominal wind speed of 35 mph, and the thermal impact on the target building is observed using heat flux gauges, thermocouples, and cameras. As can be seen in Figure 1, about 10 minutes after a point ignition inside the shed, the target building ignited and within the next few seconds, the fire could spread on the surface causing severing damage to the eaves, vents, and windows. The test was terminated after a minute due to safety reasons. In this test the target structure had 1-hr FRR from exterior. The dark gray siding was fiber cement board (noncombustible siding) while the light gray siding was engineered wood (combustible) siding material.

Figure 1. a. The test setup for wind driven building to building fire spread tests. The target building has an hour fire resistant rated wall assembly.

Figure 1. b. ignition of the combustible siding.

Figure 1. c. fire spread on the surface and flames touching all components in about 10 seconds on left side.

Figure 1. d. after suppression; severe damage can be seen on all components on the left-side.

Another concern with 1-hour FRR alone is the wide range of wall assemblies that can meet the performance requirements of ASTM E119. Figure 2 shows two different wall assemblies that achieve 1-hr FRR from either side.

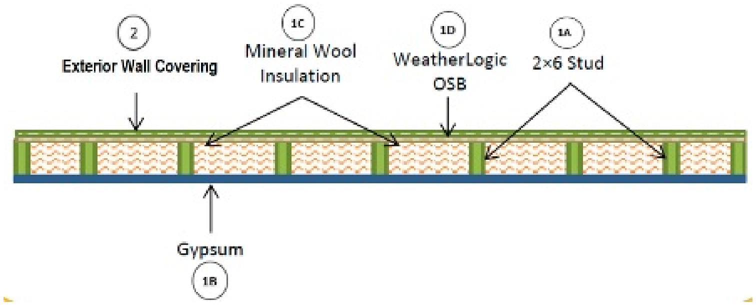


Figure 2. *a.* 1-hour fire resistance rated exterior wall with *OSB sheathing panel on the exterior side [1].*

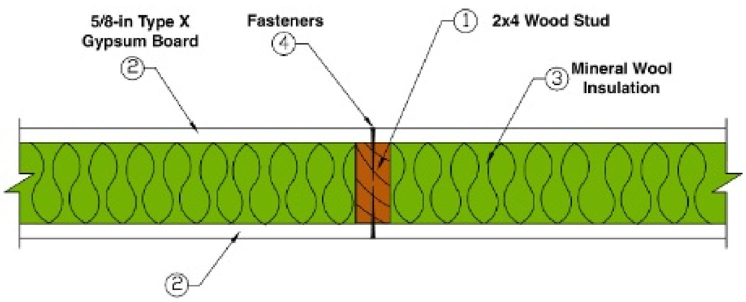


Figure 2. b. 1-hour fire resistance rated exterior wall with *Type X gypsum board on the exterior side [2].*

While Figure 2a and 2b both qualify as 1-hr FRR construction, the assembly in Figure 2a is particularly vulnerable to wildfire exposure at the base because combustible sheathing material is used in the assembly. Figure 3 shows a series of fire tests conducted at the IBHS Research Center where different configurations of 1-hour fire-resistant rated assembly with combustible engineered wood siding material were exposed to a small fire at the base. Figure 3a is about a typical 1-hour fire-resistant rated assembly constructed with OSB sheathing material. In this test the OSB sheathing material is exposed from bottom. During this experiment, the fire spread across the surface of the combustible exterior siding and impinged inside the wall cavity because of the exposed bottom surface of OSB sheathing material. Figure 3b shows a 1-hour fire-resistant rated assembly constructed with noncombustible sheathing material in accordance with Figure 2b. In this experiment the fire only ignited the combustible engineered wood siding material and did not impinge inside the wall assembly.

Figure 3. a. 1-hr FRR assembly with unprotected OSB Sheathing material at the bas3. Photo curtesy by Milad Shabanian, IBHS.

Figure 3. b. 1-hr FRR assembly with noncombustible sheathing material. Photo curtesy by Milad Shabanian, IBHS.

Item 2 of Section 504.5 permits the use of noncombustible materials. While this construction method provides comprehensive protection against fire spread, it does not specifically address the fire resistance rating and protection against fire impingement. Item 3 permits the use of heavy timber or log wall construction suggesting they offer similar protection. However, Section 602.4.4 in the IBC requires exterior walls of heavy timber construction to be noncombustible, which arguably aligns more appropriately with Item 2 or constructed with FRTW or cross-laminated timber. In case that the exterior walls constructed with cross-laminated timber and heavy timber elements the exterior surface of such element shall be protected with: FRTW, Gypsum board or noncombustible materials.

In contrast, log wall construction technically aligns more with Item 1. According to Section 303 of ICC 400, 6-inch-thick logs can provide a 1-hour fire resistance against fire impingement. However, given their combustible nature, log wall constructions may exhibit varying fire spread rates, influenced by the different flame spread indices associated with various wood species.

Items 4 and 5 do not explicitly address fire impingement. These methods are only intended to limit the flame spread index of exterior surfaces. Figure 4 illustrates two typical exterior wall assembly constructed with ignition-resistant building material. Figure 4a is a typical exterior wall assembly protected on the exterior with noncombustible metal siding and Figure 4b is a wall protected with noncombustible fiber cement lap siding material.

Figure 4. a. Typical exterior wall assemblies constructed on the exterior with noncombustible metal siding. Photo curtesy by Milad

Shabanian, IBHS.

Figure 4. b. Typical exterior wall assemblies constructed on the exterior with noncombustible fiber cement siding material. Photo curtesy by Milad Shabanian, IBHS.

An additional inconsistency in the IWUIC is that requirements for exterior wall construction are the same for IR1 and IR2. This is clearly a discrepancy as IR1 construction is required in conditions more severe than those requiring IR2 construction in Table 503.1.

This proposed code change will increase the level of fire protection and provide a more logical and consistent level of performance for exterior wall assemblies against fire impingement and flame spread for IR1 where defensible space is nonconforming by:

- Requiring a minimum of 1 hr. fire resistance rating for all exterior wall assemblies to address fire impingement, and,
- Limiting the flame spread index of exterior siding materials to address flame spread to other areas of the building.

Note: IBC is the source of all suggested definitions.

Bibliography:

1. INTERTEK DIRECTORY OF BUILDING PRODUCTS, Louisiana-Pacific - LP WeatherLogic® Air & Water Barrier Fire Performance, https://bpdirectory.intertek.com/pages/DLP_SearchDetail.aspx?SpecID=67818

2. Design for code acceptance 3, American Wood Council, Fire-resistance-rated wood-frame wall and floor/ceiling assemblies. https://awc.org/wp-content/uploads/2021/12/awc-dca3_20210209_awcwebsite.pdf

Cost Impact: Increase

Estimated Immediate Cost Impact:

This modification to the code will raise construction costs by introducing two stipulations for exterior walls.

Estimated Immediate Cost Impact Justification (methodology and variables):

The existing code mandates that exterior walls should be built with either a one-hour fire-resistant rated assembly or an ignition-resistant exterior surface. In contrast, the proposed amendment will necessitate exterior walls to be constructed with both a one-hour fire-resistant rated assembly and an ignition-resistant exterior surface where provisions of Section 603 (defensible space requirement) are not met.

WUIC36-24

WUIC37-24

IWUIC: 504.6

Proponents: Milad Shabanian, Insurance Institute for Business & Home Safety (mshabanian@ibhs.org); T. Eric Stafford, Insurance Institute for Business and Home Safety (testafford@charter.net)

2024 International Wildland Urban Interface Code

Revise as follows:

504.6 Underfloor enclosure.
Buildings or structures shall have underfloor areas enclosed to the ground with exterior walls in accordance with Section 504.5.

Exception:

1. Where defensible space conforms to the provisions of Section 603, complete ~~Complete~~ enclosure shall not be required where the underside of exposed floors and exposed structural columns, beams and supporting walls are constructed with one of the following: ~~protected as required for exterior 1-hour *fire-resistance-rated construction* or *heavy timber construction* or fire-retardant-treated wood. The fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section 2303.2 of the International Building Code.~~
   1.1 Exterior 1-hour fire-resistance-rated construction.

   1.2. Noncombustible material.

   1.3. Heavy timber or log wall construction.

   1.4. Fire-retardant treated wood labeled for exterior use and meeting the requirements of Section 2303.2 of the International Building Code.

   1.5. Ignition-resistant building material on the exterior surface.

2. Where defensible space does not conform to the provisions of Section 603, complete enclosure shall not be required where the underside of exposed floors and exposed structural columns, beams and supporting walls are protected as required for exterior 1-hour fire-resistance-rated construction in accordance with Section 501.3 and the exterior surfaces of these assemblies are constructed with one of the following materials:
   2.1. Noncombustible material complying with Section 503.2.1

   2.2. Fire-retardant-treated wood complying with Section 503.2.2

   2.3. Ignition-resistant building materials complying with Section 503.2.4.

Reason: Table 503.1 requires the use of Ignition Resistant Construction Class 1 (IR1) in situations where defensible space is nonconforming. In such conditions, the structure may be exposed to embers, radiation heat, and direct flame contact during a wildfire. Accordingly, the underfloor area of the building needs to provide a minimum resistance against these exposures.

Currently, the exception in section 504.6 provides 3 alternatives for constructing the unenclosed underfloor areas of buildings:

1. Materials approved for not less than 1-hour fire-resistance-rated (FRR) construction on the exterior side.
2. Heavy timber construction
3. Fire-retardant treated wood.

These methods do not provide protection from flame spread during a wildfire. This proposal addresses this issue by creating two exceptions addressing conditions with nonconforming defensible space and conditions with conforming defensible space.

For the nonconforming defensible space condition, this proposal requires the underside of exposed floors and exposed structural columns, beams and supporting walls to protected with 1-hour fire-resistant-rated construction and also protected on the exterior surfaces by ignition-resistant building materials complying with Section 503.2. This would provide protection from flame impingement and reduce rate of flame spread in areas where defensible space is nonconforming.

For the confirming defensible space condition, this proposal permits the use of the currently specified materials but expands the options to include noncombustible construction, log wall construction, and ignition resistant building materials on the exterior surface consistent with construction methods permitted by other areas in Section 504.

An additional inconsistency is that requirements for underfloor areas in the IWUIC are the same for IR1 and IR2. This is clearly a discrepancy as IR1 construction is required in conditions more severe than those requiring IR2 construction in Table 503.1. This proposed code change will increase the level of fire protection and provide a more logical and consistent level of performance for underfloor areas against fire impingement and flame spread for IR1 where defensible space is nonconforming by:

- Requiring a minimum of 1 hr. fire resistance rating to address fire impingement, and,
- Limiting the flame spread index of exterior surfaces to address flame spread to other areas of the building.

Cost Impact: Increase

Estimated Immediate Cost Impact:

$0 or more. This code change proposal may increase the construction cost only where the underfloor area height is enough to be usable and 1-hour rated columns or walls covered on the exterior with combustible materials having a flame spread index more than 25 when tested in accordance with ASTM E84 (Figure 1). In such a case, the siding material will need to be removed or replaced with an ignition-resistant building material (noncombustible, FRTW, IR material) having a flame spread index less than 25.

Estimated Immediate Cost Impact Justification (methodology and variables):

Figure 1. Usable unenclosed underfloor areas.

WUIC37-24

WUIC38-24

IWUIC: 504.6, 505.6, 506.3

Proponents: Edward Lisinski, American Wood Council (elisinski@awc.org); Jason Smart, American Wood Council (jsmart@awc.org)

2024 International Wildland Urban Interface Code

Revise as follows:

504.6 Underfloor enclosure.
~~Buildings or structures shall have underfloor~~ Underfloor areas of buildings and structures shall be enclosed to the ground with exterior walls in accordance with Section 504.5.

Exception: Complete enclosure shall not be required where the underside of exposed floors and exposed structural columns, beams and supporting walls are protected as required for exterior 1-hour *fire-resistance-rated construction* or *heavy timber construction* or fire-retardant-treated wood. The fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section 2303.2 of the International Building Code.

505.6 Underfloor enclosure.
~~Buildings or structures shall have underfloor~~ Underfloor areas of buildings and structures shall be enclosed to the ground, with exterior walls in accordance with Section 505.5.

Exception: Complete enclosure shall not be required where the underside of exposed floors and exposed structural columns, beams and supporting walls are protected as required for exterior 1-hour *fire-resistance-rated construction* or *heavy timber construction* or fire-retardant-treated wood. The fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section 2303.2 of the International Building Code.

506.3 Underfloor enclosure.
~~Buildings or structures shall have underfloor~~ Underfloor areas of buildings and structures shall be enclosed to the ground with exterior walls.

Exception: Complete enclosure shall not be required where the underside of exposed floors and exposed structural columns, beams and supporting walls are protected as required for exterior 1-hour *fire-resistance-rated construction*, fire-retardant-treated wood or *heavy timber construction*. Fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section 2303.2 of the International Building Code.

Reason: Current provisions in Sections 504.6, 505.6 and 506.3 could be interpreted as requiring all buildings or structures to have underfloor areas. Many buildings and structures, such as those with slab-on-grade foundations or basements, do not have underfloor areas, nor should they be required to. This proposal clarifies that the provisions of Sections 504.6, 505.6 and 506.3 only apply where underfloor areas exist.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is a simple clarification of existing provisions. See also the proponent’s reason statement.

WUIC38-24

WUIC39-24

IWUIC: 504.6, 505.5.1 (New), 505.6, 506.3 (New), 506.3, 504.5.1

Proponents: Milad Shabanian, Insurance Institute for Business & Home Safety (mshabanian@ibhs.org); T. Eric Stafford, Insurance Institute for Business and Home Safety (testafford@charter.net)

2024 International Wildland Urban Interface Code

Revise as follows:

504.6 Underfloor enclosure.
Buildings or structures shall have underfloor areas enclosed to the ground with exterior walls in accordance with Section 504.5.

> **Exception:** Complete enclosure shall not be required where the underside of exposed floors and exposed structural columns, beams and supporting walls are protected as required for exterior 1-hour *fire-resistance-rated construction* or *heavy timber construction* or fire-retardant-treated wood. The fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section 2303.2 of the International Building Code. A minimum of 6 inches of noncombustible material or metal flashing extending vertically from grade is required on the exterior of columns and walls.

Add new text as follows:

505.5.1 Flashing. A minimum of 6 inches of noncombustible material or metal flashing extending vertically is required on the exterior of the wall at the ground, decking and roof intersections.

Revise as follows:

505.6 Underfloor enclosure.
Buildings or structures shall have underfloor areas enclosed to the ground, with exterior walls in accordance with Section 505.5.

> **Exception:** Complete enclosure shall not be required where the underside of exposed floors and exposed structural columns, beams and supporting walls are protected as required for exterior 1-hour *fire-resistance-rated construction* or *heavy timber construction* or fire-retardant-treated wood. The fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section 2303.2 of the International Building Code. A minimum of 6 inches of noncombustible material or metal flashing extending vertically from grade is required on the exterior of columns and walls.

Add new text as follows:

506.3 Exterior walls. A minimum of 6 inches of noncombustible material or metal flashing extending vertically is required on the exterior of the wall at the ground, decking and roof intersections.

Revise as follows:

~~506.3~~ 506.4 Underfloor enclosure.
Buildings or structures shall have underfloor areas enclosed to the ground with exterior walls in accordance with Section 506.3.

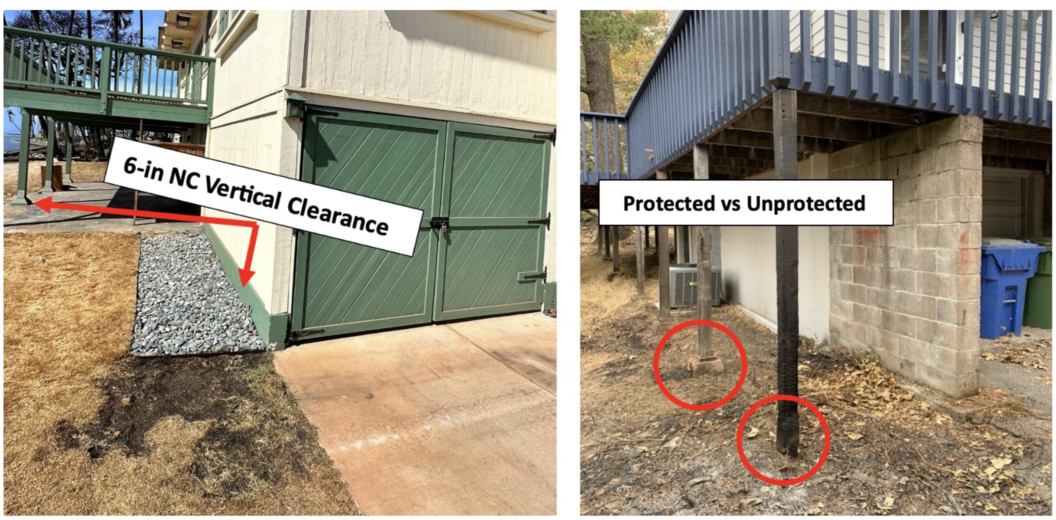
> **Exception:** Complete enclosure shall not be required where the underside of exposed floors and exposed structural columns, beams and supporting walls are protected as required for exterior 1-hour *fire-resistance-rated construction*, fire-retardant-treated wood or *heavy timber construction*. Fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section 2303.2 of the International Building Code. A minimum of 6 inches of noncombustible material or metal flashing extending vertically from grade is required on the exterior of columns and walls.

504.5.1 Flashing.
A minimum of 6 inches (152 mm) of ~~metal flashing or~~ noncombustible material or metal flashing extending~~applied~~ vertically is required on the exterior of the wall ~~shall be installed~~ at the ground, decking and roof intersections.

Reason: In the 2024 IWUIC, a new section was added to Class 1 ignition resistant construction (IR1) that requires a minimum of 6 inches of metal flashing or noncombustible material applied vertically on the exterior of the wall at the ground, decking and roof intersections. In a wildfire event, buildings are threatened by at least one of the three fundamental wildfire exposures: embers, radiant heat, or direct flame contact. Of these exposures, ember exposure stands out as a prevalent cause of building ignition. Embers, propelled for miles by the wind, can penetrate small openings and accumulate around buildings, particularly where combustible debris is also present (Figure1).

Figure 1. 6-in noncombustible vertical clearance worked as fuel break at the base of exterior walls in Lahaina wildfire. Photo credit: Steve Hawks, IBHS.

Therefore, this proposal will add protection against embers for all structures in wildfire-prone areas by expanding ember protection requirements in IR1 and adding ember protection for IR2 and IR3. Figure 2 shows a 6-in noncombustible vertical clearance at the base of exterior walls and underfloor columns.



a *b*

Figure 2. 6-in Noncombustible vertical clearance at the base of exterior walls and underfloor area columns: a. Lahaina Fire 2023 (Photo curtesy Milad Shabanian, IBHS), b. Glass Fire 2020 (Photo curtesy Steve Hawks, IBHS).

The objective of this proposal is to enhance the resilience of buildings in wildfire-prone regions against embers by requiring a 6-inch noncombustible vertical clearance on exterior walls for all ignition resistant construction classes where they intersect with horizontal surfaces such as the ground, decks, and roof assemblies.

This code change intends to improve the protection of a vertical surface where the vertical surface intersects with a horizontal surface. The intersection of a vertical and horizontal surface is a known area where debris tends to accumulate and where embers tend to accumulate during a wildfire. The combination of accumulated debris and embers can ignite the debris, enabling the fire to spread to the vertical surface. The first part of this proposal adds a minimum 6 inches of noncombustible flashing on the exterior walls of Ignition-Resistant Class 2 and 3 constructions at points where exterior walls intersect with horizontal surfaces. The remainder of this proposal extends an equivalent level of ember-resistance to exposed columns and vertical members within unenclosed underfloor areas across all three classes of ignition-resistant construction.

Section 504.5.1 is proposed to be revised to match the language proposed for Sections 504.6, 505.5.1, 505.6, 506.3 and 506.4 and to provide some clarity. As currently written, Section 504.5.1 could be interpreted to require metal flashing or noncombustible materials on a noncombustible wall such as a concrete or masonry wall. This clearly was not the intent of the original language. The revised language is intended to clarify this.

Cost Impact: Increase

Estimated Immediate Cost Impact:

This code change may increase the construction cost only where the exterior walls intersect with unenclosed projections such as attached decks, balconies, and roofs such as dormers.

Estimated Immediate Cost Impact Justification (methodology and variables):

The noncombustible flashing that needs to be installed instead of exterior siding material in these cases may be cheaper or more expensive than the siding material considering the range of flashing products available in the market. But in general the cost increase will not be significant. A review of common retailers websites indicates that the cost of 6 inch wide metal flashing varies according to the quantity purchased. Galvanized steel metal flashing that is 6 inches wide costs approximately $24.24 for a 50 foot length. This is approximately $0.48 per foot of material. Labor and fastener costs are estimated to be minimal.

WUIC39-24

WUIC40-24

IWUIC: 504.6, 505.6, 506.3

Proponents: Milad Shabanian, Insurance Institute for Business & Home Safety (mshabanian@ibhs.org); T. Eric Stafford, Insurance Institute for Business and Home Safety (testafford@charter.net)

2024 International Wildland Urban Interface Code

Revise as follows:

504.6 Underfloor enclosure.
Buildings or structures shall have underfloor areas enclosed to the ground with exterior walls in accordance with Section 504.5.

Exception: Complete enclosure shall not be required where the underside of exposed floors and exposed structural columns, beams and supporting walls are ~~protected as required for exterior 1-hour *fire-resistance-rated construction* or *heavy timber construction* or fire-retardant-treated wood. The fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section 2303.2 of the International Building Code.~~ constructed with one of the following:

1. Exterior 1-hour fire-resistance-rated construction.
2. Noncombustible material.
3. Heavy timber or log wall construction.
4. Fire-retardant treated wood labeled for exterior use and meeting the requirements of Section 2303.2 of the *International Building Code*.
5. Ignition-resistant building material on the exterior surface.

505.6 Underfloor enclosure.
Buildings or structures shall have underfloor areas enclosed to the ground, with exterior walls in accordance with Section 505.5.

Exception: Complete enclosure shall not be required where the underside of exposed floors and exposed structural columns, beams and supporting walls are ~~protected as required for exterior 1-hour *fire-resistance-rated construction* or *heavy timber construction* or fire-retardant-treated wood. The fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section 2303.2 of the International Building Code.~~ constructed with one of the following:

1. Exterior 1-hour fire-resistance-rated construction.
2. Noncombustible material.
3. Heavy timber or log wall construction.
4. Fire-retardant treated wood labeled for exterior use and meeting the requirements of Section 2303.2 of the *International Building Code*.
5. Ignition-resistant building material on the exterior surface.

506.3 Underfloor enclosure.
Buildings or structures shall have underfloor areas enclosed to the ground with exterior walls.

Exception: Complete enclosure shall not be required where the underside of exposed floors and exposed structural columns, beams and supporting walls are ~~protected as required for exterior 1-hour *fire-resistance-rated construction*, fire-retardant-treated wood or *heavy timber construction*. Fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section 2303.2 of the International Building Code.~~ constructed with one of the following:

1. Exterior 1-hour fire-resistance-rated construction.
2. Noncombustible material.
3. Heavy timber or log wall construction.

4. Fire-retardant treated wood labeled for exterior use and meeting the requirements of Section 2303.2 of the *International Building Code.*
5. Ignition-resistant building material on the exterior surface.

Reason: This code change proposal intends to address the gaps in the exception for open underfloor areas for all three ignition-resistant construction classes. Currently, the exception to complete enclosure only permits the use of a 1-hour fire-resistance-rated construction, heavy timber construction, and fire-retardant-treated wood. However, it is very common to use noncombustible columns and beams for underfloor areas. Considering the fire performance of noncombustible materials in comparison to the other permitted types of construction, noncombustible materials should be added to the exception. Figure 1 shows two examples of an unenclosed underfloor area constructed with noncombustible materials. Ignition-resistant building materials are also proposed to be added as an option consistent with fire-retardant-treated wood which is currently permitted.

Figure 1. Noncombustible unenclosed underfloor areas.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This code change intends to address the alternatives missed in current code language for underfloor areas. This code change provides more alternatives for unenclosed underfloor areas and therefore will not increase the construction cost.

WUIC40-24

WUIC41-24

IWUIC: 504.7, 505.7

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Wildland Urban Interface Code

Revise as follows:

504.7 ~~Appendages and projections~~ Attachments. *Unenclosed accessory structures* attached to buildings with habitable spaces and projections, such as decks, shall be ~~be not less than 1-hour fire-resistance-rated construction, heavy timber construction or~~ constructed with ~~of~~ one of the following methods, except that coated materials shall not be used as the walking surface of decks::

1. Materials *approved* for not less than 1-hour fire resistance-rated construction on the exterior side.
2. *Approved noncombustible* materials.
3. ~~2.~~3. ~~Fire-retardant-treated wood identified for exterior use and meeting the requirements of Section 2303.2 of the International Building Code.~~ Heavy timber or log wall construction.
4. ~~3.~~4. Ignition-resistant building materials complying ~~in accordance~~ with Section 503.2 on the exterior side.

    ~~**Exception:** Coated materials shall not be used as the walking surface of decks.~~

505.7 ~~Appendages and projections~~ Attachments.
Unenclosed accessory structures attached to buildings with habitable spaces and projections, such as decks, shall be ~~not less than 1-hour fire-resistance-rated construction, heavy timber construction or~~ constructed with ~~of~~ one of the following methods, except that coated materials shall not be used as the walking surface of decks::

1. Materials *approved* for not less than 1-hour fire-resistance-rated construction on the exterior side.
2. *Approved noncombustible* materials.
3. ~~2.~~3. ~~Fire-retardant-treated wood identified for exterior use and meeting the requirements of Section 2303.2 of the International Building Code~~ Heavy timber or log wall construction.
4. ~~3.~~4. Ignition-resistant building materials complying ~~in accordance~~ with Section 503.2 on the exterior side.

    ~~**Exception:** Coated materials shall not be used as the walking surface of decks.~~

Reason: This proposal is an editorial cleanup. There are no technical change in requirements.

This proposal addresses the fact that section 503.2 describes the requirements for “ignition resistant building materials”. Therefore, the important distinction for the requirements on attachments (including appendages, projections, and decks) is whether the entire assembly (the exterior assembly) is addressed or just the exterior side (the exterior covering). Therefore, there are four categories of materials to be addressed, namely exterior assemblies for the attachments (materials providing 1 hour fire resistance rating, approved noncombustible materials making up the entire exterior assembly, or heavy timber or log wall construction) and exterior coverings, as represented by ignition-resistant building materials, complying with Section 503.2, on the exterior side.

The title is being changed from “Appendages and projections” to “Attachments”. Also, the prohibition for using coated materials on the walking surface of decks is being moved from an exception into the charging paragraph.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is a simple clairificatin of existing requirements has has no affect on cost

WUIC41-24

WUIC42-24

IWUIC: 504.7, 505.7

Proponents: Edward Lisinski, American Wood Council (elisinski@awc.org); Jason Smart, American Wood Council (jsmart@awc.org)

2024 International Wildland Urban Interface Code

Revise as follows:

504.7 Appendages and projections.
Unenclosed accessory structures attached to buildings with habitable spaces and projections, such as decks, shall be ~~not less than 1-hour fire-resistance-rated construction, *heavy timber construction* or~~ constructed of one of the following:

1. 1-hour *fire-resistance-rated construction.*
2. *Heavy timber construction.*
3. ~~1.~~3. *Approved noncombustible* materials.
4. ~~2.~~4. Fire-retardant-treated wood identified for exterior use and meeting the requirements of Section 2303.2 of the International Building Code.
5. ~~3.~~5. Ignition-resistant building materials in accordance with Section 503.2.

    Exception: Coated materials shall not be used as the walking surface of decks.

6. Any materials permitted by code where all exterior walls to which the *unenclosed accessory structure* is attached have a 1-hour fire-resistance rating, rated for exposure to fire from the exterior side, and have ignition-resistant materials complying with Section 503.2 on the exterior side.

505.7 Appendages and projections.
Unenclosed accessory structures attached to buildings with habitable spaces and projections, such as decks, shall be ~~not less than 1-hour *fire-resistance-rated construction*, *heavy timber construction* or~~ constructed of one of the following:

1. 1-hour *fire-resistance-rated construction.*
2. *Heavy timber construction.*
3. ~~1.~~3. *Approved noncombustible* materials.
4. ~~2.~~4. Fire-retardant-treated wood identified for exterior use and meeting the requirements of Section 2303.2 of the International Building Code.
5. ~~3.~~5. Ignition-resistant building materials in accordance with Section 503.2.

    Exception: Coated materials shall not be used as the walking surface of decks.

6. Any materials permitted by code where all exterior walls to which the *unenclosed accessory structure* is attached have a 1-hour fire-resistance rating, rated for exposure to fire from the exterior side, and have ignition-resistant materials complying with Section 503.2 on the exterior side.

Reason: The two options currently listed in the charging language of Sections 504.7 and 505.7 for appendages and projections are moved down into the existing list of other options. An additional option is added to the requirements for unenclosed accessory structures, such as decks, in Class 1 and Class 2 ignition-resistant construction. This additional option allows for unenclosed accessory structures to be constructed of any materials permitted by code where the exterior walls, to which the unenclosed accessory structures are attached, comply with enhanced fire protection requirements. These enhanced fire protection requirements for exterior walls require both a 1-hour fire-resistance rating and use of ignition-resistant materials on the exterior side. These requirements are more stringent than current exterior wall requirements in Class 1 ignition-resistant construction, which is permitted to be used where defensible space provisions of Section 603 are not met. This option for enhanced protection of the adjacent exterior walls will help prevent entry of fire into the building in the event of ignition of the unenclosed accessory structure, such as decks.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0 or less. There could be a cost decrease for some buildings.

Estimated Immediate Cost Impact Justification (methodology and variables):

The proposal provides one additional option for compliance (Item 6). This new option allows for more cost-effective deck construction in cases where exterior walls meet enhanced fire protection requirements. The other existing provisions and options currently allowed in 504.7 and 505.7 remain functionally unchanged.

WUIC42-24

WUIC43-24

IWUIC: 504.7, 505.7

Proponents: Milad Shabanian, Insurance Institute for Business & Home Safety (mshabanian@ibhs.org); T. Eric Stafford, Insurance Institute for Business and Home Safety (testafford@charter.net)

2024 International Wildland Urban Interface Code

Revise as follows:

504.7 Appendages and projections.
Unenclosed accessory structures and projections, such as decks, balconies, porches, and stairs attached to buildings with habitable spaces ~~and projections, such as decks,~~ shall be ~~not less than 1-hour fire-resistance-rated construction, *heavy timber construction* or~~ constructed ~~of~~with one of the following:

1. Not less than 1-hour fire resistance rated construction on the exterior side.

~~1~~2. *Approved noncombustible* materials.

3. *Heavy timber construction.*

~~2~~4. Fire-retardant-treated wood identified for exterior use and meeting the requirements of Section 2303.2 of the International Building Code.

~~3~~5. Ignition-resistant building materials in accordance with Section 503.2.

Exception: Coated materials shall not be used as the walking surface of decks.

505.7 Appendages and projections.
Unenclosed accessory structures and projections, such as decks, balconies, porches, and stairs attached to buildings with habitable spaces ~~and projections, such as decks,~~ shall be ~~not less than 1-hour *fire-resistance-rated construction*, *heavy timber construction* or~~ constructed ~~of~~ with one of the following:

1. Not less than 1-hour fire-resistance-rated construction on the exterior side.

~~1~~2. *Approved noncombustible* materials.

3. Heavy timber construction.

~~2~~4. Fire-retardant-treated wood identified for exterior use and meeting the requirements of Section 2303.2 of the International Building Code.

~~3~~5. Ignition-resistant building materials in accordance with Section 503.2.

Exception: Coated materials shall not be used as the walking surface of decks.

Reason: This primary intent of this proposal is to provide clarity to the criteria for appendages and projections. Sections 504.7 and 505.7 are proposed to be reorganized by relocating the allowable construction methods to a numbered list which is a similar format to other sections in the IWUIC. Additionally, Chapter 2 defines unenclosed accessory structures as "an accessory structure without a complete exterior wall system enclosing the area under roof or floor above. The IWUIC commentary also states that “this definition refers to structures without walls, or without walls on all sides. Most commonly, this would include a deck or platform.” Balconies, porches and stairs are also other platforms that should be listed to provide clarity around construction of these attached structures. For example, in post-event investigations performed by IBHS, it is clear that stairs constructed of inappropriate materials that are attached to a building are at risk of ignition and need to be included in the list of examples in Sections 504.7 and 505.7. Figure 1 provides an example of a nonconforming attached stair ignited by surrounding fuel sources. The intent of this proposal is to make clear that all attached accessory structures, including stairs, proches and balconies, are required to be constructed in accordance with the requirements of IWUIC.

Figure 1. Nonconforming attached accessory structure (stair). Photo by Milad Shabanian, IBHS.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This code change proposal does not result in technical changes to the code and will not impact construction costs.

WUIC43-24

WUIC44-24

IWUIC: 504.7.1, 505.7.1, 506.6 (New), 506.6.1 (New)

Proponents: Milad Shabanian, Insurance Institute for Business & Home Safety (mshabanian@ibhs.org); T. Eric Stafford, Insurance Institute for Business and Home Safety (testafford@charter.net)

2024 International Wildland Urban Interface Code

Revise as follows:

504.7.1 Underfloor areas.
~~Where the attached structure is located and constructed so that the structure or any portion thereof projects over a descending slope surface greater than 10 percent, the area below the structure shall have underfloor areas enclosed to within 6 inches (152 mm) of the ground, with exterior wall construction in accordance with Section 504.5.~~
Unenclosed accessory structures and projections attached to buildings with habitable spaces shall have underfloor areas enclosed to the ground with exterior wall construction in accordance with Section 504.5.

> **Exception:** Complete enclosure shall not be required where the underside of exposed floors and exposed structural columns, beams and supporting walls are constructed in accordance with Section 504.7 and a minimum of 6 inches of metal flashing or noncombustible material applied vertically on the exterior of the vertically aligned structural elements such as columns and supporting walls at the ground.

505.7.1 Underfloor areas.
~~Where the attached structure is located and constructed so that the structure or any portion thereof projects over a descending slope surface greater than 10 percent, the area below the structure shall have underfloor areas enclosed to within 6 inches (152 mm) of the ground, with exterior wall construction in accordance with Section 505.5.~~
Unenclosed accessory structures and projections attached to buildings with habitable spaces shall have underfloor areas enclosed to the ground with one of the following methods:

1. Exterior wall construction in accordance with Section 505.5.
2. Noncombustible corrosion-resistant mesh with openings not to exceed 1/8 inch (3.2 mm).

> **Exception:** Complete enclosure shall not be required where the underside of exposed floors and exposed structural columns, beams and supporting walls are constructed in accordance with Section 505.7 and a minimum of 6 inches of metal flashing or noncombustible material applied vertically on the exterior of the vertically aligned structural elements such as columns and supporting walls at the ground.

Add new text as follows:

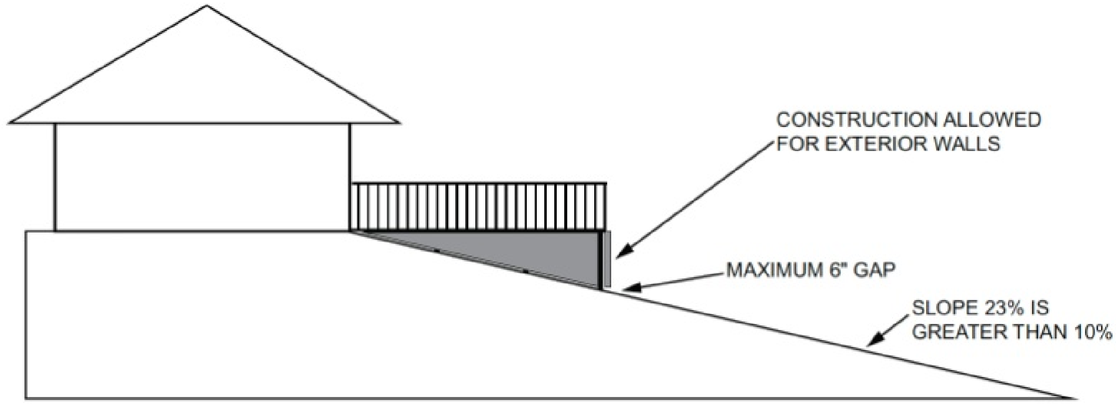
506.6 Appendages and projections. The underfloor areas of unenclosed accessory structures and projections, such as decks, balconies, porches, and stairs attached to buildings with habitable spaces shall be constructed in accordance with Section 506.6.1

506.6.1 Underfloor areas. Unenclosed accessory structures and projections attached to buildings with habitable spaces shall have underfloor areas enclosed to the ground with noncombustible corrosion-resistant mesh with openings not to exceed 1/8 inch (3.2 mm).

> **Exception:** Complete enclosure shall not be required where a minimum of 6 inches of metal flashing or noncombustible material applied vertically on the exterior of columns and supporting walls at the ground.

Reason: Figure 1 clarifies the intention of sections 504.7.1 and 505.7.1. There are 4 concerns surrounding the current requirements of the IWUIC regarding the construction of an underfloor area of attached accessory structures.
First, there is no scientific reason to support the slope limitations provided in these sections. All structures, their attached accessory structures, detached accessory structures and their underfloor areas are exposed to at least one of the wildfire exposures. As it is well studied, wildfires can threaten buildings through three different exposures: embers, radiation heat, and direct flame contact. Excluding

the underfloor area of attached accessory structures located on a surface with a slope less than 10 percent will result in excluding many balconies, decks, stairs, and other attached accessory structures constructed on flat surfaces. The code requirements should not differentiate between underfloor areas of building and attached structures. This is also against the requirements provided in the California Building Code (Chapter 7A, Section 707.9A).



Commentary Figure 504.7.1
PROTECTION UNDER DECK ON A SLOPE

Figure 1. 6-in gap at the ground level (IWUIC Commentary).

Second, technical concerns around having a 6-in opening at the base of walls. Currently, the code requires the underfloor areas of attached accessory structures to be fully enclosed to within 6 inches (152 mm) of the ground (Figure 1). The 6-in opening seems to be required for water irrigation purposes. However, this requirement does not align well with provided construction methods for attached accessory structures.

According to sections 504.7 and 505.7, appendages and projections shall be constructed with one of the following alternatives:

1. 1-hour fire-resistant construction.
2. Heavy timber construction.
3. Approved noncombustible materials.
4. Fire-retardant-treated wood.
5. Ignition-resistant building materials in accordance with section 503.2.

In a 1-hour fire-resistant floor assembly, the fire shall not pass the floor assembly for at least 1 hour during ASTM E119 or UL 263 fire test. Consequently, water intrusion through the floor system is not possible.

In heavy timber construction, based on the definition (Figure 2) from IBC, “the exterior walls are of noncombustible materials” with some exceptions.

602.4.4 Type IV-HT. Type IV-HT (Heavy Timber) construction is that type of construction in which the exterior walls are of noncombustible materials and the interior building elements are of solid wood, laminated heavy timber or structural composite lumber (SCL), without concealed spaces or with concealed spaces complying with Section 602.4.4.3. The minimum dimensions for permitted materials including solid timber, glued-laminated timber, SCL and cross-laminated timber (CLT) and the details of Type IV construction shall comply with the provisions of this section and Section 2304.11. Exterior walls complying with Section 602.4.4.1 or 602.4.4.2 shall be permitted. Interior walls and partitions not less than 1- hour fire-resistance rated or heavy timber conforming with Section 2304.11.2.2 shall be permitted.

Figure 2. IBC requirements for Heavy Timber (HT) construction.

Figure 3 provides examples of attached accessory structure constructed with noncombustible materials. It is evident that building a noncombustible attached accessory structure with maximum 6-in gap at the base is unnecessary and impractical in many cases. IWUIC provides an exception for underfloor areas of buildings and detached accessory structures while missing a similar requirement for attached accessory structures. In many instances such as examples provided in Figure 3, attached accessory structures are required to have unenclosed underfloor areas and having an exception is unavoidable.

Figure 3. Unenclosed and enclosed attached accessory structure nonconforming with current requirements.

In addition, there is a safety concern about having a 6-in gap at the base during a wildfire. Combustible debris and embers can both collect in corners and around the building where exterior walls intersect with horizontal surfaces (Figure 4). IBHS research shows that protecting these areas with noncombustible materials can protect the building from ignitions caused by embers. Leaving a gap at the base of exterior walls of attached accessory structures will increase the chance of combustible debris and ember accumulation under the deck area.

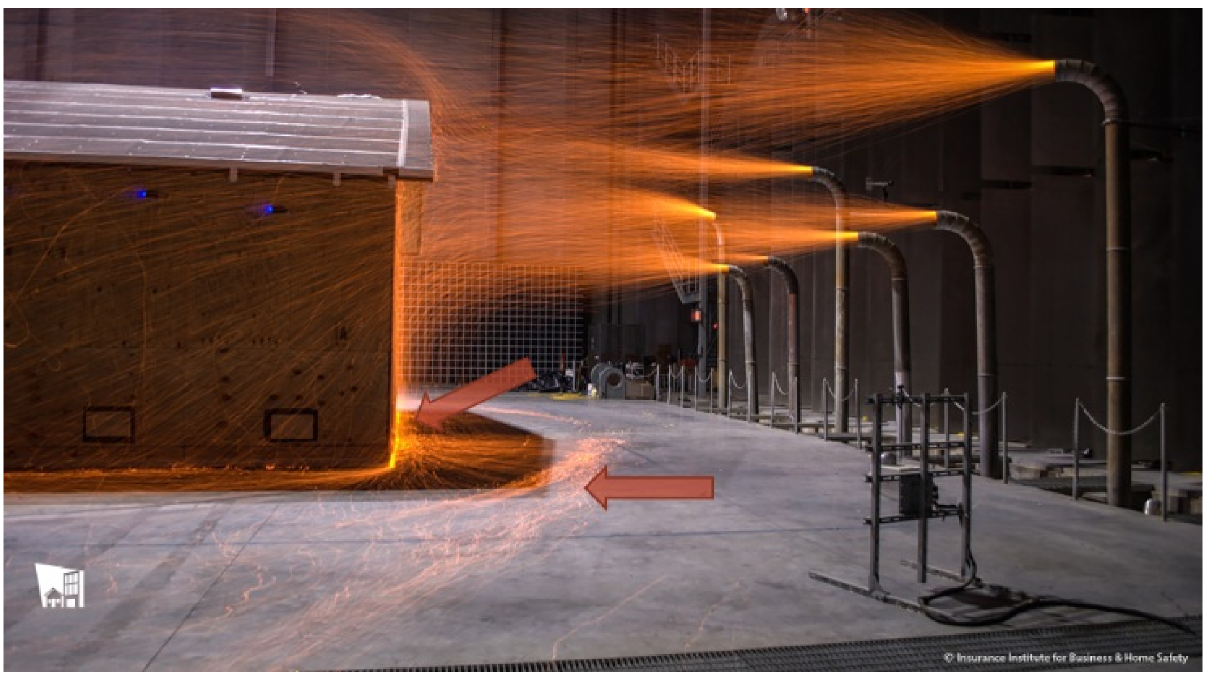


Figure 4. Ember accumulation around a building, IBHS Research Center.

Finally, the IWUIC provides identical requirements for construction of underfloor areas of attached accessory structures in IR1 and IR2. On the other hand, the IWUIC does not address this known vulnerability in IR3. All buildings located in wildfire prone areas need to be always protected against ember exposure.

This code change proposal intends to address these concerns by revising the requirements in sections 504.7.1 and 505.7.1 and adding a new section forIR3.

Section 504.7.1 revised to:

- Eliminate the slope limitation.
- Eliminate the 6-in opening at the base.
- Add exception for unenclosed underfloor areas.
- Add a 6-in noncombustible flashing requirement to columns and walls of unenclosed underfloor areas.

Section 505.7.1 revised to:
- Eliminate the slope limitation.
- Eliminate the 6-in gap at the base.
- Provide additional alternative (1/8-in noncombustible mesh) for protection of underfloor areas to make it less restrictive than IR Class 1.
- Add exception for unenclosed underfloor areas.
- Add a 6-in noncombustible flashing requirement to columns and walls of unenclosed underfloor areas.

New section added to IR Class 3 to:
- Add a 1/8-in noncombustible screen mesh protection for underfloor areas to make it ember-resistant with less restrictive requirements than IR Class 1 and 2.
- Add exception for unenclosed underfloor areas.
- Add a 6-in noncombustible flashing requirement to columns and walls of unenclosed underfloor areas to make unenclosed underfloor areas ember-resistant.

Cost Impact: Increase

Estimated Immediate Cost Impact:

This code change proposal will increase the construction cost where it expands the scope of these sections through eliminating the limitation of the ground slope. However, the code change will reduce construction costs by proposing exceptions for unenclosed underfloor areas. It will also increase the construction cost in IR Class 3 construction where the code change will mandate additional requirements for protecting underfloor areas with 1/8-in noncombustible mesh screen or 6-in metal flashing.

Estimated Immediate Cost Impact Justification (methodology and variables):

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WUIC44-24

WUIC45-24

IWUIC: 504.9, 504.9.1 (New), 505.9, 505.9.1 (New), 506.9 (New), 506.9.1 (New)

Proponents: Milad Shabanian, Insurance Institute for Business & Home Safety (mshabanian@ibhs.org); T. Eric Stafford, Insurance Institute for Business and Home Safety (testafford@charter.net)

2024 International Wildland Urban Interface Code

Revise as follows:

504.9 Exterior doors.
Exterior doors shall be *approved noncombustible* construction, solid-core wood not less than 1$^3/_4$ inches thick (44 mm) and protected with a minimum 6-inch noncombustible material, such as a kick plate, applied at the base on the exterior of the door~~,~~ or have a fire protection rating of not less than 20 minutes. Windows within doors and glazed doors shall be in accordance with Section 504.8.

~~**Exception**~~ **Exceptions**: ~~Vehicle access doors.~~

1. Vehicle access doors.
2. The 6 inches of noncombustible material at the base is not required for solid-core wood doors not less than 1$^3/_4$ inches thick (44 mm) protected by an approved noncombustible door such as a storm door.

Add new text as follows:

504.9.1 Exterior underfloor access doors. Exterior underfloor access doors shall be constructed with noncombustible material or a minimum of 6-in noncombustible material that extends vertically from the base.

Revise as follows:

505.9 Exterior doors.
Exterior doors shall be *approved noncombustible* construction, solid core wood not less than 1$^3/_4$ inches thick (45 mm) and protected with a minimum 6-inch noncombustible material such as a kick plate at the base on the exterior of door ~~,~~ or have a fire protection rating of not less than 20 minutes. Windows within doors and glazed doors shall be in accordance with Section 505.8.

~~**Exception**~~ **Exceptions**: ~~Vehicle access doors.~~

1. Vehicle access doors.
2. The 6 inches of noncombustible material at the base is not required for solid-core wood door not less than 1$^3/_4$ inches thick (44 mm) protected by an approved noncombustible door such as a storm door.

Add new text as follows:

505.9.1 Exterior underfloor access doors. Exterior underfloor access doors shall be constructed with noncombustible material or a minimum 6-in noncombustible material that extends vertically at the base.

506.9 Exterior doors. Exterior doors shall be protected with a minimum 6-inch noncombustible material at the base on the exterior of the door.

Exceptions:

1. Vehicle access doors.
2. Exterior doors protected by an approved noncombustible door such as a storm door.

506.9.1 Exterior underfloor access doors. Exterior underfloor access doors shall be constructed with noncombustible material or a minimum 6-in noncombustible material that extends vertically at the base.

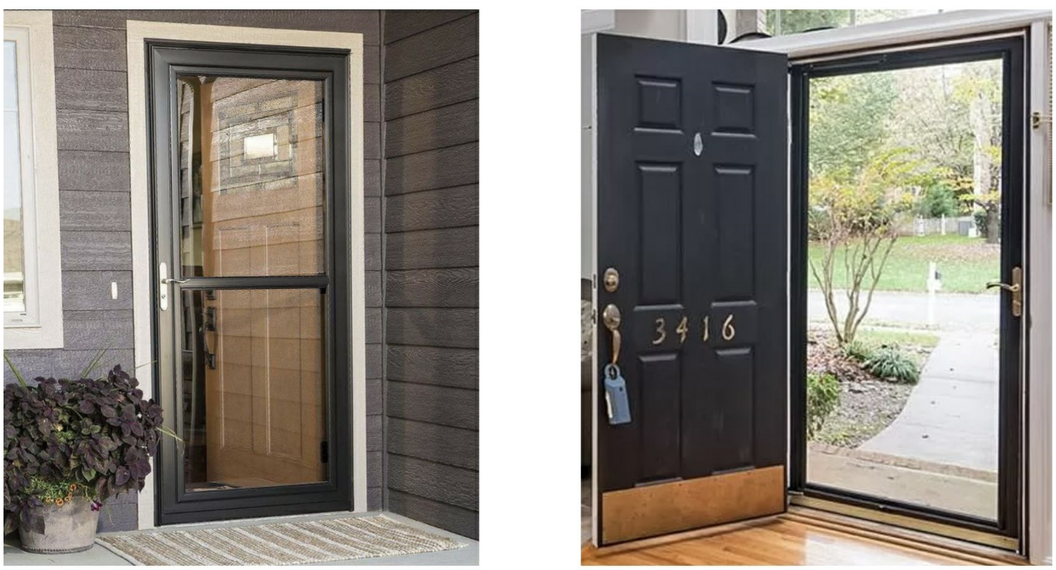
Reason: Like other parts of the building envelope, exterior doors can be exposed to flames, radiant heat, and embers. NIST's Waldo Canyon Fire (2012) post-investigation in El Paso County, Colorado, reports doors as a frequent damaged component of the building [1]. Maintaining a proper defensible space around the building reduces the potential thermal insults from flames. However, embers can still accumulate at the base of a door and potentially penetrate through the door jamb. IBHS's post-Marshall Fire (2021) investigation in Boulder County, Colorado, showed damage to exterior doors due to ember accumulation at the base, as can be seen in Figure 1a. Figure 1b demonstrates ignition of the door jamb due to ember penetration during the Victorian Bushfire (2009) in Australia [2].

(a) *(b)*

Figure 1. ignition from accumulation of embers and debris at the base of the door.

This code change proposal intends to address this vulnerability by providing requirements for all buildings located in wildfire prone areas (IR1,2 and 3) to protect the exterior doors against embers.

Requiring a 6-in noncombustible vertical protection by a kickplate at the base of exterior doors or a storm door will reduce this vulnerability (Figure 2).



(a) *(b)*

Figure 2. Protection for exterior doors (a) storm door, (b) kickplate.

The 6-in noncombustible vertical clearance at the base of the door can protect the exterior door assembly against embers. As a part of this effort, a new section was added to the IR1, 2, and 3 exterior doors to protect exterior underfloor access doors (Figure 3) against embers.

(a) (b)

Figure 3. Exterior underfloor access doors (a) unprotected vs. (b) protected against embers.

Bibliography: [1] Maranghides, A., McNamara, D., Vihnanek, R., Restaino, J., & Leland, C. (2015). A Case Study of a Community Affected by the Waldo Fire Event Timeline and Defensive Actions (NIST Technical Note 1910). National Institute of Standards and Technology. https://doi.org/10.6028/NIST.TN.1910
[2] Leonard, J. (2009). Report to the 2009 Victorian bushfires Royal Commission. Building performance in bushfires (CSIRO Sustainable Ecosystems, Issue. CSIRO Sustainable Ecosystems.

Cost Impact: Increase

Estimated Immediate Cost Impact:

This code change will slightly increase the construction cost by requiring a 6-in noncombustible protection at the base for exterior doors and exterior underfloor access doors.

Estimated Immediate Cost Impact Justification (methodology and variables):

A web search of several retailers carrying kickplate, storm doors and a metal underfloor access door revealed that a kickplate costs approximately $33, a storm door costs approximately $400 and 12-in by 12-in metal underfloor access door costs around $40. Additional labor costs are estimated to be negligible.

WUIC45-24

WUIC46-24

IWUIC: 504.9.1 (New), ASTM Chapter 07, UL Chapter 07

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Wildland Urban Interface Code

Add new text as follows:

504.9.1 Garage door perimeter gap. Exterior garage doors for vehicles shall resist the intrusion of embers by protecting the gaps between each door and the opening at the bottom, sides and top by all of the following:

1. Bottom opening shall provide a maximum gap of 1/8 inch (3.2 mm) between the surface and the door opening seal.
2. Sides and top by one or more of he following:

    2.1 Provide a maximum gap of 1/8 inch (3.2 mm) between the door and the door opening.

    2.2 Cover or block the gap with weather-stripping products constructed of materials which comply with both of the following:

    2.2.1 The tensile strength of he material shall be tested in accordance with ASTM D638 before and after light exposure in accordance with ASTM G155 for a period of 2000 hours, and the maximum allowable difference in tensile strength values between exposed and non-exposed samples shall not exceed 10 percent.

    2.2.2 The material shall be tested in accordance with UL 94 and have a flammability rating of V-2 or better.

    2.3 Cover or block the gap with metal flashing.

Revise as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428-2959

D638-22	Standard Test Method for Tensile Properties of Plastics.
G155—21	Practice for Operating Xenon Arc Light Apparatus For Exposure of Nonmetallic Materials

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062-2096

94-2023	Tests for Flammability of Plastic Materials for Parts in Devices and Appliances, 7th edition

Staff Analysis: A review of the following standards proposed for inclusion in the code regarding some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024:

- ***Standard Test Method for Tensile Properties of Plastics (ASTM D638-22)***
- ***Practice for Operating Xenon Arc Light Apparatus For Exposure of Nonmetallic Materials (ASTM G155-21)***
- ***Safety of Flammability of Plastic Materials for Parts in Devices and Appliances, 7th edition (UL 94-2023)***

Reason: One of the issues with wildland fires is the spread of flaming or hot embers into structures. This proposal is intended to address protection of vehicle door of a garage to reduce this exposure and eliminate a route of ember entry by addressing the gap created between the garage door and the garage door opening.

Section 504.9.1 requires a battery backup for motorized garage door openers. Often in a wildland fire, utility power is shut down, or damaged, to an area or region. When the utility power is no longer available, and the residents need to evacuate, the garage door can still be opened to allow vehicles to exit and then closed to protect the opening into the garage.

Section 504.9.2 addresses the gap, or clearance, provided around the garage door allowing for door movement and operation. This gap needs to be evaluated to inhibit the passage of flaming embers. There are four methods of protection offered in this section: 1) design the door so there is a maximum ⅛" gap on all four sides of the door; 2) provide weatherstripping to cover or fill the gap—weatherstripping must be designed to stay in place during the impact of the fire so criteria is provided (Items 2.1 and 2.2) to address the strength and flammability of the material; and 3) install metal flashing to cover the gap. Any one of the methods can be utilized, or a combination of these methods will suffice. For example, the door may have less than a 1/8” gap along the header (Item 3) and be provided with weatherstripping on the bottom and sides (Item 2).

As part of the requirements for protecting the gap, new test standards are included to ensure that where weather-stripping is chosen as the solution, the weather-stripping material is reliable and dependable for the purpose.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: Increase

Estimated Immediate Cost Impact:

The approximate cost of compliance to add an approved protection material around the edges of a vehicle garage door is $50. As this is only one of the compliance options, the added cost will be applicable in an estimated 1/3 to 1/2 of the cases.

Estimated Immediate Cost Impact Justification (methodology and variables):

The materials needed for compliance with this proposal are readily available in the retail and wholesale building supply chain. Installation labor is minimal or can be DIY.

WUIC46-24

WUIC47-24

IWUIC: 504.9.1 (New), UL Chapter 07

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Wildland Urban Interface Code

Add new text as follows:

504.9.1 **Garage doors..** Automatic garage door openers for vehicle use in a residential building, where provided, shall be *listed* and *labeled* in accordance with UL 325 and shall be installed in accordance with the manufacturer's instructions. The opener shall be equipped with battery backup or a secondary power supply shall be provided.

Revise as follows:

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062-2096

325—2017 Door, Drapery, Gate, Louver, and Window Operators and Systems

Staff Analysis: The standard proposed for inclusion in the code, Door, ***Drapery, Gate, Louver, and Window Operators and Systems (UL 325-2017)***, is currently referenced in the IRC.

Reason: One of the tragic situations that has occurred in wildland fires is the inability to open the electrically operated garage door vehicle doors so the occupants can utilize their vehicle to evacuate as a fire approaches. This proposal adds Section 504.9.1 which will require garage doors in the interface area to be provided with backup power for operation when utility power is unavailable.

Section 504.9.1 requires a battery backup for motorized garage door openers. Often in a wildland fire, utility power is shut down or power lines are damaged—both possibly affecting an entire area or region. Regardless of the cause, when utility power is no longer available and residents need to evacuate, the backup power supply will allow the garage door to be opened allowing occupants and vehicles to exit. After the occupants have driven out of the garage, the garage door can then be closed to protect the opening into the garage from the approaching fire.

It is true that motorized garage door opening devices have a release to allow for manual operation; however, manual operation is difficult, if not impossible, for elderly residents. Even if they are able to open the door, they most likely will not stop the vehicle to return and manually close the garage door as they evacuate. The battery backup allows for the normal opening and closing that they are accustomed to and increases the likelihood that the garage door will be closed when they depart.

In October 2017 Northern California wildfires were the most deadly in California's history, killing 43 people and forcing thousands to evacuate from their homes. News media told the story of one Santa Rosa resident who was obstructed from evacuating her home when her garage door would not open as a result of an associated power outage. With the help of neighbors, she was able to manually open the door and escape. Not everyone was so fortunate. It has been reported that at least five of people lost their lives during the evacuation because they could not get out of their garages because of the power outages. Several people were found in their cars inside their garage. As strong winds accelerate the spread of wildfires, utilities often shut off the power to prevent a falling line from igniting new fires. Several utilities routinely shut down power during specific weather conditions as part of a pre-emptive plan to eliminate a potential fire start should an active power line be damaged and fall as a result of the weather. Cutting power increases the risk of residents being blocked by their garage doors, which do not operate during an outage. Requiring that automatic garage door openers include a backup battery will assist residents in safely evacuating their residence during an evacuation.

Providing a battery backup for garage door openers is not a new concept. The technology and equipment for battery backup is currently available. Manufacturers offer a battery backup as an option for new devices, and even offer a battery backup kit that can be added to existing garage door openers. Garage door opener manufacturers have been providing a backup battery for all garage door openers sold in California since January 1, 2019.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: Increase

Estimated Immediate Cost Impact:

This proposal does not mandate the installation or use of an automatic garage door opener. For owners that choose to purchase one, a new garage door opener with an integral backup battery costs approximately $30-$40 more than an opener with no battery backup.

Estimated Immediate Cost Impact Justification (methodology and variables):

Average retail price for automatic door openers with and without battery backup.

WUIC47-24

WUIC48-24

IWUIC: 504.10, 505.10

Proponents: Aaron Phillips, Asphalt Roofing Manufacturers Association (ARMA), Asphalt Roofing Manufacturers Association (aphillips@asphaltroofing.org)

2024 International Wildland Urban Interface Code

Revise as follows:

504.10 Vents.
Where provided, ~~ventilation~~ openings ~~for enclosed attics, gable ends, ridge ends, under eaves and cornices, enclosed eave soffit spaces, enclosed rafter spaces formed where ceilings are applied directly to the underside of roof rafters, underfloor ventilation, foundations and crawl spaces, or any other opening~~ intended to permit ventilation, either in a horizontal or vertical surface, shall be in accordance with Section 504.10.1 or Section 504.10.2 to resist building ignition from the intrusion of burning embers and flame through the ventilation openings.

505.10 Vents.
Where provided, ~~ventilation~~ openings ~~for enclosed attics, gable ends, ridge ends, under eaves and cornices, enclosed eave soffit spaces, enclosed rafter spaces formed where ceilings are applied directly to the underside of roof rafters, underfloor ventilation, foundations and crawl spaces, or any other opening~~ intended to permit ventilation, either in a horizontal or vertical surface, shall be in accordance with Section 505.10.1 or Section 505.10.2 to resist building ignition from the intrusion of burning embers and flame through the ventilation openings.

Reason: The existing charging language of sections 504.10 and 505.10 contains a lengthy and potentially incomplete list which includes a mixture of constructions (e.g., enclosed attics, enclosed eave soffit spaces, enclosed rafter spaces) and ventilation opening locations (e.g., gable ends, ridge ends, under eaves and cornices, foundations). However, a careful review of the current language reveals the intent is for the provisions to apply to any "opening intended to permit ventilation." This proposal simplifies the charging language by removing the list and relying on the heart of the provision, i.e., all ventilation openings are to be protected.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal makes no technical change to existing provisions. Therefore, there should be no impact on construction cost. See also the proponent’s reason statement.

WUIC48-24

WUIC49-24

IWUIC: 504.10, 504.10.1, 504.10.2, 505.10, 505.10.1, 505.10.2, ASTM Chapter 07 (New)

Proponents: Milad Shabanian, Insurance Institute for Business & Home Safety (mshabanian@ibhs.org); T. Eric Stafford, Insurance Institute for Business and Home Safety (testafford@charter.net)

2024 International Wildland Urban Interface Code

Revise as follows:

504.10 Vents.
Where provided, ventilation openings for enclosed attics, gable ends, ridge ends, under eaves and cornices, enclosed eave soffit spaces, enclosed rafter spaces formed where ceilings are applied directly to the underside of roof rafters, underfloor ventilation, foundations and crawl spaces, or any other opening intended to permit ventilation, either in a horizontal or vertical surface, shall be in accordance with Section 504.10.1 or Section 504.10.2 ~~to resist building ignition from the intrusion of burning embers and flame through the ventilation openings~~.

504.10.1 Performance requirements.
Ventilation openings shall be fully covered with listed vents, tested in accordance with ASTM E2886, to demonstrate compliance with all the following requirements:

1. There shall be no flaming ignition of the cotton material during the Ember Intrusion Test.
2. There shall be no flaming ignition during the Integrity Test portion of the Flame Intrusion Test.
3. The maximum temperature of the unexposed side of the vent shall not exceed 662°F (350°C).

<u>Joints around such vents shall be sealed with sealants complying with ASTM E814 or ASTM E1966 and in accordance with vent manufacturer installation instructions to avoid flame intrusion through the joints.</u>

504.10.2 Prescriptive requirements.
Where provided, attic ventilation openings, foundation or underfloor vents, or other ventilation openings in vertical or horizontal surfaces and vents through roofs shall not exceed 144 square inches (0.0929 m^2) each. Such vents shall be covered with noncombustible corrosion-resistant mesh with openings not to exceed $^1/_8$ inch (3.2 mm) or shall be designed and approved to prevent flame or ember penetration into the structure.

Revise as follows:

505.10 Vents.
Where provided, ventilation openings for enclosed attics, gable ends, ridge ends, under eaves and cornices, enclosed eave soffit spaces, enclosed rafter spaces formed where ceilings are applied directly to the underside of roof rafters, underfloor ventilation, foundations and crawl spaces, or any other opening intended to permit ventilation, either in a horizontal or vertical surface, shall be in accordance with Section 505.10.1 or Section 505.10.2 ~~to resist building ignition from the intrusion of burning embers and flame through the ventilation openings~~.

505.10.1 Performance requirements.
Ventilation openings shall be fully covered with listed vents, tested in accordance with ASTM E2886, to demonstrate compliance with all the following requirements:

1. There shall be no flaming ignition of the cotton material during the Ember Intrusion Test.
2. There shall be no flaming ignition during the Integrity Test portion of the Flame Intrusion Test.
3. The maximum temperature of the unexposed side of the vent shall not exceed 662°F (350°C).

<u>Joints around such vents shall be sealed with sealants complying with ASTM E814 or ASTM E1966 and in accordance with vent manufacturer installation instructions to avoid flame intrusion through the joints.</u>

505.10.2 Prescriptive requirements.
Where provided, attic ventilation openings, foundation or underfloor vents, or other ventilation openings in vertical or horizontal surfaces and vents through roofs shall not exceed 144 square inches (0.0929 m^2) each. Such vents shall be covered with noncombustible corrosion-resistant mesh with openings not to exceed 1/8 inch (3.2 mm) or shall be designed and approved to prevent flame or ember penetration into the structure.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428-2959

<u>ASTM E814-2013A(2017)</u>	<u>Standard Test Method for Fire Tests of Penetration Firestop Systems</u>
<u>ASTM E1966-15 (Reapproved 2019)</u>	<u>Standard Test Method for Fire-Resistive Joint Systems</u>

Staff Analysis: The following standards proposed for inclusion in the code are currently referenced by the IBC:
- ***Standard Test Method for Fire Tests of Penetration Firestop Systems (ASTM E814-2013A(2017))***
- ***Standard Test Method for Fire-Resistive Joint Systems (ASTM E1966-15 (Reapproved 2019)***

Reason: This code modification is intended to improve the fire performance of and enhance the clarity of the existing IWUI code requirements related to vents.

The last sentence in the charging paragraph is deemed unnecessary and potentially misleading. This sentence stipulates that vents must be constructed according to either the performance or prescriptive requirements to resist ember and "flame" intrusion. While performance-based requirements can achieve ember and flame resistance, prescriptive requirements only protect against ember intrusion, not flame intrusion. Deleting this unnecessary portion of the charging paragraph will eliminate confusion around flame intrusion and accurately acknowledge that mesh screens can only resist ember intrusion.
The second concern pertains to flame intrusion through joints around approved vents tested in accordance with ASTM E2886. Experiments at the IBHS research center revealed that, in the absence of appropriate sealant, flames can pass through unsealed joints around these vents (see Figure 1). A review of approved vent manufacturers' installation instructions regarding sealants for vent joints revealed some inconsistencies. This proposal specifically requires vent joints to be sealed with a sealant complying with ASTM E814 or ASTM E1966.

Figure 1.

Fire intrusion through the joints around an ASTM E2886 approved eave vent.

Cost Impact: Increase

Estimated Immediate Cost Impact:

The primary purpose of this modification is to enhance the clarity of IWUIC provisions regarding the fire performance of vents. Most manufacturers of these vents already require a specific fire resistant sealant as part of their installation instructions. For these manufacturers, this proposal will not have any impact on the cost of construction. However, for manufacturers that do not specifiy a sealant, it is anticipated that this proposal will have a cost impact of $15-$30 depending on the number of ventilation openings and the size of the building. For typical single family dwellings, it is estimated that one tube of sealant (approximately $15) will be sufficient to seal all ventilation openings.

Estimated Immediate Cost Impact Justification (methodology and variables):

A web search of several retailers carrying sealants complying with ASTM E814 or ASTM E1966 revealed that one tube of sealant costs approximately $15. Additional labor costs are estimated to be negligible.

WUIC50-24

IWUIC: 504.10.3, 505.10.3

Proponents: Aaron Phillips, Asphalt Roofing Manufacturers Association (ARMA), Asphalt Roofing Manufacturers Association (aphillips@asphaltroofing.org)

2024 International Wildland Urban Interface Code

Revise as follows:

504.10.3 Vent locations.
~~Attic ventilation openings shall not be located in soffits, in eave overhangs, between rafters at eaves or in other overhang areas.~~ Gable-end and dormer vents shall be located not less than 10 feet (3048 mm) from lot lines. Underfloor ventilation openings shall be located as close to grade as practical.

505.10.3 Vent locations.
~~Attic ventilation openings shall not be located in soffits, in eave overhangs, between rafters at eaves or in other overhang areas.~~ Gable-end and dormer vents shall be located not less than 10 feet (3048 mm) from lot lines. Underfloor ventilation openings shall be located as close to grade as practical.

Reason: Sections 504.10 and 505.10 permit ventilation openings "for enclosed attics, ... under eaves and cornices, enclosed eave soffit spaces, [and] enclosed rafter spaces formed where ceilings are applied directly to the underside of roof rafters ...." Sections 504.10.3 and 505.10.3 expressly exclude attic ventilation openings "located in soffits, in eave overhangs, between rafters at eaves or in other overhang areas." This proposal corrects this logical inconsistency by removing the restriction on vents located in soffits, in eave overhangs, between rafters at eaves, or in other overhang areas from Sections 504.10.3 and 505.10.3. Vents must comply with the performance or prescriptive requirements within Sections 504.10 or 505.10, and those that do so should be permitted for any ventilation opening regardless of location.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal corrects a logical inconsistency between code sections for IR 1 and IR 2 construction. As such, the changes proposed are not expected to change the cost of construction.

WUIC50-24

WUIC51-24

IWUIC: 504.10, 504.10.2, 505.10, 505.10.2, 506.5

Proponents: Aaron Phillips, Asphalt Roofing Manufacturers Association (ARMA), Asphalt Roofing Manufacturers Association (aphillips@asphaltroofing.org)

2024 International Wildland Urban Interface Code

Revise as follows:

504.10 Vents.
Where provided, ventilation openings for enclosed attics, gable ends, ridge ends, under eaves and cornices, enclosed eave soffit spaces, enclosed rafter spaces formed where ceilings are applied directly to the underside of roof rafters, underfloor ventilation, foundations and crawl spaces, or any other opening intended to permit ventilation, ~~either in a horizontal or vertical surface~~, shall be in accordance with Section 504.10.1 or Section 504.10.2 to resist building ignition from the intrusion of burning embers and flame through the ventilation openings.

504.10.2 Prescriptive requirements.
~~Where provided, attic ventilation~~ Ventilation openings~~, foundation or underfloor vents, or other ventilation openings in vertical or horizontal surfaces and vents through roofs shall not exceed 144 square inches (0.0929 m²) each. Such vents~~ shall be fully covered with noncombustible corrosion-resistant mesh with openings not to exceed $^1/_8$ inch (3.2 mm) or with vents ~~shall be~~ designed and *approved* ~~approved~~ to prevent flame or ember penetration into the structure.

505.10 Vents.
Where provided, ventilation openings for enclosed attics, gable ends, ridge ends, under eaves and cornices, enclosed eave soffit spaces, enclosed rafter spaces formed where ceilings are applied directly to the underside of roof rafters, underfloor ventilation, foundations and crawl spaces, or any other opening intended to permit ventilation, ~~either in a horizontal or vertical surface,~~ shall be in accordance with Section 505.10.1 or Section 505.10.2 to resist building ignition from the intrusion of burning embers and flame through the ventilation openings.

505.10.2 Prescriptive requirements.
~~Where provided, attic ventilation~~ Ventilation openings~~, foundation or underfloor vents, or other ventilation openings in vertical or horizontal surfaces and vents through roofs shall not exceed 144 square inches (0.0929 m²) each. Such vents~~ shall be fully covered with noncombustible corrosion-resistant mesh with openings not to exceed 1/8 inch (3.2 mm) or with vents ~~shall be~~ designed and *approved* ~~approved~~ to prevent flame or ember penetration into the structure.

506.5 Vents.
~~Where provided, attic ventilation~~ Ventilation openings~~, foundation or underfloor vents, or other ventilation openings in vertical exterior walls and vents through roofs shall not exceed 144 square inches (0.0929 m²) each. Such vents~~ shall be fully covered with noncombustible corrosion-resistant mesh with openings not to exceed 1/8 inch (3.2 mm) or with vents~~shall be~~ designed and *approved* ~~approved~~ to prevent flame or ember penetration into the structure.

Reason: This proposal makes changes to the IWUIC vent provisions (1) to clarify that ventilation openings are permitted on sloped surfaces, (2) to remove the ventilation opening size limitation from the prescriptive compliance option, and (3) to require full coverage of ventilation openings regardless of the compliance path. Also, the proposal cleans up the prescriptive options (sections 504.10.2 and 505.10.2) and section 506.5 by removing the unnecessary and potentially confusing list of ventilation opening locations.

Ventilation Openings on Sloped Surfaces. The ventilation sections in the 2024 IWUIC restrict ventilation openings to horizontal or vertical surfaces. This could imply that ventilation openings on sloped surfaces (e.g., rooftops) are not subject to these requirements, which is not understood to be the intention or a desirable interpretation. Ventilation openings on all surfaces of the building should provide protection, and removal of the restriction to horizontal and vertical surfaces from sections 504.10 and 505.10 clarifies that all ventilation openings must be addressed.

Prescriptive Option Size Limitation. The size of ventilation openings is limited to 144 square inches when complying via the prescriptive option. This restriction has been in the IWUIC since the first edition, but no technical justification was discovered during an examination of the available code development records or through discussions with several parties involved in creation of the original IWUIC and California Building Code Chapter 7A provisions. It is worth noting that California provisions have not included such a size limitation.

Full Coverage of Ventilation Openings. The performance compliance option in sections 504.10.1 and 505.10.1 includes the important provision that ventilation openings be fully covered. This proposal adds this practical requirement to the prescriptive path and to section 506.5.

Cleanup. Sections 504.10.2, 505.10.2 and 506.5 include an unnecessary list of ventilation opening locations. In their simplest form, these sections state, "Where provided, ventilation openings ... in vertical or horizontal surfaces and vents through roofs ...." The intention is clearly to require these provisions to apply to any ventilation opening. The cleanup simplifies the language and eliminates potential misinterpretation of the requirements.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The changes offered in this proposal primarily improve clarity of existing provisions. Removal of the ventilation opening size restriction which is present in the prescriptive requirements should not affect construction cost because the existing performance path already provides a means to demonstrate compliance for vents installed over ventilation openings which are larger than 144 square inches.

WUIC51-24

WUIC52-24

IWUIC: 504.11, 504.11.1, 505.11, 505.11.1

Proponents: Milad Shabanian, Insurance Institute for Business & Home Safety, Insurance Institute for Business & Home Safety (mshabanian@ibhs.org); T. Eric Stafford, Insurance Institute for Business and Home Safety (testafford@charter.net)

2024 International Wildland Urban Interface Code

Revise as follows:

504.11 Detached accessory structures.
Detached accessory structures located less than 50 feet (15 240 mm) from a building containing habitable space shall have exterior walls constructed in accordance with Section 504.5, underfloor areas constructed in accordance with Section 504.6, roof assemblies constructed in accordance with Section 504.2, gutters and downspouts constructed in accordance with Section 504.4 and vents constructed in accordance with Section 504.10.
Where detached accessory structures are located less than 20 feet (6096 mm) from a building containing habitable space, exterior glazing and exterior doors in the detached accessory structure shall not be located in walls that face the building containing habitable space.

Exception: Exterior glazing complying Section 504.8 and exterior doors complying Section 504.9.

~~with materials *approved* for not less than 1-hour *fire-resistance-rated construction*, heavy timber, *log wall construction*, or constructed with *approved noncombustible* materials or fire-retardant-treated wood on the exterior side. The fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section 2303.2 of the International Building Code.~~

Delete without substitution:

~~**504.11.1 Underfloor areas.**~~
~~Where the detached structure is located and constructed so that the structure or any portion thereof projects over a descending slope surface greater than 10 percent, the area below the structure shall have underfloor areas enclosed to within 6 inches (152 mm) of the ground, with exterior wall construction in accordance with Section 504.5 or underfloor protection in accordance with Section 504.6.~~

~~**Exception:** The enclosure shall not be required where the underside of exposed floors and exposed structural columns, beams and supporting walls are protected as required for exterior 1-hour *fire-resistance-rated construction* or *heavy timber construction* or fire-retardant-treated wood on the exterior side. The fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section 2303.2 of the International Building Code.~~

Revise as follows:

505.11 Detached accessory structures.
Detached accessory structures located less than 50 feet (15 240 mm) from a building containing habitable space shall have exterior walls constructed in accordance with Section 505.5, underfloor areas constructed in accordance with Section 505.6, roof assemblies constructed in accordance with Section 505.2, gutters and downspouts constructed in accordance with Section 505.4 and vents constructed in accordance with Section 505.10.
Where detached accessory structures are located less than 20 feet (6096 mm) from a building containing habitable space, exterior glazing and exterior doors in the detached accessory structure shall not be located in walls that face the building containing habitable space.

Exception: Exterior glazing complying Section 505.8 and exterior doors complying Section 505.9.

~~with materials *approved* for not less than 1-hour *fire-resistance-rated construction*, heavy timber, *log wall construction*, or constructed with *approved noncombustible* materials or fire-retardant-treated wood on the exterior side. The fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section 2303.2 of the International Building Code.~~

Delete without substitution:

~~**505.11.1 Underfloor areas**~~**.**

~~Where the detached *accessory structure* is located and constructed so that the structure or any portion thereof projects over a descending slope surface greater than 10 percent, the area below the structure shall have underfloor areas enclosed to within 6 inches (152 mm) of the ground, with exterior wall construction in accordance with Section 505.5 or underfloor protection in accordance with Section 505.6.~~

> ~~**Exception:** The enclosure shall not be required where the underside of exposed floors and exposed structural columns, beams and supporting walls are protected as required for exterior 1-hour *fire-resistance-rated construction* or heavy-timber construction or fire-retardant-treated wood on the exterior side. The fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section 2303.2 of the International Building Code.~~

Reason: This proposal is intended to improve and enhace the construciton of detached accessory structures in Class 1 and Class 2 ignition-resistant construction. The current language in sections 504.11 and 505.11 contains three primary flaws:

1. The requirements fail to completely safeguard detached accessory structures from ember exposure, which is the most likely scenario in a wildfire event. Consequently, this lack of protection against embers may jeopardize the primary structure, making it vulnerable to direct flame contact and radiant heat exposure emanating from the detached accessory structure.
2. The requirements for exterior walls of detached accessory structures do not align completely with the requirements for the exterior walls of the main structure. Specifically, these sections do not refer to ignition-resistant materials.
3. The requirements for the underfloor area of detached accessory structures in Sections 504.11.1 and 505.11.1 are essentially the same as the requirements in Sections 504.7.1 and 505.7.1 pertaining to appendages and projections. However, they should conform to the requirements for the underfloor areas of structures outlined in sections 504.6 and 505.6.

The proposed language addresses these issues through three key revisions:

1. New language incorporates specific references to requirements for roof assemblies, gutters and downspouts, vents, and windows and doors for detached accessory structures to enhance their resistance to embers.
2. Referring to sections 504.5 and 505.5 for exterior walls to ensure comprehensive coverage and prevent future misalignment.
3. Referring to sections 504.6 and 505.6 for underfloor areas to ensure all possible options are available, reducing the likelihood of confusion and misalignment.

While the second and third items above are primarily intended to correlate the technical requirements with the current language, the first item is intended to enhance the ember resistance of detached accessory structures. It does this by mandating a Class A roof assembly, noncombustible gutters and downspouts, gutter protection, and vent protection. Additionally, it restricts the proximity of exterior openings facing the main structure to a minimum of 20 feet. This restriction is designed to shield the main structure from potential direct flame contact and radiant heat exposure caused by fire jetting out of window and door openings in detached accessory structures.

Based on structural separation experiments conducted by IBHS and NIST [1-3] and observations during these experiments, (see Figure 1) it is evident that the orientation of openings plays a significant role in the fire exposure for the target structure, particularly when the detached accessory structure is located less than 20 feet from the building. Therefore, it is recommended that openings in detached accessory structures located within this range not be located in walls that face the primary structure.

Figure 1. Possible fire exposure to target structure caused by noncombustible detached accessory structures 20 ft away from target structure.

Bibliography:

1. Maranghides, A., Link, E. D., Nazare, S., Hawks, S., McDougald, J., Quarles, S. L., & Gorham, D. J. (2022). *WUI Structure/Parcel/Community Fire Hazard Mitigation Methodology*. Department of Commerce. National Institute of Standards and Technology. https://doi.org/10.6028/NIST.TN.2205

2. Maranghides, A., Nazare, S., Hedayati, F., Gorham, D., Link, E., Hoehler, M., ... & Walton, W. (2022). *Structure Separation Experiments: Shed Burns without Wind*. National Institute of Standards and Technology, US Department of Commerce. https://doi.org/10.6028/NIST.TN.2235

3. Maranghides, A., Nazare, S., Butler, K. M., Johnsson, E. L., Link, E., Bundy, M., ... & Frievalt, F. (2023). *NIST Outdoor Structure Separation Experiments (NOSSE) with Wind.* https://doi.org/10.6028/NIST.TN.2253

4. Barrett, K., Quarles, S., Gorham, D. (2022). *Construction costs for a wildfire-resistant home, California edition.* Headwaters Economics and Institute for business & home safety (IBHS).

Cost Impact: Increase

Estimated Immediate Cost Impact:

The proposed alteration will result in increased construction costs as it necessitates compliance with specific sections concerning the roof assembly, gutters, vents, and openings within a 20-foot proximity to the main structure.

Estimated Immediate Cost Impact Justification (methodology and variables):

In 2022, a study conducted by IBHS and Headwaters Economics assessed the expenses associated with constructing more wildfire-resistant homes in California. According to the findings, addressing the vulnerability of various elements, including those mentioned above, can be achieved for a cost of less than $3,000 during new construction [4].

Estimated Life Cycle Cost Impact:

The proposed change also has cost advantages, both in the short and long term, of implementing new requirements that will enhance the safety of first responders during a wildfire incident, as well as improve fire and life safety measures.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

This proposal will enhance the resilience of detached accessory structures to ember exposure, consequently improving the fire safety of buildings with living spaces next to these detached structures. This increased resilience at the property level will yield lasting economic advantages for the community and the businesses within it.

WUIC52-24

WUIC53-24

IWUIC: SECTION 503, 503.1, TABLE 503.1, 503.2, 503.2.1, 503.2.2, 503.2.3, 503.2.4, 503.2.4.1, 503.2.4.2, 503.2.4.3, 503.2.4.3.1, 503.2.4.3.2, 503.2.4.3.3

Proponents: Crystal Sujeski, CAL FIRE/Office of the State Fire Marshal (crystal.sujeski@fire.ca.gov); Cary Yballa, Central County Fire Department, Cal FPO (cyballa@ccfd.org); Darcy Davidson, Carlsbad Fire Department, California Fire Prevention Officers (darcy.davidson@carlsbadca.gov)

2024 International Wildland Urban Interface Code

Revise as follows:

SECTION 503
~~IGNITION-RESISTANT~~ WILDLAND CONSTRUCTION AND MATERIAL

503.1 General.
Buildings and structures hereafter constructed, modified or relocated into or within *wildland-urban interface areas* shall ~~meet~~comply with the construction requirements in ~~accordance with Table 503.1. Class 1, Class 2 or Class 3, ignition-resistant construction shall be in accordance with Sections 504, 505 and 506, respectively~~ Section 504. Materials required to be ignition-resistant materials shall comply with the requirements of Section 503.2.

Delete without substitution:

~~TABLE 503.1 IGNITION-RESISTANT CONSTRUCTION[a]~~

DEFENSIBLE SPACE[c]	FIRE HAZARD SEVERITY					
	Moderate Hazard		High Hazard		Extreme Hazard	
	Water Supply[b]		Water Supply[b]		Water Supply[b]	
	Conforming[d]	Nonconforming[e]	Conforming[d]	Nonconforming[e]	Conforming[d]	Nonconforming[e]
Nonconforming	IR 2	IR 1	IR 1	IR 1 N.C.	IR 1 N.C.	Not Permitted
Conforming	IR 3	IR 2	IR 2	IR 1	IR 1	IR 1 N.C.
1.5 × Conforming	Not Required	IR 3	IR 3	IR 2	IR 2	IR 1

~~a. Access shall be in accordance with Section 403.~~

~~b. Subdivisions shall have a conforming water supply in accordance with Section 402.1.~~

~~IR 1 = Ignition-resistant construction in accordance with Section 504.~~

~~IR 2 = Ignition-resistant construction in accordance with Section 505.~~

~~IR 3 = Ignition-resistant construction in accordance with Section 506.~~

~~N.C. = Exterior walls shall have a fire-resistance rating of not less than 1 hour and the exterior surfaces of such walls shall be noncombustible. Usage of log wall construction is allowed.~~

~~c. Conformance based on Section 603.~~

~~d. Conformance based on Section 404.~~

~~e. A nonconforming water supply is any water system or source that does not comply with Section 404, including situations where there is no water supply for structure protection or fire suppression.~~

Revise as follows:

503.2 Ignition-resistant building material.
Ignition-resistant building materials shall be designed for exterior use and comply with any one of the requirements in Section 503.2.1 through ~~503.2.4~~ 503.2.4.3.3.

503.2.1 Noncombustible material.
Material shall comply with the definition of *noncombustible* materials in Section 202.

503.2.2 Fire-retardant-treated wood.
Fire-retardant-treated wood shall be identified for exterior use and shall meet the requirements of Section 2303.2 of the *International Building Code*.

503.2.3 Fire-retardant-treated wood roof coverings.
Roof assemblies containing fire-retardant-treated wood shingles and shakes shall comply with the requirements of Section 1505.6 of the *International Building Code* and shall be classified as Class A roof assemblies as required in Section 1505.2 of the *International Building Code*.

503.2.4 Ignition-resistant building material.
Material shall be tested on the front and back faces in accordance with the extended ASTM E84 or UL 723 test, for a total test period of 30 minutes, or with the ASTM E2768 test. The materials shall bear identification showing the fire test results. Panel products shall be tested with a ripped or cut longitudinal gap of $^1/_8$ inch (3.2 mm). The materials, when tested in accordance with the test procedures set forth in ASTM E84 or UL 723 for a test period of 30 minutes, or with ASTM E2768, shall comply with Sections 503.2.4.1 through 503.2.4.3.

Exception: Materials composed of a combustible core and a noncombustible exterior covering made from either aluminum at a minimum 0.019 inch (0.48 mm) thickness or corrosion-resistant steel at a minimum 0.0149 inch (0.38 mm) thickness shall not be required to be tested with a ripped or cut longitudinal gap.

503.2.4.1 Flame spread.
The material shall exhibit a flame spread index not exceeding 25.

503.2.4.2 Flame front.
The material shall exhibit a flame front that does not progress more than 10 feet 6 inches (3200 mm) beyond the centerline of the burner at any time during the test.

503.2.4.3 Weathering.
Ignition-resistant building materials shall maintain their performance in accordance with this section under conditions of use. The materials shall meet the performance requirements for weathering (including exposure to temperature, moisture and ultraviolet radiation) contained in Sections 503.2.4.3.1 through 503.2.4.3.3, as applicable to the materials and conditions of use.

503.2.4.3.1 Evaluation requirements for weathering.
Fire-retardant-treated wood, wood-plastic composite materials and plastic lumber materials shall be evaluated after weathering in accordance with Method A “Test Method for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing” in ASTM D2898.

503.2.4.3.2 Wood-plastic composite materials.
Wood-plastic composite materials shall also demonstrate acceptable fire performance after weathering by the following procedure: first testing in accordance with ASTM E1354 at an incident heat flux of 50 kW/m^2 in the horizontal orientation, then weathering in accordance with ASTM D7032 and then retesting in accordance with ASTM E1354 and exhibiting an increase of no more than 10 percent in peak rate of heat release when compared to the peak heat release rate of the nonweathered material.

503.2.4.3.3 Plastic lumber materials.
Plastic lumber materials shall also demonstrate acceptable fire performance after weathering by the following procedure: first testing in accordance with ASTM E1354 at an incident heat flux of 50 kW/m^2 in the horizontal orientation, then weathering in accordance with ASTM D6662 and then retesting in accordance with ASTM E1354 and exhibiting an increase of no more than 10 percent in peak rate of heat release when compared to the peak heat release rate of the nonweathered material.

Reason: This code change proposes one construction method for buildings and structures in the wildland-urban interface area. This is a companion proposal to another proposal which deletes Sections 505 and 506. In other words, the other proposal removes Ignition Resistant Construction Classes 2 and 3. Replacing these multiple classifications with a single defined Ignition Resistant Construction as provided by Section 504 of this code. As the IWUIC is intended to provide a minimum standard of protection for the Wildland-Urban Interface areas, a single classification of Ignition Resistant Construction should be provided to accomplish the following goals:

1. Protect lives and property within the Wildland-Urban Interface areas
2. Provide clear and consistent standards, simplifying the construction process
3. Providing a minimum standard of protection, with appendices providing potential pathways for increased protection beyond the minimum

Defensible space is a component of home hardening and the benefits go hand in hand with the construction materials. Embers will find the path of least resistance.

Defensible space is the buffer between your structure and the surrounding area.

Adequate defensible space acts as a barrier to slow or halt the progress of fire that would otherwise engulf your property. It also helps ensure the safety of firefighters defending your home. Defensible space is the first line of defense for your home against wildfire.

The intensity of wildfire fuel management varies within the 100-foot perimeter of the home, with more intense fuels’ reduction occurring closer to your home. Start at the home and work your way out to 100 feet or to your property line, whichever is closer. Learn more about the Defensible Space Zones below.

It takes the combination of both Defensible Space and Home Hardening to give your home and property the best chance of surviving a wildfire.

Bibliography: Construction costs for a wildfire-resistant home: California edition - Headwaters Economics

Fire Research Division | NIST

https://nvlpubs.nist.gov/nistpubs/TechnicalNotes/NIST.TN.2205.pdf

Cost Impact: Increase

Estimated Immediate Cost Impact:

Construction costs for a typical single-family (1,750 square-foot) home would increase approximately $2,000 including developer overhead costs

Estimated Immediate Cost Impact Justification (methodology and variables):

In 2004, and as a precursor to California adopting Building Code Chapter 7A, the Office of the State Fire Marshal requested an analysis identifying the costs and benefits associated with proposed regulations in the state's wildfire-prone areas. The study was conducted by Fire Cause Analysis and evaluated economic and construction data within various business sectors to analyze construction costs if proposed regulations were implemented.33 The study found construction costs for a typical single-family (1,750 square-foot) home would increase approximately $2,000 including developer overhead costs. As an aggregated total at the state level, construction costs would increase approximately $30 million per year for the estimated 14,000 new homes built in areas where regulations would apply. The authors concluded the costs of not implementing regulations, in the form of property losses and suppression costs, exceeded the projected costs for regulations and therefore recommended adopting mitigation standards in wildfire-prone areas.

In 2019, the National Institute of Building Sciences (NIBS) released a report identifying the benefit-cost ratio (BCR) of investing in hazard mitigation, including wildfires.35 The authors found that for every $1 spent on up-front costs for wildfire mitigation, a benefit of $4 was received.

In 2021, the National Research Council of Canada released a study analyzing the benefit-cost ratio for building new construction to comply with the country's wildland urban interface (WUI) Guide.38 In its examination, approximately $12,000 CAD (~$9,500 USD) was added to the overall costs for a new, 2,000-square-foot home to meet the provision of Canada's National WUI Guide. The comprehensive report also examined costs for retrofitting existing structures, as well as transferred costs at the community and national scale. Similar to the NIBS study in 2019, the NRC report found an up-front investment in wildfire-resistant construction and vegetation management yielded benefits that exceeded long-term costs and losses.

WUIC53-24

WUIC54-24

IWUIC: SECTION 504, 504.1, 504.2, 504.2.1 (New), 504.2.1, 504.2.3 (New), 504.3, 504.3.1 (New), 504.4, 504.5, 504.5.1 (New), 504.5.1, 504.6, 504.7, 504.7.1, 504.7.2 (New), 504.7.3 (New), 504.7.3.1 (New), 504.7.3.2 (New), 504.7.3.3 (New), 504.7.3.3.1 (New), 504.7.3.3.2 (New), 504.7.3.4 (New), 504.8, 504.8.1 (New), 504.8.2 (New), 504.9, 504.9.1 (New), 504.9.2 (New), 504.9.3 (New), 504.10, 504.10.1, 504.10.2, 504.10.3, 504.11, 504.11.1, 504.11.2 (New), 504.11.3 (New), 504.11.4 (New), 504.11.5 (New), 504.11.6 (New)

Proponents: Crystal Sujeski, CAL FIRE/Office of the State Fire Marshal (crystal.sujeski@fire.ca.gov); Kevin Scott, KH Scott & Associates LLC, self (khscottassoc@gmail.com); Cary Yballa, Central County Fire Department, Cal FPO (cyballa@ccfd.org); Darcy Davidson, Carlsbad Fire Department, California Fire Prevention Officers (darcy.davidson@carlsbadca.gov)

2024 International Wildland Urban Interface Code

Revise as follows:

SECTION 504
~~CLASS 1 IGNITION-RESISTANT CONSTRUCTION~~ CONSTRUCTION METHODS FOR EXTERIOR WILDFIRE EXPOSURE

504.1 General.
~~Class 1 ignition~~ Ignition-resistant construction shall be in accordance with Sections 504.2 through ~~504.11~~ 504.11.6.

504.2 Roof assembly.
Roofs shall have a *roof assembly* that complies with a Class A ~~rating~~ fire classification when tested in accordance with ASTM E108 or UL 790. ~~For *roof assemblies* where the profile allows a space between the *roof covering* and *roof deck*, the space at the eave ends shall be firestopped to preclude entry of flames or embers or have one layer of 72-pound (32.4 kg) mineral-surfaced, nonperforated cap sheet complying with ASTM D3909 installed over the combustible *roof deck*~~.

Exceptions:

1. Class A *roof assemblies* include those with coverings of brick, masonry or an exposed concrete *roof deck*.
2. Class A *roof assemblies* also include ferrous or copper shingles or sheets, metal sheets and shingles, clay or concrete roof tile or slate installed on noncombustible decks or ferrous, copper or metal sheets installed without a *roof deck* on noncombustible framing.
3. Class A *roof assemblies* include minimum 16 oz/sq ft (0.0416 kg/m^2) copper sheets installed over combustible *roof decks*.

Add new text as follows:

504.2.1 Roof covering gaps. Roof covering gaps and voids shall be protected as follows:

1. Where the roofing covering profile has an airspace under the roof covering and is installed over a combustible deck, the combustible deck shall be protected by any of the following:
   - 1.1 Install a 72-pound (32.7 kg) cap sheet, complying with ASTM D3909, over the roof deck.
   - 1.2 Install mineral wool board or other noncombustible material with a minimum thickness of 1 inch (25.4 mm) between the roofing material and the wood framing or deck.
   - 1.3 Install a Class A fire classification roof underlayment, tested in accordance with ASTM E108 or UL 790. If the sheathing consists of exterior fire-retardant treated wood, the underlayment shall not be required to comply with a Class A classification.
2. Bird stops shall be used at the eaves, when the profile fits, to prevent debris from entering at the eave. Hip and ridge caps shall be mudded to prevent intrusion of fire or embers.

Revise as follows:

~~504.2.1~~ 504.2.2 Roof valleys.
Where provided, valley flashings shall be not less than 0.019 inch (0.48 mm) (No. 26 galvanized sheet gage) corrosion-resistant metal installed over a minimum 36-inch-wide (914 mm) underlayment consisting of one layer of 72-pound (32.~~4~~7 kg) mineral-surfaced, nonperforated cap sheet complying with ASTM D3909 running the full length of the valley.

Add new text as follows:

504.2.3 Skylights. Skylights, including tubular daylighting devices and sloped glazing shall comply with section 504.8

Revise as follows:

504.3 Protection of enclosed eaves.
The exposed underside of enclosed roof ~~Eaves~~eaves and soffits shall be protected on the exposed underside by any of the following:

1. Noncombusible materials.
2. ~~ignition-resistant I~~gnition-resistant materials. ~~or by~~
3. Fire-retardant-treated wood labeled for exterior use.
4. ~~materials~~Materials *approved* for not less than 1-hour *fire-resistance-rated construction* on the exterior side.~~,~~
5. 2-inch (51 mm) nominal dimension lumber.~~, or~~
6. 1-inch (25 mm) nominal fire-retardant-treated lumber or $^3/_4$-inch (19.1 mm) nominal fire-retardant-treated plywood~~,~~ identified for exterior use ~~and meeting the requirements of Section 2303.2 of the International Building Code~~.
7. Boxed-in roof eave soffit assemblies with an underside that meets the performance criteria in Section 504.7.2 when tested in accordance with the test procedures set forth in ASTM E2957.

Fascias are required and shall be ~~protected on the backside by~~ ignition-resistant materials, fire retardant-treated wood labeled for exterior use ~~or by~~ materials *approved* for not less than 1-hour *fire-resistance-rated construction* or 2-inch (51 mm) nominal dimension lumber.

Add new text as follows:

504.3.1 Protection of open eaves. The exposed roof deck on the underside of unenclosed roof eaves shall consist of one or more of the following:

1. Noncombustible material.
2. Ignition-resistant material.
3. Fire-retardant-treated wood labeled for exterior use.
4. Materials approved for not less than 1-hour fire-resistance-rated construction on the exterior side.
5. 2-inch (51 mm) nominal dimension lumber.
6. One layer of 5/8-inch (16 mm) Type X gypsum sheathing applied behind an exterior covering on the underside of the roof deck.
7. The exterior portion of a 1-hour fire-resistance-rated exterior assembly applied to the underside of the roof deck designed for exterior fire exposure, including assemblies using the gypsum panel and sheathing products listed in the Gypsum Association Fire Resistance Design Manual.

Fascias, if provided, shall be of fire-retardant-treated wood, ignition-resistant materials, materials approved for not less than 1-hour fire-resistance -rated construction or 2-inch (51 mm) nominal dimension lumber.

504.4 Gutters and downspouts.
Gutters and downspouts shall be constructed of *noncombustible* material. Gutters shall be provided with an *approved* means to prevent

the accumulation of leaves and debris in the gutter.

Revise as follows:

504.5 Exterior walls.
Exterior walls of buildings or structures shall be constructed with one of the following methods:

1. ~~Materials *approved* for not less than~~ 1-hour *fire-resistance-rated construction* ~~on the exterior side~~.
2. *Approved noncombustible* materials.
3. Heavy timber. ~~or *log wall construction*~~ Assembly of sawn lumber or glue-laminated wood with the smallest minimum nominal dimension of 4 inches (102 mm). Sawn or glue-laminated planks splined, tongue-and-grove or set close together and well spiked.
4. Log wall construction. Assembly that has been tested in accordance with the test procedures for a 10-minute direct flame contact exposure test set forth in ASTM E2707 with the conditions of acceptance shown in Section 504.9.3.
5. Wall assemblies suitable for exterior fire exposure containing one layer of 5/8-inch (15.9 mm) Type X gypsum sheathing applied behind the exterior wall covering or cladding on the exterior side of the framing.

~~4.~~ 6. Fire-retardant-treated wood ~~on the exterior side. The fire-retardant-treated wood~~ shall be labeled for exterior use and meet the requirements of Section 2303.2 of the International Building Code.

~~5~~ 7. Ignition-resistant materials complying with Section 503.2 ~~on the exterior side~~.

Such material shall extend from the top of the foundation to the underside of the roof sheathing.

Add new text as follows:

504.5.1 Exterior wall coverings. The exterior wall covering shall comply with one or more of the following requirements, except as permitted for exterior walls complying with Section 504.5:

1. Noncombustible material.
2. Ignition-resistant material labeled for exterior use.
3. Fire-retardant-treated wood. The fire-retardant-treated wood shall be labeled for exterior use and shall meet the requirements of Section 2303.2 of the International Building Code.

Revise as follows:

504.5.~~1~~ 2 Flashing.
A minimum of 6 inches (152 mm) of metal flashing or noncombustible material applied vertically on the exterior of the wall shall be installed at the ground, decking and roof intersections.

504.6 Underfloor enclosure.
Buildings or structures shall have underfloor areas enclosed to the ground with exterior walls in accordance with Section 504.5.

> **Exception:** Complete enclosure shall not be required where the underside of exposed floors and exposed structural columns, beams and supporting walls are protected as required for exterior 1-hour *fire-resistance-rated construction* or *heavy timber construction* or fire-retardant-treated wood. The fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section 2303.2 of the International Building Code.

Revise as follows:

504.7 ~~Appendages and projections~~ Projections.
Unenclosed accessory structures attached to buildings with habitable spaces and projections, ~~such as~~other than decks, shall be ~~not less than 1-hour fire-resistance-rated construction,~~ *heavy timber construction* or constructed of one of the following:

1. ~~*Approved noncombustible*~~ Noncombustible materials.
2. Fire-retardant-treated wood identified for exterior use and meeting the requirements of Section 2303.2 of the International Building Code.
3. Ignition-resistant building materials in accordance with Section 503.2.

   ~~**Exception:** Coated materials shall not be used as the walking surface of decks.~~

4. Materials approved for not less than 1-hour fire-resistance-rated construction on the exterior side, as tested in accordance with ASTM E119 or UL 263.
5. One layer of 5/8-inch (15.9 mm) Type X gypsum sheathing applied behind the exterior covering on the underside of the ceiling.
6. The exterior portion of a 1-hour fire-resistance-rated exterior assembly, as tested in accordance with ASTM E119, applied to the underside of the ceiling assembly, including assemblies using the gypsum panel and sheathing products listed in the Gypsum Association Fire Resistance Design Manual.
7. The underside of a floor projection assembly that meets the performance criteria in Section 504.7.2 when tested in accordance with the test procedures set forth in ASTM E2957.

504.7.1 ~~Underfloor areas~~ Underside of projections.
~~Where the attached structure is located and constructed so that the structure or any portion thereof projects over a descending slope surface greater than 10 percent, the area below the structure shall have underfloor areas enclosed to within 6 inches (152 mm) of the ground, with exterior wall construction in accordance with Section 504.5.~~
The underside of projections shall be enclosed to grade in accordance with the requirements of this chapter or the underside of the exposed underfloor shall be protected by one or more of the following:

Exception: Structural columns and beams are not required to be protected in accordance with Section 504.7.1 when constructed with sawn lumber or glue-laminated wood with the smallest minimum nominal dimension of 4 inches (102 mm). Sawn or glue-laminated planks shall be splined, tongue-and-groove, or set close together and well spiked.

1. Noncombustible material.
2. The ignition-resistant material shall be labeled for exterior use and shall meet the requirements of Section 503.2.
3. The fire-retardant-treated wood shall be labeled for exterior use and shall meet the requirements of Section 2303.2 of the International Building Code.
4. Materials approved for not less than 1-hour fire-resistance-rated construction on the exterior side, as tested in accordance with ASTM E119 or UL 263.
5. One layer of 5/8-inch (15.9 mm) Type X gypsum sheathing applied behind an exterior covering on the underside of the floor projection.
6. The exterior portion of a 1-hour fire-resistance-rated exterior assembly, as tested in accordance with ASTM E119 or UL 263, applied to the underside of the floor, including assemblies using the gypsum panel and sheathing products listed in the Gypsum Association Fire Resistance Design Manual.
7. The underside of a floor assembly that meets the performance criteria in Section 504.7.2 when tested in accordance with the test procedures set forth in ASTM E2957.

Add new text as follows:

504.7.2 Conditions of acceptance for ASTM E2957. The ASTM E2957 test shall be conducted on a minimum of three test specimens and meet the conditions of acceptance in Items 1 through 3 below. If any one of the three tests does not meet the conditions of acceptance, three additional tests shall be performed. All three additional tests must meet the conditions of acceptance.

1. Absence of flame penetration of the eaves or horizontal projection assembly at any time.
2. Absence of structural failure of the eaves or horizontal projection subassembly at any time.
3. Absence of sustained combustion of any kind at the conclusion of the 40-minute test.

504.7.3 Decks. The walking surface material of decks, porches, balconies and stairs shall comply with the requirements of Sections 504.7.3.1 through 504.7.3.4.

504.7.3.1 Flashing. A minimum of a 6-inch (150 mm) metal flashing, applied vertically on the exterior of the wall, shall be installed at all deck-to-wall intersections.

504.7.3.2 Decking surfaces. The walking surface material of decks, porches, balconies and stairs shall be constructed with any of the following materials:

1. Material that complies with the performance requirements of Section 504.7.3.3.
2. Ignition-resistant material that complies with the performance requirements of Section 504.7.2.
3. Fire-retardant-treated wood labeled for exterior use and shall meet the requirements of section 2302 of the International Building Code.
4. Noncombustible material.
5. Any material that complies with the performance requirements of Section 504.7.3.4 when tested in accordance with ASTM E2632 provided that any attached exterior wall covering is noncombustible or ignition-resistant materials.

    Exception: Wall material shall be permitted to be of any material that otherwise complies with this chapter when the decking surface material complies with the performance requirements ASTM E84 with a Class B flame spread index.

504.7.3.3 Performance requirements for Section 504.7.3.2, Item 1. Materials shall be tested in accordance with both ASTM E2632 and ASTM E2726 and comply with the conditions of acceptance in Sections 504.7.3.3.1 and 504.7.3.3.2. The material shall also be tested in accordance with ASTM E84 or UL 723 and comply with the performance requirements of Section 503.2.4.

504.7.3.3.1 Conditions of acceptance for ASTM E2632. . The ASTM E2632 test shall be conducted on a minimum of three test specimens and meet the conditions of acceptance in Items 1 through 3 below. If any one of the three tests does not meet the conditions of acceptance, three additional tests shall be performed. All three additional tests must meet the conditions of acceptance.

1. Peak heat release rate of less than or equal to 25 kW/ft^2 (269 kW/m^2).
2. Absence of sustained flaming or glowing combustion of any kind at the conclusion of the 40-min observation period.
3. Absence of falling particles that are still burning when reaching the burner or floor.

504.7.3.3.2 Conditions of acceptance for ASTM E2726. The ASTM E2726 test shall be conducted, using a "Class A" size roof test brand, on a minimum of three test specimens and meet the conditions of acceptance in Items 1 and 2 below. If any one of the three tests does not meet the conditions of acceptance, three additional tests shall be performed. All three additional tests must meet the conditions of acceptance.

1. Absence of sustained flaming or glowing combustion of any kind at the conclusion of the 40-minute observation period.
2. Absence of falling particles that are still burning when reaching the burner or floor.

504.7.3.4 Performance requirements for Section 504.7.3.2, Item 5. The ASTM E2632 test shall be conducted on a minimum of three test specimens and meet the condition of acceptance in Item 1 below. If any one of the three tests does not meet the condition of acceptance, three additional tests shall be performed. All three additional tests must show a peak heat release rate shall be 25 kW/ft^2 (269 kW/ m^2) or less.

Revise as follows:

504.8 Exterior glazing.
Exterior windows, window walls and <u>exterior</u> glazed doors <u>having a glazed area of 25 percent or more of the door area</u>, windows within exterior doors, and skylights shall be <u>constructed of any of the following:</u>

1. ~~tempered glass, multilayered glazed panels,~~ Multilayered glazed panels <u>with at least one tempered panel or dome</u> <u>complying with Section 2406 of the International Building Code.</u> ~~,~~
2. ~~glass~~ <u>Glass</u> block <u>units.</u> ~~, or have a~~
3. <u>A minimum</u> fire-protection rating of ~~not less than~~ 20 minutes <u>when tested in accordance with NFPA 257 or UL 9, and shall be exempt from the hose stream test.</u>

Add new text as follows:

<u>**504.8.1**</u> <u>**Structural glass veneer.**</u> <u>The wall assembly behind structural glass veneer shall comply with Section 504.5.</u>

<u>**504.8.2**</u> <u>**Operable skylights.**</u> <u>Operable skylights shall be protected by a non-combustible mesh screen and the dimensions of the openings in the screen shall not exceed ⅛ inch (3.2 mm).</u>

Revise as follows:

504.9 Exterior doors.
Exterior doors shall be <u>constructed in accordance with any of the following:</u>

1. ~~*approved noncombustible*~~ <u>Noncombustible</u> construction<u>.</u>~~,~~
2. ~~solid core~~ <u>Solid-core</u> wood not less than $1^3/_4$ inches thick (44 mm)<u>.</u>~~, or~~
3. ~~have~~ <u>Have</u> a fire protection rating of not less than 20 minutes <u>when tested according to NFPA 252.</u>
4. <u>The exterior door shall be constructed of solid core wood that complies with the following requirements:</u>
   4.1. <u>Stiles and rails shall not be less than 1 3/8 inches (35 mm) thick.</u>
   4.2. <u>Panels shall not be less than 1¼ inches thick, except for the exterior perimeter of the panel that shall be permitted to taper to a tongue not less than 3/8 inch (35 mm) thick.</u>
5. <u>The exterior surface or cladding shall be tested to meet the performance requirements of Section 504.9.3 when tested in accordance with ASTM E2707 with the conditions of acceptance shown in Section 504.9.3.</u>

Windows within doors and exterior glazed doors shall be in accordance with Section 504.8.

~~**Exception:** Vehicle access doors.~~

Add new text as follows:

<u>**504.9.1**</u> <u>**Garage doors.**</u> <u>Automatic garage door openers for vehicle doors serving a residential building shall be equipped with a battery backup function.</u>

<u>**504.9.2**</u> <u>**Garage door perimeter gap.**</u> <u>Exterior garage doors shall resist the intrusion of embers from entering by preventing gaps between doors and door openings, at the bottom, sides and tops of doors, from exceeding ⅛ inch (3.2 mm). Gaps between doors and door openings shall be controlled by one of the following methods:</u>

1. <u>Weather-stripping products shall be constructed of materials which comply with both of the following:</u>
   1.1. <u>The tensile strength of the material shall be tested in accordance with ASTM D638 before and after exposure to ASTM G155 for a period of 2,000 hours, and the maximum allowable difference in tensile strength values between exposed and non-exposed samples shall not exceed 10 percent.</u>
   1.2. <u>When tested to UL 94, the materials shall have a flammability rating of V-2 or better.</u>
2. <u>Door overlaps onto jambs and headers.</u>

3. Garage door jambs and headers covered.

504.9.3 Conditions of acceptance for ASTM E2707. The ASTM E2707 test shall be conducted on a minimum of three test specimens and meet the conditions of acceptance in Items 1 and 2 below. If any one of the three tests does not meet the conditions of acceptance, three additional tests shall be performed. All three additional tests must meet the conditions of acceptance.

1. Absence of flame penetration through the wall assembly at any time.
2. Absence of evidence of glowing combustion on the interior surface of the assembly at the end of the 70-minute test.

504.10 Vents.

Where provided, ventilation openings for enclosed attics, gable ends, ridge ends, under eaves and cornices, enclosed eave soffit spaces, enclosed rafter spaces formed where ceilings are applied directly to the underside of roof rafters, underfloor ventilation, foundations and crawl spaces, or any other opening intended to permit ventilation, either in a horizontal or vertical surface, shall be in accordance with Section 504.10.1 or Section 504.10.2 to resist building ignition from the intrusion of burning embers and flame through the ventilation openings.

504.10.1 Performance requirements.

Ventilation openings shall be fully covered with listed vents, tested in accordance with ASTM E2886, to demonstrate compliance with all the following requirements:

1. There shall be no flaming ignition of the cotton material during the Ember Intrusion Test.
2. There shall be no flaming ignition during the Integrity Test portion of the Flame Intrusion Test.
3. The maximum temperature of the unexposed side of the vent shall not exceed 662°F (350°C).

Delete and substitute as follows:

~~**504.10.2 Prescriptive requirements**~~**.**

~~Where provided, attic ventilation openings, foundation or underfloor vents, or other ventilation openings in vertical or horizontal surfaces and vents through roofs shall not exceed 144 square inches (0.0929 m²) each. Such vents shall be covered with noncombustible corrosion-resistant mesh with openings not to exceed 1/8 inch (3.2 mm) or shall be designed and approved to prevent flame or ember penetration into the structure.~~

504.10.2 Off ridge and ridge vents. Vents that are installed on a sloped roof, such as dormer vents, shall comply with all of the following:

1. Vents shall be covered with a mesh where the dimensions of the mesh therein shall be a minimum of 1/16 inch (1.6 mm) and shall not exceed ⅛ inch (3.2 mm) in diameter.
2. The mesh material shall be noncombustible.
3. The mesh material shall be corrosion resistant.

504.10.3 Vent locations.

Attic ventilation openings shall not be located in soffits, in eave overhangs, between rafters at eaves or in other overhang areas. Gable-end and dormer vents shall be located not less than 10 feet (3048 mm) from lot lines. Underfloor ventilation openings shall be located as close to grade as practical.

Delete and substitute as follows:

~~**504.11 Detached accessory structures**~~**.**

~~Detached accessory structures located less than 50 feet (15 240 mm) from a building containing habitable space shall have exterior walls constructed with materials *approved* for not less than 1-hour *fire-resistance-rated construction* , heavy timber, *log wall construction*, or constructed with *approved noncombustible* materials or fire-retardant-treated wood on the exterior side. The fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section 2303.2 of the International Building Code.~~

504.11 Accessory buildings and miscellaneous structures. Accessory buildings and miscellaneous structures shall be constructed to conform to the ignition-resistance requirements of Sections 504.11.1 through 504.11.6.

~~**504.11.1 Underfloor areas.**~~
~~Where the detached structure is located and constructed so that the structure or any portion thereof projects over a descending slope surface greater than 10 percent, the area below the structure shall have underfloor areas enclosed to within 6 inches (152 mm) of the ground, with exterior wall construction in accordance with Section 504.5 or underfloor protection in accordance with Section 504.6.~~

~~**Exception:** The enclosure shall not be required where the underside of exposed floors and exposed structural columns, beams and supporting walls are protected as required for exterior 1-hour *fire-resistance-rated construction* or *heavy timber construction* or fire-retardant-treated wood on the exterior side. The fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section 2303.2 of the International Building Code.~~

504.11.1 Applicability. Sections 504.11.2 through 504.11.6 apply to accessory buildings, and attached or detached miscellaneous structures, on the same lot as an applicable building, including but not limited to trellises, arbors, patio covers, gazebos and similar structures.

Exceptions:

1. Decks shall comply with the requirements of Section 504.7.3.
2. Awnings and canopies shall comply with the requirements of Section 3105 of the International Building Code.

Add new text as follows:

504.11.2 Miscellaneous structures and accessory buildings within 3 feet.. Miscellaneous structures and accessory buildings of any size, when separated from an applicable building on the same lot by a distance of less than 3 feet (914 mm), shall be constructed of noncombustible materials or of ignition-resistant materials as described in Section 503.2.4.

504.11.3 Accessory buildings greater than 120 square feet, located 3 feet or more but less than 50 feet. Accessory buildings that are greater than 120 square feet (11.15 m²) in size and separated from an applicable building on the same lot by a distance of 3 feet (914 mm) or more but less than 50 feet (15 240 mm) shall be constructed of noncombustible materials or of ignition-resistant materials as described in Section 503.2.4., located 3 feet or more but less than 50 feet.

504.11.4 Accessory buildings 120 square feet or less, located 3 feet or more but less than 50 feet. When required by the enforcing agency, accessory buildings 120 square feet (11.15 m²) or less and separated from an applicable building on the same lot by a distance of 3 feet (914 mm) or more but less than 50 feet (15 240 mm) shall be constructed of noncombustible materials or of ignition-resistant materials as described in Section 503.2.4.

504.11.5 Miscellaneous structures located 3 feet or more but less than 50 feet. When required by the enforcing agency, miscellaneous structures that require a permit and are separated from an applicable building on the same lot by a distance of 3 feet (914 mm) or more but less than 50 feet (15 240 mm) shall be constructed of noncombustible materials or of ignition-resistant materials as described in Section 503.2.4.

504.11.6 Roof construction. Roof assemblies and roof coverings of accessory buildings required to be constructed entirely of noncombustible materials or of ignition-resistant materials shall comply with Sections 504.2 and 504.2.1.

Attached Files

- **accessory table.jpg**
  https://www.cdpaccess.com/proposal/10556/30799/files/download/4420/
- **NIST.TN.2205.pdf**
  https://www.cdpaccess.com/proposal/10556/30799/files/download/4412/
- **2017 fire data.pdf**
  https://www.cdpaccess.com/proposal/10556/30799/files/download/4406/
- **2022_HE_IBHS_WildfireConstruction reduced.pdf**
  https://www.cdpaccess.com/proposal/10556/30799/files/download/4405/

Reason: This code change is to propose one construction method for building and structures in the wildland area. This is the companion to another proposal to delete sections 505 and 506 with the intent to remove Ignition Resistant Construction Classes 2 and 3. Replacing these multiple classifications will be a single defined Ignition Resistant Construction as provided by Section 504. As the IWUIC is intended to provide a minimum standard of protection for the Wildland-Urban Interface areas, a single classification of Ignition Resistant Construction should be provided to accomplish the following goals:

1. Protect lives and property within the Wildland-Urban Interface areas
2. Provide clear and consistent standards, simplifying the construction process
3. Provide a minimum standard of protection, with appendices providing potential pathways for increased protection beyond the minimum

Findings during a NIST case study of the 2018 Camp Fire (https://nvlpubs.nist.gov/nistpubs/TechnicalNotes/NIST.TN.2135.pdf) found that a primary factor in fire spread was significant ember exposure. As stated in the case study "In agreement with the other NIST case studies of WUI fires, the Camp Fire has demonstrated that embers can have significant impact on WUI communities. Laboratory and field work by NIST [57] has demonstrated that embers with enough energy to cause ignitions are readily generated from parcel-level combustibles such as landscaping mulch, fences, and firewood piles. These parcel-level fuels can cause ignitions over 40 m (130 ft) downwind. Ember ignitions downwind from parcel-level combustibles enable fire to readily spread from parcel to parcel. In high hazard areas, WUI structures therefore need to be able to withstand the exposures generated from both wildland and parcel-level combustibles." (A Case Study of the Camp Fire, pg.141)

Given the distances that embers can travel, this minimum standard of protection should be across all Wildland-Urban Interface areas; regardless of whether they have been designated as Moderate, High or Extreme hazards. An analysis of California structures damaged by wildfire in 2017 found that more homes were damaged in the areas designated as moderate fire hazard severity (3645 damaged) than those damaged in areas designated as very high fire hazard severity (2215 damaged). Of those damaged, a similar percentage of those structures were recorded as destroyed; 92% of damaged structures being destroyed in moderate fire hazard severity zones, and 86% of damaged structures being destroyed in very high fire hazard severity zones. This data indicates that the requirements proposed in 504 which mirror the California Building Code Chapter 7A requirements are working.

Construction Costs for a Wildfire Resistant Home, California Edition (headwaterseconomics.org)

The Headwaters Economics study by the Insurance Institute for Business & Home Safety outlines that California's Chapter 7A requirements should be the bare minimum. If there is a proposal for three construction versions, using the proposed code provisions as the minimum with an enhanced version and an optimum version for best performance standards. "In preliminary research conducted by Baylis and Boomhower (2021), the authors examined home survivability factors for nearly 50,000 homes exposed to wildfires between 2007 and 2020 across California. The authors reported that a home built in 2010 or later was nearly 40% less likely to be destroyed by a wildfire compared to a home built in 1985 or before. Home survivability was closely correlated to modern building codes requiring homeowner mitigation measures. Additionally, a home was more likely to survive if its nearest neighbor also complied with recent mitigation regulations resulting in a positive net spillover effect for the larger neighborhood.

Roof - Section 504.2

Roofs are highly vulnerable to ignition due to their relatively large horizontal surface area. The exposure of roof coverings to a range of climatic conditions, including wind, rain, and sun, means the roof covering will require maintenance and eventual replacement. Many

Class A fire-rated roof covering options are available (e.g., asphalt fiberglass composition shingles). A main reason the roof is vulnerable is because the roof edge—including gutters and roof-to-wall intersections where roof covering meets other materials (e.g., siding used in dormers and split-level homes)—is exposed to ember ignitions. These areas must be properly protected by adding additional flashing at roof-to-wall locations.

Under-Eave Area - Sections 504.3 and 504.3.1

Research suggests eaves are extremely important in structure survivability. Eaves play an important role for building design but they also create vulnerabilities and pathways for the building to ignite. Embers can travel through vents in the eave into the attic and accumulate in gaps between blocking and rafters in open-eave construction. Should flames reach the under-eave area, open eaves can also trap heat. Once there is an ignition in the under-eave area, fire will spread laterally more quickly.

Vents in the under-eave area are inlet openings and therefore allow air to enter the attic space. During a wildfire, vent openings can allow the entry of wind-blown embers into the interior attic space. If combustible materials in the attic ignite, the house can burn from the inside out. The importance of ember and flame entry through vents during a wildfire, and as per requirements in Chapter 7A, have resulted in the development of vents designed to resist the intrusion of flames and embers.

Exterior Wall and Wall Covering - Sections 504.5 and 504.5.1

Exterior walls and components in the wall assembly can be vulnerable if exposed to embers, flames, or prolonged exposure to radiant heat from burning items located close to the home. These exposures can ignite combustible siding and the resulting flames can spread vertically and laterally to other wall components such as windows and the under-eave area. Siding extending close to the ground can be vulnerable to ignition by embers accumulating at the base of the wall that ignite it or components in the wall assembly (e.g., wood sheathing). Requirements are included to address the wall assembly itself, along with the exterior wall covering. The wall could be fire resistant, but a combustible exterior wall covering could carry fire up the wall to the eaves and attic.

Attached Deck - Sections 504.7.3 through 504.7.3.4

Similar to a roof, a deck can cover a large horizontal surface area and can be vulnerable to embers and under-deck flame impingement exposures. A burning deck can expose the side of the house to extended radiant heat and/or direct flame contact. The deck walking surface and structural support members, as well as what is stored on or below the deck are therefore important considerations.

Most commonly used deck board products (including wood and plastic composite boards) are combustible. Decks with noncombustible walking surfaces include lightweight concrete or a flagstone product. Regardless of the walking surface, decks are typically supported by solid wood joists, beams, and columns that will be vulnerable to ignition if nearby combustible materials ignite.

Enclosing the under-deck area vertically around the perimeter can minimize the accumulation of vegetative debris, vegetation, and other combustible materials. For enclosed decks, installing vents to ensure that excessive moisture does not accumulate in the under-deck area is critical to avoid moisture-related degradation.

Glazing - Sections 504.8 through 804.8.2

Window manufacturers and suppliers indicated that where dual-pane windows are required to be tempered, most window manufacturers only supply windows with both panes tempered. Other manufacturers will supply what the customer requests, and will only provide one-pane tempered. Since all comparative versions of the wildfire-resistant home are compliant, the price of windows would not result in a significant cost difference.

Doors - Section 504.9

Doors and door frames can fail for the same reasons as windows. Embers can accumulate in the small gaps between the door and frame, resulting in ignition of the door-framing and weather-sealing material.

Vents - Section 504.10 through 504.10.3

Flame- and ember-resistant vents are required to be listed. Currently, only vents in a vertical orientation are listed. Where vents are installed in other than by the OSFM Building Materials Listing Program, will be required for all attic and crawl space vents.

Accessory Structures - Section

The following table helps visualize the resultant requirements.

NIST Technical note 2205 explains how the mitigation of accessory structures help in hardening a building in the wildland area.

https://nvlpubs.nist.gov/nistpubs/TechnicalNotes/NIST.TN.2205.pdf

Bibliography: Construction costs for a wildfire-resistant home: California edition - Headwaters Economics

Fire Research Division | NIST

https://nvlpubs.nist.gov/nistpubs/TechnicalNotes/NIST.TN.2205.pdf

Cost Impact: Increase

Estimated Immediate Cost Impact:

Construction costs for a typical single-family (1,750 square-foot) home would increase approximately $2,000 including developer overhead costs.

Estimated Immediate Cost Impact Justification (methodology and variables):

In 2004, and as a precursor to California adopting Building Code Chapter 7A, the Office of the State Fire Marshal requested an analysis identifying the costs and benefits associated with proposed regulations in the state's wildfire-prone areas. The study was conducted by Fire Cause Analysis and evaluated economic and construction data within various business sectors to analyze construction costs if proposed regulations were implemented.33 The study found construction costs for a typical single-family (1,750 square-foot) home would increase approximately $2,000 including developer overhead costs. As an aggregated total at the state level, construction costs would increase approximately $30 million per year for the estimated 14,000 new homes built in areas where regulations would apply. The authors concluded the costs of not implementing regulations, in the form of property losses and suppression costs, exceeded the projected costs for regulations and therefore recommended adopting mitigation standards in wildfire-prone areas.

In 2019, the National Institute of Building Sciences (NIBS) released a report identifying the benefit-cost ratio (BCR) of investing in hazard mitigation, including wildfires.35 The authors found that for every $1 spent on up-front costs for wildfire mitigation, a benefit of $4 was received.

In 2021, the National Research Council of Canada released a study analyzing the benefit-cost ratio for building new construction to comply with the country's wildland urban interface (WUI) Guide.38 In its examination, approximately $12,000 CAD (~$9,500 USD) was added to the overall costs for a new, 2,000-square-foot home to meet the provision of Canada's National WUI Guide. The comprehensive report also examined costs for retrofitting existing structures, as well as transferred costs at the community and national scale. Similar to the NIBS study in 2019, the NRC report found an up-front investment in wildfire-resistant construction and vegetation management yielded benefits that exceeded long-term costs and losses.

WUIC54-24

WUIC55-24

IWUIC: SECTION 505, 505.1, 505.2, 505.2.1, 505.3, 505.4, 505.5, 505.6, 505.7, 505.7.1, 505.8, 505.9, 505.10, 505.10.1, 505.10.2, 505.10.3, 505.11, 505.11.1, SECTION 506, 506.1, 506.2, 506.2.1, 506.3, 506.4, 506.5

Proponents: Cary Yballa, Central County Fire Department, Cal FPO (cyballa@ccfd.org); Crystal Sujeski, CAL FIRE/Office of the State Fire Marshal (crystal.sujeski@fire.ca.gov)

2024 International Wildland Urban Interface Code

Delete without substitution:

~~SECTION 505~~
~~CLASS 2 IGNITION-RESISTANT CONSTRUCTION~~

Revise as follows:

~~505.1 General~~.
~~Class 2 ignition-resistant construction shall be in accordance with Sections 505.2 through 505.11.~~

~~505.2 Roof assembly~~.
~~Roofs shall have a *roof assembly* that complies with not less than a Class A rating when tested in accordance with ASTM E108 or UL 790, or an *approved noncombustible roof covering*. For *roof assemblies* where the profile allows a space between the *roof covering* and *roof deck*, the space at the eave ends shall be firestopped to preclude entry of flames or embers, or have one layer of cap sheet complying with ASTM D3909 installed over the combustible *roof deck*.~~

~~505.2.1 Roof valleys~~.
~~Where provided, valley flashings shall be not less than 0.019-inch (0.48 mm) (No. 26 galvanized sheet gage) corrosion-resistant metal installed over a minimum 36-inch-wide (914 mm) underlayment consisting of one layer of 72-pound (32.4 kg) mineral-surfaced, nonperforated cap sheet complying with ASTM D3909 running the full length of the valley.~~

~~505.3 Protection of eaves~~.
~~Combustible eaves, fascias and soffits shall be enclosed with solid materials with a minimum thickness of $^3/_4$ inch (19 mm). Exposed rafter tails shall not be permitted unless constructed of heavy timber materials.~~

~~505.4 Gutters and downspouts~~.
~~Gutters and downspouts shall be constructed of *noncombustible* material. Gutters shall be provided with an *approved* means to prevent the accumulation of leaves and debris in the gutter.~~

~~505.5 Exterior walls~~.
~~Exterior walls of buildings or structures shall be constructed with one of the following methods:~~

1. ~~Materials *approved* for not less than 1-hour *fire-resistance-rated construction* on the exterior side.~~
2. ~~*Approved noncombustible* materials.~~
3. ~~*Heavy timber* or *log wall construction*.~~
4. ~~Fire-retardant-treated wood on the exterior side. The fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section 2303.2 of the International Building Code.~~
5. ~~Ignition-resistant materials on the exterior side.~~

~~Such material shall extend from the top of the foundation to the underside of the roof sheathing.~~

~~505.6 Underfloor enclosure~~.

~~Buildings or structures shall have underfloor areas enclosed to the ground, with exterior walls in accordance with Section 505.5.~~

> ~~**Exception:** Complete enclosure shall not be required where the underside of exposed floors and exposed structural columns, beams and supporting walls are protected as required for exterior 1-hour *fire-resistance-rated construction* or *heavy timber construction* or fire-retardant-treated wood. The fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section 2303.2 of the International Building Code.~~

~~505.7 Appendages and projections~~.

~~*Unenclosed accessory structures* attached to buildings with habitable spaces and projections, such as decks, shall be not less than 1-hour *fire-resistance-rated construction*, *heavy timber construction* or constructed of one of the following:~~

1. ~~*Approved noncombustible* materials.~~
2. ~~Fire-retardant-treated wood identified for exterior use and meeting the requirements of Section 2303.2 of the International Building Code.~~
3. ~~Ignition-resistant building materials in accordance with Section 503.2.~~

   ~~**Exception:** Coated materials shall not be used as the walking surface of decks.~~

~~505.7.1 Underfloor areas~~.

~~Where the attached structure is located and constructed so that the structure or any portion thereof projects over a descending slope surface greater than 10 percent, the area below the structure shall have underfloor areas enclosed to within 6 inches (152 mm) of the ground, with exterior wall construction in accordance with Section 505.5.~~

~~505.8 Exterior glazing~~.

~~Exterior windows, window walls and glazed doors, windows within exterior doors, and skylights shall be tempered glass, *multilayered glazed panels*, glass block or have a fire protection rating of not less than 20 minutes.~~

~~505.9 Exterior doors~~.

~~Exterior doors shall be *approved noncombustible* construction, solid core wood not less than 1³/₄ inches thick (45 mm), or have a fire protection rating of not less than 20 minutes. Windows within doors and glazed doors shall be in accordance with Section 505.8.~~

> ~~**Exception:** Vehicle access doors.~~

~~505.10 Vents~~.

~~Where provided, ventilation openings for enclosed attics, gable ends, ridge ends, under eaves and cornices, enclosed eave soffit spaces, enclosed rafter spaces formed where ceilings are applied directly to the underside of roof rafters, underfloor ventilation, foundations and crawl spaces, or any other opening intended to permit ventilation, either in a horizontal or vertical surface, shall be in accordance with Section 505.10.1 or Section 505.10.2 to resist building ignition from the intrusion of burning embers and flame through the ventilation openings.~~

~~505.10.1 Performance requirements~~.

~~Ventilation openings shall be fully covered with listed vents, tested in accordance with ASTM E2886, to demonstrate compliance with all the following requirements:~~

1. ~~There shall be no flaming ignition of the cotton material during the Ember Intrusion Test.~~
2. ~~There shall be no flaming ignition during the Integrity Test portion of the Flame Intrusion Test.~~
3. ~~The maximum temperature of the unexposed side of the vent shall not exceed 662°F (350°C).~~

~~505.10.2 Prescriptive requirements~~.

~~Where provided, attic ventilation openings, foundation or underfloor vents, or other ventilation openings in vertical or horizontal surfaces and vents through roofs shall not exceed 144 square inches (0.0929 m^2) each. Such vents shall be covered with noncombustible corrosion-resistant mesh with openings not to exceed 1/8 inch (3.2 mm) or shall be designed and approved to prevent flame or ember penetration into the structure.~~

~~505.10.3 Vent locations~~.

~~Attic ventilation openings shall not be located in soffits, in eave overhangs, between rafters at eaves or in other overhang areas. Gable-end and dormer vents shall be located not less than 10 feet (3048 mm) from lot lines. Underfloor ventilation openings shall be located as close to grade as practical.~~

~~505.11 Detached accessory structures~~.

~~Detached accessory structures located less than 50 feet (15 240 mm) from a building containing habitable space shall have exterior walls constructed with materials *approved* for not less than 1-hour *fire-resistance-rated construction*, heavy timber, *log wall construction*, or constructed with *approved noncombustible* materials or fire-retardant-treated wood on the exterior side. The fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section 2303.2 of the International Building Code.~~

~~505.11.1 Underfloor areas~~.

~~Where the detached *accessory structure* is located and constructed so that the structure or any portion thereof projects over a descending slope surface greater than 10 percent, the area below the structure shall have underfloor areas enclosed to within 6 inches (152 mm) of the ground, with exterior wall construction in accordance with Section 505.5 or underfloor protection in accordance with Section 505.6.~~

> **~~Exception:~~** ~~The enclosure shall not be required where the underside of exposed floors and exposed structural columns, beams and supporting walls are protected as required for exterior 1-hour *fire-resistance-rated construction* or heavy-timber construction or fire-retardant-treated wood on the exterior side. The fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section 2303.2 of the International Building Code.~~

Delete without substitution:

~~SECTION 506~~
~~CLASS 3 IGNITION-RESISTANT CONSTRUCTION~~

Revise as follows:

~~506.1 General~~.

~~Class 3 ignition-resistant construction shall be in accordance with Sections 506.2 through 506.4~~.

~~506.2 Roof assembly~~.

~~Roofs shall have a *roof assembly* that complies with not less than a Class B rating when tested in accordance with ASTM E108 or UL 790 or an *approved noncombustible roof covering*. For *roof assemblies* where the profile allows a space between the *roof covering* and *roof deck*, the space at the eave ends shall be firestopped to preclude entry of flames or embers, or have one layer of cap sheet complying with ASTM D3909 installed over the combustible *roof deck*.~~

~~506.2.1 Roof valleys~~.

~~Where provided, valley flashings shall be not less than 0.019-inch (0.44 mm) (No. 26 galvanized sheet gage) corrosion-resistant metal installed over a minimum 36-inch-wide (914 mm) underlayment consisting of one layer of 72-pound (32.4 kg) mineral-surfaced, nonperforated cap sheet complying with ASTM D3909 running the full length of the valley.~~

~~506.3 Underfloor enclosure~~.

~~Buildings or structures shall have underfloor areas enclosed to the ground with exterior walls.~~

> **~~Exception:~~** ~~Complete enclosure shall not be required where the underside of exposed floors and exposed structural columns, beams and supporting walls are protected as required for exterior 1-hour *fire-resistance-rated construction*, fire-retardant-treated wood or *heavy timber construction*. Fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section 2303.2 of the International Building Code.~~

~~506.4 Gutters and downspouts~~.

~~Gutters and downspouts shall be constructed of *noncombustible* material. Gutters shall be provided with an *approved* means to prevent~~

~~the accumulation of leaves and debris in the gutter.~~

~~506.5 Vents~~.

~~Where provided, attic ventilation openings, foundation or underfloor vents, or other ventilation openings in vertical exterior walls and vents through roofs shall not exceed 144 square inches (0.0929 m^2) each. Such vents shall be covered with noncombustible corrosion-resistant mesh with openings not to exceed 1/8 inch (3.2 mm) or shall be designed and approved to prevent flame or ember penetration into the structure.~~

Reason: This code change is to propose one construction method for building and structures in the wildland area. This is the companion to another proposal to delete sections 505 and 506 with the intent to remove Ignition Resistant Construction Classes II and III. Replacing these classifications will be a single defined Ignition Resistant Construction as provided by Section 504 of this code. As the IWUIC is intended to provide a minimum standard of protection for the Wildland-Urban Interface areas, a single classification of Ignition Resistant Construction should be provided to accomplish the following goals:

1. Protect lives and property within the Wildland-Urban Interface areas

2. Provide clear and consistent standards, simplifying the construction process

3. Providing a minimum standard of protection, with appendices providing potential pathways for increased protection beyond the minimum

Findings during a NIST case study of the 2018 Camp Fire (https://nvlpubs.nist.gov/nistpubs/TechnicalNotes/NIST.TN.2135.pdf) found that a primary factor in fire spread was significant ember exposure. As stated in the case study "In agreement with the other NIST case studies of WUI fires, the Camp Fire has demonstrated that embers can have significant impact on WUI communities. Laboratory and field work by NIST [57] has demonstrated that embers with enough energy to cause ignitions are readily generated from parcel-level combustibles such as landscaping mulch, fences, and firewood piles. These parcel-level fuels can cause ignitions over 40 m (130 ft) downwind. Ember ignitions downwind from parcel-level combustibles enable fire to readily spread from parcel to parcel. In high hazard areas, WUI structures therefore need to be able to withstand the exposures generated from both wildland and parcel-level combustibles." (A Case Study of the Camp Fire, pg.141)

Given that this far distances that embers can travel, this minimum standard of protection should be across the Wildland-Urban Interface areas; regardless of whether they have been designated as Moderate, High or Extreme hazards. In an analysis of California structures damaged by wildfire in 2017 found that of more homes were damaged in the areas designated as moderate fire hazard severity (3645 damaged) than those damaged in areas designated as very high fire hazard severity (2215 damaged). Of those damaged, a similar percentage of those structures were recorded as destroyed. 92% of damaged structures being destroyed in moderate fire hazard severity zones. 86% of damaged structures being destroyed in very high fire hazard severity zones. This data indicates that the requirements proposed in 504 which mirror the California 7A requirements are working.

In an analysis of California structures damaged by wildfire in 2017 found that of more homes were damaged in the areas designated as moderate fire hazard severity (3645 damaged) than those damaged in areas designated as very high fire hazard severity (2215 damaged). Of those damaged, a similar percentage of those structures were recorded as destroyed. 92% of damaged structures being destroyed in moderate fire hazard severity zones. 86% of damaged structures being destroyed in very high fire hazard severity zones.

Whereas the designated fire hazard severity zone did not play a large determining factor in whether a structure was damaged or destroyed, the date of construction did play a large role. In 2017, 33,508 structures that were constructed prior to 2009 were damaged in wildfires. In the same year, only 592 structures that were built after 2009 were damaged or destroyed by wildfire. The year 2009 is significant as it was the first full year that structures build in Wildland-Urban Interface areas were required to comply with California Building Code, Chapter 7A requirements. This data indicates that the requirements proposed in 504 which mirror the California 7A requirements are working.

Construction Costs for a Wildfire Resistant Home, California Edition (headwaterseconomics.org)

The Headwaters Economics study by the Insurance Institute for Business & Home Safety outlines that California's Chapter 7A requirements are a minimum. If there is a proposal for three construction versions, using the proposed code provisions as the minimum with an enhanced version and an optimum version for best performance standards. "In preliminary research conducted by Baylis and Boom hower (2021), the authors examined home survivability factors for nearly 50,000 homes exposed to wildfires between 2007 and 2020 across California.30 The authors reported that a home built in 2010 or later was nearly 40% less likely to be destroyed by a wildfire compared to a home built in 1985 or before. Home survivability was closely correlated to modern building codes requiring homeowner mitigation measures. Additionally, a home was more likely to survive if its nearest neighbor also complied with recent mitigation regulations resulting in a positive net spillover effect for the larger neighborhood.

Roof

Roofs are highly vulnerable to ignition due to their relatively large horizontal surface area. The exposure of roof coverings to a range of climatic conditions, including wind, rain, and sun, means the roof covering will require maintenance and eventual replacement. Many Class A fire-rated roof covering options are available (e.g., asphalt fiberglass composition shingles). A main reason the roof is vulnerable is because the roof edge—including gutters and roof-to-wall intersections where roof covering meets other materials (e.g., siding used in dormers and split-level homes)—is exposed to ember ignitions. These areas must be properly protected by adding additional flashing t roof-to-wall locations.

Under-Eave Area

Research suggests eaves are extremely important in structure survivability.1 Eaves play an important role for building design but they also create vulnerabilities and pathways for the building to ignite. Embers can travel through vents in the eave into the attic and accumulate in gaps between blocking and rafters in open-eave construction. Should flames reach the under-eave area, open eaves can also trap heat. Once there is an ignition in the under-eave area, fire will spread laterally more quickly.

Vents in the under-eave area are inlet vents and therefore allow air to enter the attic space. During a wildfire, vent openings can allow the entry of wind-blown embers into the interior attic space. If combustible materials in the attic ignite, the house can burn from the inside out.2 The importance of ember and flame entry through vents during a wildfire, and as per requirements in Chapter 7A, have resulted in the development of vents designed to resist the intrusion of flames and embers.

Exterior Wall

Exterior walls and components in the wall assembly can be vulnerable if exposed to embers, flames, or prolonged exposure to radiant heat from burning items located close to the home. These exposures can ignite combustible siding and the resulting flames can spread vertically and laterally to other wall components such as windows and the under-eave area. Siding extending close to the ground can be vulnerable to ignition by embers accumulating at the base of the wall that ignite it or components in the wall assembly (e.g., wood sheathing).

Attached Deck

Similar to a roof, a deck can cover a large horizontal surface area and can be vulnerable to embers and under-deck flame impingement exposures. A burning deck can expose the side of the house to extended radiant heat and/or direct flame contact. The deck walking surface and structural support members, as well as what is stored on or below the deck are therefore important considerations.

Most commonly used deck board products (including wood and plastic composite boards) are combustible. Decks with noncombustible walking surfaces include lightweight concrete or a flagstone product. Regardless of the walking surface, decks are typically supported by solid wood joists, beams, and columns that will be vulnerable to ignition if nearby combustible materials ignite. Enclosing the under-deck area vertically around the perimeter can minimize the accumulation of vegetative debris, vegetation, and other combustible materials. For enclosed decks, installing vents to ensure that excessive moisture does not accumulate in the under-deck area is critical to avoid moisture-related degradation.

Glazing Window manufacturers and suppliers indicated that whereas Chapter 7A only requires one pane in a dual-paned window to be tempered, many window manufacturers only supply windows with both panes tempered. Other manufacturers will supply what the customer requests but will default to one-pane tempered. Since all comparative versions of the wildfire-resistant home are Chapter 7A-compliant, the price of windows would not result in a net cost difference.

Doors

Doors (including window glass set in doors) and door frames can fail for the same reasons as windows. Embers can accumulate in the small gaps between the door and frame, resulting in ignition of the door-framing and weather-sealing material. Vents: Flame- and ember-resistant vents, approved and listed by the OSFM Building Materials Listing Program, will be required for all attic and crawlspace vents. Separation Distance from accessory structures NIST Technical note 2205 explains how the mitigation of accessory structures help in hardening a building in the wildland area.

https://nvlpubs.nist.gov/nistpubs/TechnicalNotes/NIST.TN.2205.pdf

Bibliography: https://nvlpubs.nist.gov/nistpubs/TechnicalNotes/NIST.TN.2135.pdf

https://headwaterseconomics.org/natural-hazards/wildfire-resistant-costs-california/

Cost Impact: Increase

Estimated Immediate Cost Impact:

Construction costs for a typical single-family (1,750 square-foot) home would increase approximately $2,000 including developer overhead costs.

Estimated Immediate Cost Impact Justification (methodology and variables):

In 2004, and as a precursor to California adopting Building Code Chapter 7A, the Office of the State Fire Marshal requested an analysis identifying the costs and benefits associated with proposed regulations in the state's wildfire-prone areas. The study was conducted by Fire Cause Analysis and evaluated economic and construction data within various business sectors to analyze construction costs if proposed regulations were implemented.33 The study found construction costs for a typical single-family (1,750 square-foot) home would increase approximately $2,000 including developer overhead costs. As an aggregated total at the state level, construction costs would increase approximately $30 million per year for the estimated 14,000 new homes built in areas where regulations would apply. The authors concluded the costs of not implementing regulations, in the form of property losses and suppression costs, exceeded the projected costs for regulations and therefore recommended adopting mitigation standards in wildfire-prone areas.

In 2019, the National Institute of Building Sciences (NIBS) released a report identifying the benefit-cost ratio (BCR) of investing in hazard mitigation, including wildfires.35 The authors found that for every $1 spent on up-front costs for wildfire mitigation, a benefit of $4 was received.

In 2021, the National Research Council of Canada released a study analyzing the benefit-cost ratio for building new construction to comply with the country's wildland urban interface (WUI) Guide.38 In its examination, approximately $12,000 CAD (~$9,500 USD) was added to the overall costs for a new, 2,000-square-foot home to meet the provision of Canada's National WUI Guide. The comprehensive report also examined costs for retrofitting existing structures, as well as transferred costs at the community and national scale. Similar to the NIBS study in 2019, the NRC report found an up-front investment in wildfire-resistant construction and vegetation management yielded benefits that exceeded long-term costs and losses.

WUIC55-24

WUIC56-24

IWUIC: 506.2

Proponents: Marcelo Hirschler, GBH International, GBH International (mmh@gbhint.com); Mark S. Graham, National Roofing Contractors Association (NRCA) (mgraham@nrca.net)

2024 International Wildland Urban Interface Code

Revise as follows:

506.2 Roof assembly.
Roofs shall have a *roof assembly* that complies with not less than a Class A ~~B~~ rating when tested in accordance with ASTM E108 or UL 790 or an *approved noncombustible roof covering*. For *roof assemblies* where the profile allows a space between the *roof covering* and *roof deck*, the space at the eave ends shall be firestopped to preclude entry of flames or embers, or have one layer of cap sheet complying with ASTM D3909 installed over the combustible *roof deck*.

Reason: Marcelo Hirschler:

Experience shows that the roof of a building in the WUI area is the most likely area (or perhaps one of the most likely areas) where burning embers can deposit and start a fire that will consume the building. The experience of fires in California, in particular, has shown that fire hardening the roof assembly can make a significant improvement in the probability of a building surviving a wildfire. The California Chapter 7A (the local version of a wildland urban interface code) requires that all roof assemblies in the WUI area meet a Class A rating when tested to ASTM E108 or UL 790 and the IWUIC should do the same. The IWUIC already requires Class A for classes 1 and 2 WUI construction and it should require the same for all WUI areas.The size of the Class B brand in ASTM E108 is 6 inches square by 2 1/4 inches thick Douglas fir wood, weighing approximately 500 g (1.1 lb), with a gas flame applied for 4 minutes. That is unlikely to be sufficient to ensure fire safety for a roof (and the corresponding structure) from a wildfire, since each individual burning brand can be up to 7 square inches in area and weigh several grams, and a wildfire generates large numbers of burning brands.

The attached publication by researchers at NIST (namely "Role of Firebrand Combustion in Large Outdoor Fire Spread", by S. Manzello, S. Suzuki, M. Gollner and C. Fernandez-Pello, from Prog Energy Combust Sci. 2020 ; 76: . doi:10.1016/j.pecs.2019.100801.) (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7047831/pdf/nihms-1548454.pdf) discusses the sizes and masses of firebrands in actual wildfires.

ASTM E108 explains as follows for the 3 classes of roof exposures:

Class A Tests are applicable to roof coverings that are expected to be effective against severe fire exposure, afford a high degree of fire protection to the roof deck, do not slip from position, and are not expected to present a flying brand hazard.

Class B Tests are applicable to roof coverings that are expected to be effective against moderate fire exposure, afford a moderate degree of fire protection to the roof deck, do not slip from position, and are not expected to present a flying brand hazard.

Class C Tests are applicable to roof coverings that are effective against light fire exposure, afford a light degree of fire protection to the roof deck, do not slip from position, and are not expected to present a flying brand hazard.

Mark Graham:

This code change proposal proposes to increase the required fire classification for roof coverings for Section 506-Class 3 Ignition-Resistant Construction from Class B to Class A. Section 504-Class 1 Ignition-Resistant Construction and Section 505-Class 2 Ignition-Resistant Construction already require roof coverings to be Class A. Changing the roof covering requirement for Class 3 Ignition-Resistant Construction will simplify interpretation and enforcement, and enhance resistance to spread of flame on roof coverings.

Cost Impact: Increase

Estimated Immediate Cost Impact:

Marcelo Hirschler:

The cost of a Class A fire rated roof assembly will be higher than the cost of a Class B fire rated roof assembly, but there will be less danger of destruction in case of a wildfire.

Mark Graham:

$0 - This code change proposal will have no cost impact for most roof coverings. The U.S. roofing industry already has tens of thousands of different ASTM E108 or UL 790 Class A roof coverings that are regularly designed and installed. In most instances designers already specify Class A roof coverings, whether or not they are required by the code.As an example, the U.S. product standard for asphalt shingles, ASTM D3462, "Standard Specification for Asphalt Shingles made from Glass Felt and Surfaced with Mineral Granules," which is a requirement for asphalt shingles in IBC and IRC, has a Class A minimum requirement; Class B or C asphalt shingles are no longer produced and are not permitted.

In those rare situations were a particular roof covering is a Class B, lower cost Class A roof coverings are readily available.

Estimated Immediate Cost Impact Justification (methodology and variables):

Marcelo Hirschler:

I cannot assess the difference in price between the various fire classified roof assemblies. It is known that virtually all asphalt roofing assemblies are already Class A. In the case of metal roofing assemblies, a membrane would have to be placed underneath the metal (to avoid heat transmission) and this may affect cost. In fact, other than some metal-covered roof assemblies, it is likely that most roof assemblies in the market that are not constructed of wood will actually be Class A.

WUIC56-24

WUIC57-24

IWUIC: 507.1

Proponents: Crystal Sujeski, CAL FIRE/Office of the State Fire Marshal (crystal.sujeski@fire.ca.gov); Darcy Davidson, Carlsbad Fire Department, California Fire Prevention Officers (darcy.davidson@carlsbadca.gov); Kevin Scott, KH Scott & Associates LLC, self (khscottassoc@gmail.com)

2024 International Wildland Urban Interface Code

Revise as follows:

507.1 General.
The *roof covering* on buildings or structures in existence prior to the adoption of this code that are replaced or have 25 percent or more replaced in a 12-month period shall be replaced with a *roof covering* required for new construction ~~based on the type of ignition-resistant construction specified~~ in accordance with ~~Section~~ Sections ~~503~~ 504.2 and 504.21. All repairs or maintenance of a roof covering with a Class A fire classification shall be accomplished to maintain the Class A fire classification.

Reason: Fire-resistance of the roof construction, by overwhelming consensus, is recognized as the “Achilles Heel” when protecting structures from wildfires. All new construction must meet a Class A fire classification in accordance with Section 504.2. This proposal addresses 3 scenarios where the roof covering must comply with a Class A fire classification.

Existing structures often have a lesser degree of fire classification than Class A. When these existing roofs are replaced, they must be replaced with a roof covering with a Class A fire classification. When a repair occurs that is 25% or more of the roof area, the entire roof covering must be replaced and it must meet a Class A fire classification. When an existing structure has a roof covering with ah Class A fire classification, any repair or maintenance must be done to maintain the Class A rating. This last scenario applies even if the roof area repaired is less than 25%.

Cost Impact: Increase

Estimated Immediate Cost Impact:

$0 or nominal cost increase.

Estimated Immediate Cost Impact Justification (methodology and variables):

Now with the increased production of rated roof assemblies that cost is no longer a controlling factor. It was determined that there was little to no cost difference for the change.

WUIC57-24

WUIC58-24

IWUIC: 507.1

Proponents: Mark S. Graham, National Roofing Contractors Association (NRCA) (mgraham@nrca.net)

2024 International Wildland Urban Interface Code

Revise as follows:

507.1 General.
The *roof covering* on buildings or structures in existence prior to the adoption of this code that are replaced ~~or have 25 percent or more replaced in a 12-month period~~ shall be replaced with a *roof covering* required for new construction based on the type of ignition-resistant construction specified in accordance with Section 503.

Reason: This code change proposal is intended to clarify IWUIC's requirements regarding roof covering replacement and bring consistency with what is already included in IBC and IRC. IWUIC's current language on roof replacements includes the "25 percent rule," which was included in two of the legacy codes at one point, but has not been included in the IBC or IRC. Striking the 25 percent rule from IWUIC's Section 507.1-General will make IWUIC's requirements for roof covering replacement consistent with those of IBC and IRC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal coordinates IWUIC's requirements for roof covering replacement with those already contained in IBC and IRC. There are no changes in the codes stringency.

WUIC58-24

WUIC59-24

IWUIC: 602.1

Proponents: Kevin Scott, KH Scott & Associates LLC, self (khscottassoc@gmail.com)

2024 International Wildland Urban Interface Code

Revise as follows:

602.1 General.
An *approved* automatic sprinkler system shall be installed in all occupancies in new buildings required to meet the requirements for Class 1 ignition-resistant construction in Chapter 5. The installation and maintenance of the automatic sprinkler systems shall be in accordance with ~~nationally recognized standards~~the *International Building Code* or *International Residential Code*, as applicable.

Reason: This section was written before the IRC contained references to sprinkler design standards and the IBC did not reference NFPA 13D. Changes in both codes now allow for the referenced code to be the IBC or the IRC. The appropriate code will be the code the building is constructed under. The IFC is not referenced since it does the sprinkler criteria in the IFC does not apply to dwellings, but the IBC contains the same requirements as the IFC. In this fashion, the section now refers to the applicable construction code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal does not change the code application or provide new requirements. It clarifies the reference to the specific construction code, which includes the reference to the appropriate sprinkler standards.

WUIC59-24

WUIC60-24

IWUIC: SECTION 603, 603.1, 603.2, TABLE 603.2, FIGURE 603.2, 603.2.1, 603.2.2, 603.2.3, 603.1 (New), 603.2 (New), 603.3 (New), 603.3.1 (New), 603.4 (New), 603.4.1 (New), 603.4.2 (New), 603.4.2.1 (New)

Proponents: Cary Yballa, Central County Fire Department, Cal FPO (cyballa@ccfd.org); Crystal Sujeski, CAL FIRE/Office of the State Fire Marshal (crystal.sujeski@fire.ca.gov); Darcy Davidson, Carlsbad Fire Department, California Fire Prevention Officers (darcy.davidson@carlsbadca.gov)

2024 International Wildland Urban Interface Code

Revise as follows:

SECTION 603
~~DEFENSIBLE SPACE~~ VEGETATION PLAN

603.1 ~~**Objective.** Provisions of this section are intended to modify the fuel load in areas adjacent to structures to create a *defensible space*~~

~~**603.2 Fuel modification.**~~

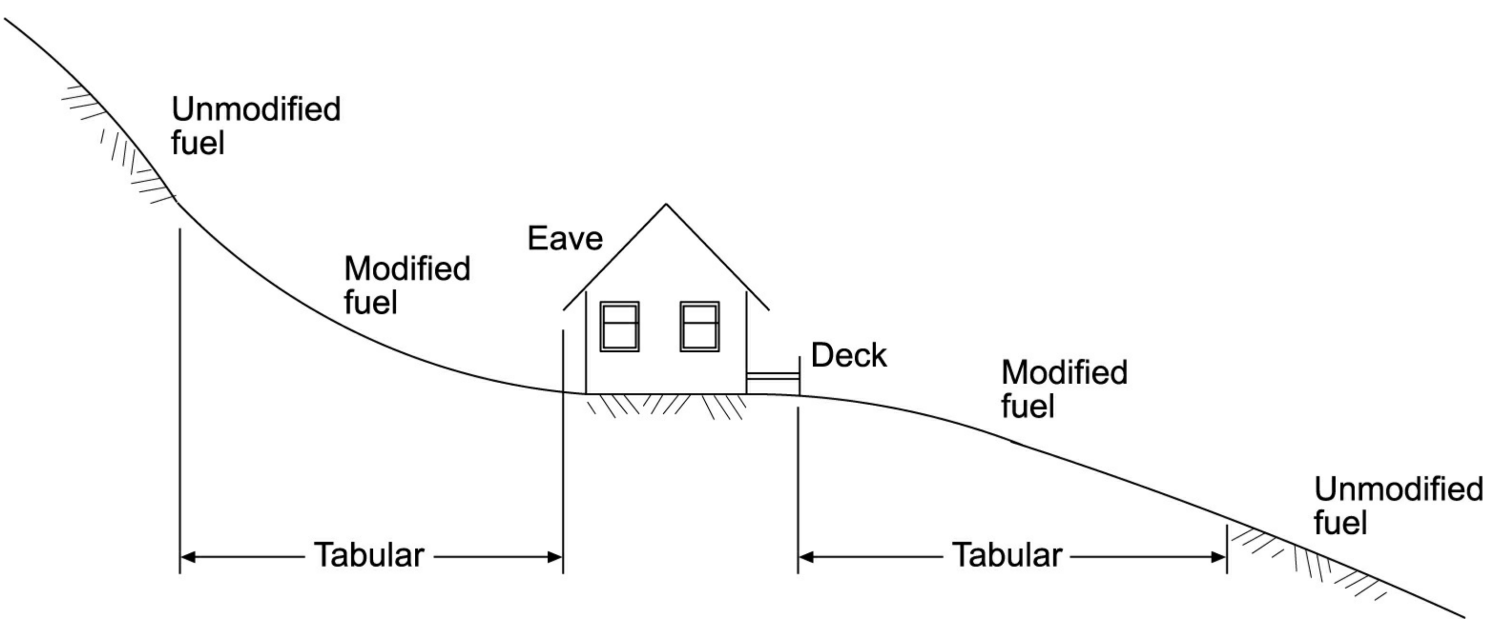
~~Buildings or structures, constructed in compliance with the conforming *defensible space* category of Table 503.1, shall comply with the *fuel modification* distances contained in Table 603.2. For all other purposes the *fuel modification* distance shall be not less than 30 feet (9144 mm) or to the lot line, whichever is less. Distances specified in Table 603.2 shall be measured on a horizontal plane from the perimeter or projection of the building or structure as shown in Figure 603.2. Distances specified in Table 603.2 are allowed to be increased by the *code official* because of a site-specific analysis based on local conditions and the *fire protection plan*.~~

~~TABLE 603.2 REQUIRED DEFENSIBLE SPACE~~

~~WILDLAND-URBAN INTERFACE AREA~~	~~FUEL MODIFICATION DISTANCE (feet)~~[a]
~~Moderate hazard~~	~~30~~
~~High hazard~~	~~50~~
~~Extreme hazard~~	~~100~~

~~For SI: 1 foot = 304.8 mm.~~

~~a. Distances are allowed to be increased due to site-specific analysis based on local conditions and the *fire protection plan*.~~



~~**FIGURE 603.2 MEASUREMENTS OF FUEL MODIFICATION DISTANCE**~~

~~**603.2.1 Responsible party.** Persons owning, leasing, controlling, operating or maintaining buildings or structures requiring *defensible spaces* are responsible for modifying or removing nonfire-resistive vegetation on the property owned, leased or controlled by said person.~~

~~**603.2.2 Trees.** Trees are allowed within the *defensible space*, provided that the horizontal distance between crowns of adjacent trees and crowns of trees and structures, overhead electrical facilities or unmodified fuel is not less than 10 feet (3048 mm).~~

~~**603.2.3 Ground cover**~~**.**
~~Deadwood and litter shall be regularly removed from trees. Where ornamental vegetative fuels or cultivated ground cover, such as green grass, ivy, succulents or similar plants are used as ground cover, they are allowed to be within the designated *defensible space*, provided that they do not form a means of transmitting fire from the native growth to any structure.~~

Add new text as follows:

603.1 General. Planting of vegetation for new landscaping shall be selected to reduce vegetation in proximity to a structure and to maintain vegetation as it matures.

603.2 Application. All new plantings of vegetation in designated Wildland-Urban Interface areas shall comply with Sections 603.3 through 603.4.2.1.

603.3 Landscape plans. Landscape plans shall be provided when required by the enforcing agency. The landscape plan shall include development and maintenance requirements for the vegetation management zone adjacent to structures and roadways, and to provide significant fire hazard reduction benefits for public and firefighting safety.

603.3.1 Contents. In addition to the construction site plan as outlined in the International Building Code landscape plans shall contain the following:

1. Delineation of the 30-foot (9144 mm) and 100-foot (3048 mm) fuel management zones from all structures.
2. Identification of existing vegetation to remain and proposed new vegetation.
3. Identification of irrigated areas.
4. A plant legend with both botanical and common names, and identification of all plant material symbols.
5. Identification of ground coverings within the 30-foot (9144 mm) zone.

603.4 Vegetation. All new vegetation shall be fire-smart vegetation in accordance with this section.

Exception: Trees classified as fire-smart vegetation complying with Section 603.4.2.1.

To be considered fire-smart vegetation, it must meet at least one of the following:

1. Be identified as fire-smart vegetation in an approved book, journal or listing from an approved organization.
2. Be identified as fire-smart vegetation by a licensed landscape architect with supporting justification.
3. Plants considered fire-smart vegetation and approved by the local enforcing agency.

603.4.1 Shrubs. All new plantings of shrubs shall comply with the following:

1. Shrubs shall not exceed 6 feet (1829 mm) in height.

2. Groupings of shrubs are limited to a maximum aggregate diameter of 10 feet (3048 mm).

3. Shrub groupings shall be separated from other groupings a minimum of 15 feet (4572 mm).

4. Shrub groupings shall be separated from structures a minimum of 30 feet (9144 mm).

5. Where shrubs are located below or within a tree's drip line, the lowest tree branch shall be a minimum of three times the height of the understory shrubs or 10 feet (3048 mm), whichever is greater.

603.4.2 Trees. Trees shall be managed as follows within the 30-foot zone (9144 mm) of a structure:

1. New trees shall be planted and maintained so that the tree's drip line at maturity is a minimum of 10 feet (3048 mm) from any combustible structure.

2. The horizontal distance between crowns of new trees and crowns of adjacent trees shall not be less than 10 feet (3048 mm).

3. Existing trees shall be trimmed to provide a minimum separation of 10 feet (3048 mm)away from chimney and stovepipe outlets

603.4.2.1 Non-fire-smart vegetation. New trees not classified as fire-smart vegetation, such as conifers, palms, pepper trees and eucalyptus species, shall be permitted provided the tree is planted and maintained so that the tree's drip line at maturity is a minimum of 30 feet from any combustible structure.

Exception: New, single specimen trees, planted so that the tree's drip line at maturity is a minimum of 10 feet (3048 mm) from any combustible structure and are well pruned and maintained to not form a means of rapidly transmitting fire from other nearby vegetation to a structure or from a structure to other nearby vegetation or to interrupt the advance of embers toward a structure.

Reason: The proposal to relocate section "Defensible Space" to follow the newly created section titled "Vegetation Plan" focuses on the planting of vegetation for new landscaping and to maintain defensible space for structures within the wildland urban interface areas. Chapter 5 of the Wildland Urban Interface Code requires vegetation management compliance prior to the final approval for building permits issued, this new section will give guidance on how to comply with the vegetation plan compliance when new landscaping is planted in these areas.

This section will apply only to new plantings of vegetation (other than a brief mention of existing trees in section 603.4.2) only in the Wildland Urban Interface area. Existing vegetation management is addressed in the Defensible Space section.

Requirements for landscape plans are laid out in this section. Since many local fire departments manage the Vegetation Plan Compliance requirements through submittals of landscape plans, there is a need for language to spell out the minimum requirements. This section provides these requirements to ensure adequate information is provided on the plans to conduct a plan review. Defensible space and Vegetation Management go hand in hand. Defensible space is based on the location of the structures in relation to the property lines as well as manmade and natural fire breaks. These topographic features are an essential factor in determining the risks of wildfire spread.

It also addresses how to select fire smart vegetation and provide basic information on planting to ensure that as the plantings grow to maturity, they can be maintained per the section for the Defensible Space requirements. Specifically addressed are shrubs and trees. The intention for shrubs is to select fire-smart species and to purposefully plant them in groupings and arrangements that ensure they create a landscape that can be easily maintained as they grow. Similarly with shrubs, new tree plantings must also be carefully considered. Trees have the added ability to create a pathway that will lead a fire up to the most vulnerable portions of a house (eaves, vents, and roofs), but also considered was the understanding that trees can provide much needed shade and can prevent the “urban heat island” effect.

The existing tree requirements that are briefly mentioned in this section because it will be very likely existing trees will be part of a new landscape plan as property owners landscape their yards.

Unique to the trees section are the requirements for non-fire-smart vegetation. Since so many of the popular varies of trees may not qualify for fire-smart status, requirements for non-fire-smart vegetation are also found in the trees section. The requirement for non-fire-smart vegetation is to simply plant them further away from structures to mitigate the additional hazard these trees may bring. This subsection allows property owners to have a path of compliance when they have a robust maintenance plan in place. The exception allows for small lots to have some kind of landscaping closer to the structure. The spacing an maintenance are the most important factors. Tree species become secondary when the spacing and maintenance are in compliance.

Cost Impact: Increase

Estimated Immediate Cost Impact:

$0 or it may increase of the cost of construction dependent upon the landscaping material and vegetation selected to comply with this section.

Estimated Immediate Cost Impact Justification (methodology and variables):

It is a property owners design choices that will determine the cost of landscaping. With many variables of cost per region and area will be driven by the local contractor, supply and demand.

WUIC60-24

WUIC61-24

IWUIC: [A] 106.6, SECTION 202 (New), SECTION 202, 603.2.1, 604.2, 604.3, A102.2, A104.4, A104.7.1, A105.4.2, A106.2, A107.3, APPENDIX F, F101.1, G101.3.1

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Wildland Urban Interface Code

Revise as follows:

[A] 106.6 Other data and substantiation.
Where required by the *code official*, the plans and specifications shall include classification of fuel loading, fuel model light, medium or heavy, and substantiating data to verify classification of ~~fire-resistive vegetation~~ *fire-smart vegetation*.

Add new definition as follows:

FIRE-SMART VEGETATION.
Plants, shrubs, trees and other vegetation that exhibit properties, such as high moisture content, little accumulation of dead vegetation and low sap or resin content, that make them less likely to ignite or contribute heat or spread flame in a fire than native vegetation typically found in the region.

Revise as follows:

FUEL MODIFICATION. A method of modifying fuel load by reducing the amount of ~~nonfire-resistive~~ vegetation or altering the type of vegetation to reduce the fuel load.

603.2.1 Responsible party. Persons owning, leasing, controlling, operating or maintaining buildings or structures requiring *defensible spaces* are responsible for modifying or removing ~~nonfire-resistive vegetation~~other than *fire-smart vegetation* on the property owned, leased or controlled by said person.

604.2 Modified area.
~~Nonfire-resistive vegetation~~ Vegetation other than *fire-smart vegetation* ~~or growth~~ shall be kept clear of buildings or structures, in accordance with Section 603, in such a manner as to provide a clear area for fire suppression operations.

604.3 Responsibility. Persons owning, leasing, controlling, operating or maintaining buildings or structures are responsible for maintenance of *defensible spaces*. Maintenance of the *defensible space* shall include modifying or removing ~~nonfire-resistive~~ vegetation other than *fire-smart vegetation* and keeping leaves, needles and other dead vegetative material regularly removed from roofs of buildings and structures.

A102.2 Clearance of brush or vegetative growth from roadways. The *code official* is authorized to require areas within 10 feet (3048 mm) on each side of portions of fire apparatus access roads and driveways to be cleared of ~~nonfire-resistive~~ vegetation ~~growth~~ other than *fire-smart vegetation.*

Exception: Single specimens of trees, ornamental vegetative fuels or cultivated ground cover, such as green grass, ivy, succulents or similar plants used as ground cover, provided they do not form a means of readily transmitting fire.

A104.4 Smoking. Where required by the *code official*, signs shall be posted stating NO SMOKING. Persons shall not smoke within 15 feet (4572 mm) of combustible materials or ~~nonfire-resistive~~ vegetation other than *fire-smart vegetation.*

Exception: Places of habitation or in the boundaries of established smoking areas or campsites as designated by the *code official*.

A104.7.1 General.
Persons shall not build, ignite or maintain any outdoor fire of any kind for any purpose in or on any *wildland-urban interface area*, except by the authority of a written permit from the *code official*.

Exception: Outdoor fires within inhabited premises or designated campsites where such fires are in a permanent barbecue, portable barbecue, outdoor fireplace, incinerator or grill and are not less than 30 feet (9144 mm) from any combustible material or ~~nonfire-resistive~~ vegetation other than fire-smart vegetation.

A105.4.2 Separation. A clear space of not less than 40 feet (12 192 mm) shall be provided between piles. The clear space shall not contain combustible material or nonfire-resistive vegetation.

Revise as follows:

A106.2 Ashes and coals.
Ashes and coals shall not be placed, deposited or dumped in or on *wildland-urban interface areas*.

Exceptions:

1. In the hearth of an established fire pit, camp stove or fireplace.
2. In a noncombustible container with a tightfitting lid, which is kept or maintained in a safe location not less than 10 feet (3048 mm) from ~~nonfire-resistive vegetation or~~ structures and vegetation other than fire-smart vegetation.
3. Where such ashes or coals are buried and covered with 1 foot (305 mm) of mineral earth not less than 25 feet (7620 mm) from ~~nonfire-resistive vegetation or~~ structures and vegetation other than fire-smart vegetation.

A107.3 Fuel modification area. Water storage and pumping facilities shall be provided with a *defensible space* of not less than 30 feet (9144 mm) clear of ~~nonfire-resistive vegetation or growth~~ vegetation other than *fire-smart vegetation* around ~~and adjacent to~~ such facilities.
Persons owning, controlling, operating or maintaining water storage and pumping systems requiring this *defensible space* are responsible for clearing and removing ~~nonfire-resistive~~ vegetation other *than fire-smart vegetation* and maintaining the *defensible space* on the property owned, leased or controlled by said person.

APPENDIX F CHARACTERISTICS OF ~~FIRE-RESISTIVE VEGETATION~~ FIRE-SMART VEGETATION

F101.1 Characteristics of ~~fire-resistive vegetation~~ fire-smart vegetation.
All plants will burn under extreme fire weather conditions, such as drought. However, plants burn at different intensities and rates of consumption. ~~Fire-resistive plants burn~~ *Fire-smart vegetation* burns at a relatively low intensity, slow rates of spread and with short flame lengths. The following are characteristics of ~~fire-resistive vegetation~~ *fire-smart vegetation*:

1. Growth with little or no accumulation of dead vegetation (either on the ground or standing upright).
2. Non-resinous plants (willow, poplar or tulip trees).
3. Low volume of total vegetation (for example, a grass area as opposed to a forest or shrub-covered land).
4. Plants with high live fuel moisture (plants that contain a large amount of water in comparison to their dry weight).
5. Drought-tolerant plants (deeply rooted plants with thick, heavy leaves).
6. Stands without ladder fuels (plants without small, fine branches and limbs between the ground and the canopy of overtopping shrubs and trees).
7. Plants requiring little maintenance (slow-growing plants that, when maintained, require little care).
8. Plants with woody stems and branches that require prolonged heating to ignite.

G101.3.1 Exterior sprinkler systems.
Currently, there is no nationally accepted standard for the design and installation of exterior fire sprinkler systems. Interior sprinkler systems are regulated by nationally recognized standards that have specific requirements. However, exterior sprinkler systems lack such uniformity. What is generally proposed is a type of sprinkler system, placed on the roofs or eaves of a building, whose primary purpose is to wet down the roof. These types of systems can be activated either manually or automatically. However, the contemporary thought on exterior sprinkler systems is that if the roof classification is of sufficient fire resistance, exterior sprinklers are of little or no value. Another option and alternative with exterior sprinklers is to use them to improve the relative humidity and fuel moisture in the *defensible space*. In

this case, the exterior sprinkler is not used to protect the structure as much as it attempts to alter the fuel situation. However, studies do not support the idea that merely spraying water into the air in the immediate vicinity of a rapidly advancing wildland-urban fire does much good. Clearly, irrigation systems that keep plants healthy and ~~fire-resistive plants~~ *fire-smart vegetation* that resist convection and radiated heat can accomplish the same purpose.

Reason: The term “fire-resistive vegetation” is a misnomer. All vegetation will burn. The IWUIC already uses the term of “ignition-resistant construction” which is applicable to construction features, not vegetation.

Since there are no fire-resistant plants, the term misleads the code user and can be misapplied. To add clarity and so that the term does not create confusion, “fire-resistive vegetation” is proposed to be replaced with “fire-smart vegetation.” This term is clear and does not imply that imply that the vegetation will not burn.

To assist with the new term, a definition is added which addresses the characteristics that are crucial for fire-smart vegetation.In the definition of “fuel modification”, the term “non-fire-resistive” is intentionally not included because the vegetation that is modified could be fire-smart vegetation or vegetation other than fire-smart vegetation. There are situations where even fire-smart vegetation needs to be modified or trimmed or removed. This revised definition of “fuel modification” means that it applies to all types of vegetation.

NOTE: The proposal to create a new Chapter 7 for all maintenance requirements would delete Section 603.2.1 (Responsible party).

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Bibliography: https://anrcatalog.ucanr.edu/pdf/8228.pdf
https://www.firefree.org/wp-content/uploads/2016/02/Fire-Resistant-Plants.pdf

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Changing the term of "fire-resistive vegetation" to the more correct term of "fire-smart vegetation" is editorial and has no regulatory impact.

WUIC61-24

WUIC62-24

IWUIC: 603.2.2.1 (New)

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Wildland Urban Interface Code

Add new text as follows:

603.2.2.1 New Trees. Planting of new trees shall be permitted within the defensible space provided they are separated or planted so that the tree's drip line at maturity is a minimum of 10 feet (3048 mm) from adjacent trees, overhead electrical facilities or unmodified vegetation and combustible structures.

Reason: This proposal addresses basic information on planting of new trees to ensure that as the trees grow to maturity, they can be maintained per defensible space requirements. The intention for new tree plantings must be carefully considered. Trees have the added ability to create a pathway for fire extension to the most vulnerable portions of a structure (eaves, vents, and roofs). The 10 foot minimum gives consideration and understanding that trees can provide much needed shade and can prevent the "urban heat island" effect.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This section merely provides requirements for the type of trees that may be planted in a designated defensible space. There is no increase to the cost of construction.

WUIC62-24

WUIC63-24

IWUIC: 603.2.3.1 (New), 604.3

Proponents: Milad Shabanian, Insurance Institute for Business & Home Safety (mshabanian@ibhs.org); T. Eric Stafford, Insurance Institute for Business and Home Safety (testafford@charter.net)

2024 International Wildland Urban Interface Code

Add new text as follows:

603.2.3.1 Combustible mulch. Combustible materials used for mulch shall be prohibited within 5 feet when measured on a horizontal plane from the perimeter or projection of the building or structure as shown in Figure 603.2.

Revise as follows:

604.3 Responsibility. Persons owning, leasing, controlling, operating or maintaining buildings or structures are responsible for maintenance of *defensible spaces*. Maintenance of the *defensible space* shall include modifying or removing nonfire-resistive vegetation and keeping leaves, needles and other dead vegetative material regularly removed from roofs of buildings and structures. Combustible debris including but not limited to deadwood, dead leaves, and pine needles shall be cleared and maintained a minimum of 5 feet when measured on a horizontal plan from the perimeter or projection of the building and structure as shown in Figure 603.2.

Reason: Combustible mulch and combustible debris located within 5 ft of exterior walls and decks are susceptible to potential ignition due to ember accumulation during a wildfire. Clearing this area of combustible debris and mulch plays an important role in reducing the likelihood of ignition. Quarles and Smith (2011) studied the fire behavior of eight different kinds of mulch including composted wood chips, medium pine bark nuggets, pine needles, shredded western red cedar, Tahoe chips, Tahoe chips with fire retardant, single layer Tahoe chips, and shredded rubber. They reported that, “with the exception of the composted wood chips, all of the mulch treatments demonstrated active flaming combustion” and that “shredded rubber, pine needles and shredded western red cedar demonstrated the most hazardous fire behavior” [1]. The fire behavior of surface fuels like mulch markedly changes with wind and slope [2]. As shown in Figures 1, investigations following the Glass Fire (2020) in Napa and Sonoma Counties, California, highlighted this pathway where embers landed in the front yard and ignited the wood mulch. The mulch enabled the fire to make direct flame contact with a hot tub, igniting the hot tub which resulted in the damage to the home.

Figure 1. Example of vegetation in small amounts located in Zone 0 creating a pathway for fire spread: (a) Wood mulch provided a pathway for fire to get close to the building and ignite a hot tub during the Glass Fire (2020) in Napa and Sonoma Counties, California; (b) Ground-level plants during the Glass Fire (2020).

Note the landscape barrier in Figure 1, which separates wood mulch from bare ground surface. There is no visible damage to the building where wood mulch is not against the home. This can also be observed at another home in Figure 2 where the fire stops where the ground cover changes from grass to gravel.

Figure 2. Noncombustible mulch breaks the fuel path in Lahaina wildfire. Photo curtesy Milad Shabanian, IBHS.

Bibliography: [1] Quarles, S. L., & Smith, E. (2011). The Combustibility of Landscape Mulches. U. o. N. C. Extension. https://cecentralsierra.ucanr.edu/files/145298.pdf

[2] Sánchez-Monroy, X., Mell, W., Torres-Arenas, J., & Butler, B. W. (2019). Fire spread upslope: Numerical simulation of laboratory experiments. Fire Safety Journal, 108.

[3] Headwaters Economics and Insurance Institute for Business & Home Safety, 2022, Construction costs for a wildfire-resistant home, California Edition. https://headwaterseconomics.org/wp-content/uploads/2022_HE_IBHS_WildfireConstruction.pdf

Cost Impact: Increase

Estimated Immediate Cost Impact:

This modification to the code will not increase or decrease the construction costs. However it could either raise or lower the maintenance expenses. If combustible mulch is eliminated and the ground cover is exposed soil, the removal of combustible mulch will lead to a cost reduction. The maintenance costs will only rise in locations where less expensive combustible mulch is replaced with pricier noncombustible hardscaping materials such as river rocks.

Estimated Immediate Cost Impact Justification (methodology and variables):

According to a recent cost study conducted by IBHS and Headwaters Economics for a wildfire resistant home in California [3], one-foot-long bark mulch with depth of three inches and 5 feet width cost $520 while same amount of pea gravel will cost $2790.

Estimated Life Cycle Cost Impact:

Although there is an initial rise in maintenance expenses when substituting bark mulch with pea gravel, over the long term, pea gravel proves to be more cost-effective. This is due to the consideration of the necessity for regularly reapplying bark mulch, while pea gravel offers a maintenance-free advantage as a noncombustible mulch, making it more economical after six years.

WUIC63-24

WUIC64-24

IWUIC: 603.2.4 (New)

Proponents: Milad Shabanian, Insurance Institute for Business & Home Safety (mshabanian@ibhs.org); T. Eric Stafford, Insurance Institute for Business and Home Safety (testafford@charter.net)

2024 International Wildland Urban Interface Code

Add new text as follows:

603.2.4 Fences. Fences located within 5 feet of a building with habitable space shall be constructed with approved noncombustible materials.

Reason: This proposal intends to reduce the possibility of direct flame contact exposure caused by ignition of combustible fences adjacent to the structure. Combustible fences that are in contact with or within 5 feet of the main building can act as a conduit for fire spread. Laboratory experiments and post-event investigations highlight the vulnerability of combustible fences, as illustrated in Figure 1 [1, 2].

Combustible fences create a pathway for fire to reach a residence (Figure 1 a and b). Even for homes featuring noncombustible cladding, flames originating from a burning fence can pose a threat to vulnerable components like eaves, vents, and glazing. As shown in Figure 1c, the installation of a noncombustible fence within Zone 0 disrupts the fire's path to a home [3].

a *b* *c*

Figure 1. Examples of combustible fencing providing a pathway for fire to the house, damaging the noncombustible siding.

Bibliography:

1. Butler, K., Johnsson, E. L., Maranghides, A., Nazare, S., Fernandez, M. G., McIntyre, R., Saar, W., Zarzecki, M., Tang, W., & Auth, E. (2022). Wind-Driven Fire Spread to a Structure from Fences and Mulch (NIST Technical Note 2228). National Institute of Standards and Technology. https://doi.org/10.6028/NIST.TN.2228

2. Insurance Institute for Business & Home Safety. (2020). California Wildfires of 2017 and 2018. https://ibhs.org/wp-content/uploads/member_docs/camp-fire-report_ibhs-1.pdf

3. Insurance Institute for Business & Home Safety. (2023). Wildfire Prepared Home Sacramento Demonstration, https://ibhs.org/ibhs-wildfire-prepared-home-demo-sacramento-ca/

4. Headwaters Economics and Insurance Institute for Business & Home Safety, 2022, Construction costs for a wildfire-resistant home, California Edition. https://headwaterseconomics.org/wp-content/uploads/2022_HE_IBHS_WildfireConstruction.pdf

Cost Impact: Increase

Estimated Immediate Cost Impact:

This modification can increase the construction cost. According to the cost study analysis performed by IBHS and Headwaters Economics in 2022, replacing 5 ft of cedar fence with a metal fence can increase the construction cost around $200 in California [4].

Estimated Immediate Cost Impact Justification (methodology and variables):

According to the cost study analysis performed by IBHS and Headwaters Economics in 2022, replacing 5 ft of cedar fence with a metal fence can increase the construction cost around $200 in California [4].

WUIC64-24

WUIC65-24

IWUIC: 604.1, 604.5 (New)

Proponents: Cary Yballa, Central County Fire Department, Cal FPO (cyballa@ccfd.org); Crystal Sujeski, CAL FIRE/Office of the State Fire Marshal (crystal.sujeski@fire.ca.gov); Darcy Davidson, Carlsbad Fire Department, California Fire Prevention Officers (darcy.davidson@carlsbadca.gov)

2024 International Wildland Urban Interface Code

Revise as follows:

604.1 General.
~~*Defensible spaces* required by Section 603 shall be maintained in accordance with Section 604.~~Hazardous vegetation and fuels shall be managed to reduce the severity of potential exterior wildfire exposure to buildings and to reduce the risk of fire spreading to buildings.

Add new text as follows:

604.5 Disposal of flammable vegetation and fuels. The disposal, including burning or removal to a site approved by the local jurisdiction, in consultation with the fire authority, of flammable vegetation and fuels removed from the site as a result of building construction, road or driveway construction or vegetation management shall be in accordance with all applicable laws and regulations.

Reason: This proposal clarifies that maintenance of the vegetation in the defensible space is required for all buildings.

It also adds Section 604.5 which addresses the disposal of fuels or debris resulting from clearing land for construction or annual vegetation maintenance.

This section allows for the material to be disposed of or burned provided the burning is in accordance with all regulations.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is for clarification of the methods of handling vegetation maintenance and disposal of the resultant debris.

WUIC65-24

WUIC66-24

IWUIC: 604.3

Proponents: Matthew Dobson, VSI, VSI (mdobson@vinylsiding.org)

2024 International Wildland Urban Interface Code

Revise as follows:

604.3 Responsibility. Persons owning, leasing, controlling, operating or maintaining buildings or structures are responsible for maintenance of *defensible spaces*. Maintenance of the *defensible space* shall include modifying or removing nonfire-resistive vegetation , combustible mulch, and keeping leaves, needles, and other dead vegetative material regularly removed from roofs of buildings and structures.

Reason: Over the past code cycles there has been concern over smoker habits and wildfires and combustible mulch, and the potential hazard they pose with combustion of exterior walls. This change focuses on providing protections from two ignition sources discarded cigarettes or pre-rolls (joints) and wildfires. Many fire service members, the UL fire fighter safety institute, and other material stakeholders, like the Vinyl Siding Institute, have been focused on this issue over close to 10 years or more. The problem identified is the spread of fire from the exterior into to the unprotected attic space and then spreading quickly to other parts of the building either through discarded cigarettes or wildfire. Note that the term "combustible ground cover" could lead to misinterpretation associated with temporary materials placed on the ground during repairs or upgrades and they should not be regulated.

Over the decade, fire departments in the Washington, DC region (Loudon County, VA) have been confronted with structure fires which have demonstrated a consistent pattern of starting on the outside. These fires have the potential for rapid loss of structural integrity and catastrophic collapse before occupants are alerted. As attention has grown locally, it is apparent that this type of fire is becoming common on a national basis.

These fires tend to follow a distinct pattern. These fires start at a low point on the exterior ground or in a waste basket with discarded cigarette and spread vertically along the exterior wall producing flammable gases, which are readily admitted into the attic area through ventilation soffits. If not cooled, these heated gases accumulate and combust, creating rapidly spreading fire conditions in the attic area, often without occupant awareness. The unchecked fire can result in full roof involvement, creating a dangerous and difficult situation for occupants and fire fighters.

The group examined a number of structure fires which have exhibited the pattern described above. There is agreement over 3 common aspects. First, these fires often result from careless smoking habits or wilfires. Second, when the smoking materials are not properly disposed of, they come into contact with combustible ground cover adjacent to a building and, very commonly, this is mulch or wildfires (flying embers) start the combustible ground cover (kindling). And, last, the combustible exterior wall is a factor in the the growth of these fires into the attic space.

The careless smoker is an impediment to effective fire prevention efforts. The fire service has consistently provided data that shows smoking is the leading cause of fatal fires in the United States. Public fire and life safety efforts have been reasonably effective at communicating the message to not smoke in bed, and various medical organizations have demonstrated the health risk associated with “second hand” smoke. We now see that people are routinely smoking outside, at or near the entrance to a building, which increases the possibility of an accidental ignition of outside combustibles.

If one were to chronicle the actions of today’s smoker, it shows the last action they take when exiting a building is to “light up.” When returning inside, they often drop the cigarette near the entrance. Many smokers seem to believe that dropping a match or cigarette onto the combustible ground cover or into a flower pot is an effective method of extinguishment, however, this behavior often places the smoking material directly into the mulch, initiating the low fire described earlier.

Combustible ground cover (mulch) has become a common exterior decorative material which aids in suppressing weed growth while enhancing a building’s curb appeal. However, most mulch is a dead organic material, comprised of chipped wood, tree bark or pine needles. Mulch is most effective when it is maintained in a moist state, however it can dry out very quickly and become a readily ignitable fuel source. Because of its relatively small mass in comparison to its surface area, when ignited, it will progress and sustain open flame.

The group discussed a method in which to proceed, the interest being to add ress, in the quickest manner, industrial and social changes which could reduce the possibility of a fire on the outside of a building. Each aspect presents unique challenges for fire prevention efforts:

1. Changing the behavior of the smoker is an ongoing and difficult challenge, especially as social pressures have resulted in regulatory changes to require people to smoke outside of a building. Further development of the “fire safe” cigarette, by way of testing using mulch, could be deemed too costly for the industry, and would have no effect on improper disposal of matches. Thus, the quickest and most practical strategy for this aspect of the problem is to expand public fire and life safety education to focus on the hazards of improper disposal of smoking materials, coupled with enforcement of applicable requirements for regulation of smoking and disposal of products. However, in this age of “information overflow” it is questionable if this would result in widespread behavioral changes for smokers.

2. Regulating the use and placement of mulch, that the study group believes could have the quickest and most significant impact toward reducing the exterior fire problem, while additional strategies to address the other problems noted are pursued. The use of wood and wood related mulch for building decoration is purely optional. It is not a required construction component under current building codes. Therefore, regulations to curtail its use or require that it be separated from a building’s combustible exterior are reasonable and could be codified on a national basis. On a large scale, the mere action of creating separation of combustible materials has been a wildland fire tactic for years. Several states and local jurisdictions have already employed this theory by either recommending or requiring that wood-based mulch be separated from exterior combustible walls:

1. The Virginia Department of Forestry recommends to “provide a minimum of an 18 inch clearance between landscaping mulch beds and combustible building materials” and to “ensure proper clearance to electric devices, such as decorative lights, by following the manufacturer’s instructions;”

2. In Raleigh, NC, following a disastrous fire in a multi-family building, the city passed a pine straw mulch ordinance that bans the use of pine straw as ground cover within 10 feet of multi-family dwellings. The ordinance exempts 1 and 2-family dwellings, however, the city strongly encourages these homeowners to comply with the pine straw restrictions;

3. The Commonwealth of Massachusetts prohibits the new application of mulch within 18 inches around combustible exteriors of buildings, such as wood or vinyl but not brick or concrete. Residential buildings with six units or less are exempted from this regulation, but it is recommended that all homeowners adopt these safety practices. The regulation applies to all other buildings including commercial properties.

4. Ventura County, CA prohibits mulch and wood chips within the required “defensible space” zone (which ranges from 0’ to 30’ from the exterior of a building).

Cost Impact: Increase

Estimated Immediate Cost Impact:

This change could increase the cost of construction and maintenance, as non-combustible mulch can be more expensive than combustible mulch.

Estimated Immediate Cost Impact Justification (methodology and variables):

Typical retail cost of non-combustible mulch (pea gravel) vs. combustible mulch, can range from 2-5 times more expensive.

Estimated Life Cycle Cost Impact:

However typical combustible mulch will need to be replaced every 1-2 years vs. non-combustible mulch which may last 10+ years.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

Based on estimated lifecycle of typical combustible vs. non-combustible mulch.

WUIC66-24

WUIC67-24

IWUIC: 606.3 (New)

Proponents: Crystal Sujeski, CAL FIRE/Office of the State Fire Marshal (crystal.sujeski@fire.ca.gov); Darcy Davidson, Carlsbad Fire Department, California Fire Prevention Officers (darcy.davidson@carlsbadca.gov); Kevin Scott, KH Scott & Associates LLC, self (khscottassoc@gmail.com)

2024 International Wildland Urban Interface Code

Add new text as follows:

<u>**606.3 Clear Area.** LP-gas installations shall be surrounded by a 10-foot (3048 mm) wide clear area to bare mineral soil. An additional 10 feet (3048 mm) beyond the bare mineral soil is permitted to have vegetation provided it is fire smart vegetation.</u>

Reason: This first part of this requirement is consistent with the International Fire Code for a 10 foot clearance of combustible material around LPG tanks. The second requirement for an additional 10 feet is based on the fact that this LP-gas installation is located in the wildland fire area. The additional 10 feet of fire smart vegetation will provide for a reduce heat impact on the LP-gas components.

The term fire smart vegetation is addressed and defined in a separate proposal.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is consistent with requirements that are already contained in the International Fire Code.

WUIC67-24

WUIC68-24

IWUIC: SECTION 608 (New), 608.1 (New), 608.1.1 (New)

Proponents: Crystal Sujeski, CAL FIRE/Office of the State Fire Marshal (crystal.sujeski@fire.ca.gov); Darcy Davidson, Carlsbad Fire Department, California Fire Prevention Officers (darcy.davidson@carlsbadca.gov); Kevin Scott, KH Scott & Associates LLC, self (khscottassoc@gmail.com)

2024 International Wildland Urban Interface Code

Add new text as follows:

SECTION 608
BUILDING SITING AND SETBACKS

608.1 General. All parcels shall provide a minimum 30-foot (9144 mm) setback for all buildings from property lines and the center of a road, except as provided for in Section 608.1.1.

608.1.1 Setback reduction. A reduction in the minimum setback shall be based upon practical reasons, which may include but are not limited to, parcel dimensions or size; topographic limitations; development density requirements or other development patterns that promote low-carbon emission outcomes; sensitive habitat; or other site constraints, and shall provide for an alternative method to reduce structure-to-structure ignition by incorporating features such as, but not limited to:

1. Non-combustible block walls or fences.
2. Non-combustible material extending 5 feet (1524 mm) horizontally from the furthest extent of the building.
3. Hardscape landscaping.
4. A reduction of exposed windows on the side of the structure with a setback less than 30 feet (9144 mm).

Reason: The principle concept of building setbacks is to maintain fire separation distances from vegetation or other structures. This setback typically exceeds any zoning or building code setback requirement, but is crucial in inhibiting the extension of a wildfire. The NIST Technical Note 2205 evaluates separation distances and supports the 30 foot setback requirements.

Cost Impact: Increase

Estimated Immediate Cost Impact:

It is expected that there will be a $0 cost in some situations however setbacks may impact the housing density of a subdivision.

A basic representative cost comparison example is as follows:

Residential development with requirement = $16, 110

Residential development with exception to requirement = $15, 460

Residential development without requirement = $12, 890

Estimated Immediate Cost Impact Justification (methodology and variables):

The separation distance benefits the entire wildland community.

WUIC68-24

WUIC69-24

IWUIC: SECTION 609 (New), 609.1 (New), 609.1.1 (New), 609.2 (New), 609.2.1 (New), 609.2.2 (New), 609.2.3 (New), 609.2.4 (New), 609.2.5 (New), 609.2.6 (New)

Proponents: Crystal Sujeski, CAL FIRE/Office of the State Fire Marshal (crystal.sujeski@fire.ca.gov); Kevin Scott, KH Scott & Associates LLC, self (khscottassoc@gmail.com); Darcy Davidson, Carlsbad Fire Department, California Fire Prevention Officers (darcy.davidson@carlsbadca.gov)

2024 International Wildland Urban Interface Code

Add new text as follows:

SECTION 609
RIDGELINES, FUEL BREAKS AND GREENBELTS

609.1 Ridgelines. The local jurisdiction shall identify strategic ridgelines, if any, to reduce fire risk and improve fire protection through an assessment of the following factors:

1. Topography.
2. Vegetation.
3. Proximity to any existing or proposed residential, commercial, or industrial land uses.
4. Construction where mass grading may significantly alter the topography resulting in the elimination of ridgeline fire risks.
5. Ability to support effective fire suppression.
6. Other factors, as required by the code official.

609.1.1 Undeveloped ridgelines. Undeveloped ridgelines identified as strategic ridgelines shall be preserved as follows:

1. New buildings on undeveloped strategic ridgelines are prohibited.
   - 1.1. New residential units are prohibited within or at the top of drainages or other topographic features common to ridgelines that act as chimneys to funnel convective heat from wildfires.
   - 1.2. Nothing in this subsection shall be construed to alter the extent to which utility infrastructure, may be constructed on undeveloped ridgelines.
   - 1.3. Where approved, buildings on strategic ridgelines where development activities such as mass grading will significantly alter the topography that results in the elimination of ridgeline fire risks.
2. The code official may implement further specific requirements to preserve undeveloped ridgelines.

609.2 Fuel breaks. When new projects meet any of the following criteria, the code official shall determine the need and location for fuel breaks in consultation with the fire chief:

1. The permitting or approval of three or more new parcels, excluding lot line adjustments.
2. A request for a change of zoning which will increase zoning intensity or density.
3. A request for a change in use permit which will increase the use intensity or density.

609.2.1 Exposures. Fuel breaks required by the code official, in consultation with the fire chief, shall be located, designed and maintained in a condition that reduces the potential of damaging radiant and convective heat or ember exposure to access routes, buildings or infrastructure within the development.

609.2.2 Fire department access. Fuel breaks shall have a minimum of one entry point for fire fighters and fire apparatus. The specific number of entry points and entry requirements shall be determined by the code official, in consultation with the fire chief.

609.2.3 Location of fuel breaks. Fuel breaks may be required at locations such as, but not limited to:

1. Directly adjacent to defensible space to reduce radiant and convective heat exposure and ember impacts, or support fire fighting tactics.
2. Directly adjacent to roads to manage radiant and convective heat exposure and ember impacts, increase evacuation safety, or support fire fighting tactics.
3. Directly adjacent to a hazardous land use to limit the spread of fire from such uses, reduce radiant and convective heat exposure, or support fire fighting tactics.
4. Strategically located along ridgelines, in greenbelts or other locations to reduce radiant and convective heat exposure, ember impacts, or support fire fighting tactics.

609.2.4 Timing. Fuel breaks shall be completed prior to the commencement of any permitted construction.

609.2.5 Construction. Fuel breaks shall be constructed using the most ecologically and site appropriate treatment option, such as, but not limited to, prescribed burning, manual treatment, mechanical treatment, prescribed herbivory and targeted ground application of herbicides.

609.2.6 Maintenance of fuel breaks. Where fuel breaks are required, maintenance mechanisms shall be established to ensure the fire behavior objectives and thresholds are maintained over time.
The mechanisms required shall be binding upon the property for which the fuel break is established, shall ensure adequate maintenance levels, and may include written legal agreements; permanent fees, taxes, or assessments; assessments through a homeowners' association; or other funding mechanisms.

Reason: This proposal introduces the concept of land use planning when it comes to development of buildings and structures in the wildland area.

Ridgeline requirements ensure that minimal visual and environmental impacts of development are associated with building and structures constructed in these areas.

The concept behind fuel breaks is to create a corridor that facilitates firefighter movement during a wildfire. These areas are often where certain wildfire firefighting techniques are employed such as backfires or burn-outs (when fire fighters set their own fire to burn the vegetation in front of an advancing wildfire).

This proposal provides the authority to the code official to designate fire breaks as appropriate to protect developments and assist in fire management.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The benefits of ridgeline and fuel break preservations for the environmental impact out way the costs of construction

WUIC69-24

WUIC70-24

IWUIC: [A] 102.8, CHAPTER 7 (New), SECTION 701 (New), 701.1 (New), SECTION 702 (New), 702.1 (New), SECTION 703 (New), 703.1 (New), SECTION 704 (New), 704.1 (New), 704.2 (New), 704.3 (New), SECTION 705 (New), 705.1 (New), SECTION 706 (New), 404.9, 706.2 (New), SECTION 707 (New), 604.1, 707.1.1 (New), 604.2, 604.3, 604.4, 604.4.1, 604.4.2, 603.2.1, 707.5 (New), 707.6 (New), 707.7 (New), 603.2.3

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Wildland Urban Interface Code

Revise as follows:

[A] 102.8 Existing conditions.
The legal occupancy or use of any structure ~~or condition~~ existing on the date of adoption of this code shall be permitted to continue without change, except as is specifically ~~covered~~ provided for in this code, the International Fire Code or the *International Property Maintenance Code*, or as is deemed necessary by the *code official* for the general safety and welfare of the occupants and the public. Existing properties shall comply with the defensible space requirements in Section 603 and Chapter 7.

Add new text as follows:

CHAPTER 7 MAINTENANCE REQUIREMENTS

SECTION 701 GENERAL

701.1 Scope. Where a building or structure was constructed in accordance with this code or was previously *approved*,maintenance of new and existing buildings, structures, systems and premises shall comply with this chapter. The construction requirements of this chapter are not intended to apply retroactively.

SECTION 702 IGNITION-RESISTANT CONSTRUCTION

702.1 General. Ignition-resistant construction features found to be damaged, missing or non-compliant shall be repaired or replaced.

SECTION 703 FIRE PROTECTION AND LIFE SAFETY SYSTEMS

703.1 General. *Fire protection* and *life safety system*s shall be maintained operable at all times in accordance with the applicable standard

SECTION 704 FIRE ACCESS ROADS

704.1 Obstructions. Fire access roads shall not be obstructed in any manner, including the parking of vehicles. The minimum widths and clearances established in Section 403.3 shall be maintained at all times.

704.2 Maintenance. Fire access roadsshall be maintained in a condition equal to or better than the condition at the time of approval.

704.3 Signs and marking. Road identification signs required in Section 403.4.1 and marking of fire protection equipment required in

Section 403.5 shall be maintained and legible.

SECTION 705
PREMISES IDENTIFICATION

705.1 General. Signs and markings for premise identification required in Section 403.6 shall be maintained and legible.

SECTION 706
WATER SUPPLY

Revise as follows:

~~404.9~~706.1 ~~Testing and maintenance~~General. Water sources, draft sites, and hydrants ~~and other fire protection equipment~~ required by this code shall be subject to periodic tests as required by the *code official*. ~~Such equipment installed under the provisions of this code shall be maintained in an operative condition at all times and shall be repaired or replaced where defective. Additions, repairs, alterations and servicing of such fire protection equipment and resources shall be in accordance with *approved* standards.~~

Add new text as follows:

706.2 Maintenance. Water sources, draft sites and hydrants shall be maintained in an operative condition at all times.

SECTION 707
DEFENSIBLE SPACE AND VEGETATION MANAGEMENT

Revise as follows:

~~604.1~~ 707.1 General.
Defensible spaces required by Section 603 or by an *approved* vegetation management plan in accordance with 502.2 shall be maintained at all times in accordance with 706.2 through 706.4.2 ~~Section 604~~.

Add new text as follows:

707.1.1 Fire protection plans. Where an *approved fire protection plan* contains *defensible space* requirements other than those in Table 603.2, the *defensible space* requirements in the *approved fire protection plan* shall be maintained at all times.

Revise as follows:

~~604.2~~ 707.2 Modified area.
Nonfire-resistive vegetation or growth shall be kept clear of buildings or structures, in accordance with Section 603, in such a manner as to provide a clear area for fire suppression operations.

~~604.3~~ 707.3 Responsibility. Persons owning, leasing, controlling, operating or maintaining buildings or structures are responsible for maintenance of *defensible spaces*. Maintenance of the *defensible space* shall include modifying or removing nonfire-resistive vegetation and keeping leaves, needles and other dead vegetative material regularly removed from roofs of buildings and structures.

~~604.4~~ 707.4 Trees. Tree crowns extending to within 10 feet (3048 mm) of any structure shall be pruned to maintain a minimum horizontal clearance of 10 feet (3048 mm). Tree crowns within the *defensible space* shall be pruned to remove limbs located less than 6 feet (1829 mm) above the ground surface ~~adjacent to the trees~~.

~~604.4.1~~ 707.4.1 Chimney clearance. Portions of tree crowns that extend to within 10 feet (3048 mm) of the outlet of a chimney shall be pruned to maintain a minimum horizontal clearance of 10 feet (3048 mm).

~~**604.4.2**~~ <u>**707.4.2**</u> **Deadwood removed.** Deadwood and ~~litter~~ <u>dying branches</u> shall be regularly removed from trees.

Delete without substitution:

~~**603.2.1 Responsible party.** Persons owning, leasing, controlling, operating or maintaining buildings or structures requiring *defensible spaces* are responsible for modifying or removing nonfire-resistive vegetation on the property owned, leased or controlled by said person.~~

Add new text as follows:

<u>**707.5 Accumulation of dead vegetation.** Leaves, needles, or other vegetation on roofs, in gutters, on or below decks, porches, balconies or exterior stairways shall be regularly removed.</u>

<u>**707.6 Woodpiles.** A minimum of 10 feet (3048 mm) clearance to combustible materials shall be maintained in all directions around all exposed woodpiles.</u>

<u>**Exception:** Where an approved vegetation management plan requires a different clearance distance.</u>

<u>**707.7 Liquid Propane Gas (LPG) storage tanks.** A minimum of 10 feet clearance to combustible materials shall be maintained in all directions around aboveground Liquid Propane Gas (LPG) storage tanks.</u>

<u>**Exception:** Where an *approved* vegetation management plan requires a different clearance distance.</u>

Revise as follows:

~~**603.2.3**~~<u>**707.8**</u> **Ground cover.**

~~Deadwood and litter shall be regularly removed from trees. Where o~~<u>O</u>rnamental vegetative fuels or cultivated ground cover, such as green grass, ivy, succulents or similar plants ~~are~~ used as ground cover, ~~they are allowed~~ <u>shall be permitted</u> to be within the designated *defensible space*, provided that they do not form a means of transmitting fire from the native growth to any structure.

Reason: This proposal accomplishes 3 things:

1. It creates a new Chapter for all maintenance requirements applicable to fire hazard mitigation of structures and premises regulated by the IWUIC. New construction requirements remain in Chapters 4, 5 and 6.
2. It relocates all existing requirements that are maintenance related from Chapter 6 into the appropriate sections of this new Chapter for clarity and easier use of this code.
3. It adds reasonable new requirements for maintenance or repair or replacement of features that were identified by F-CAC as gaps that needed to be addressed.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: Increase

Estimated Immediate Cost Impact:

This proposal does not impose any new or additional cost to initial construction. However, there are new requirements for the maintenance and/or repair of wildfire mitigation measures that are already required for new construction. Maintenance and repair costs are variable and specific cost estimates could vary significantly over the lifespan of a building or property.

Estimated Immediate Cost Impact Justification (methodology and variables):

This proposal will impose additional costs related to ongoing maintenance, repair or replacement of features that were required for initial construction and site approval but do not increase the cost of initial construction.

Estimated Life Cycle Cost Impact:

Maintenance and repair costs are variable and specific cost estimates could vary significantly over the lifespan of a building or property. Costs may necessitate purchase of replacement materials, labor (which could by DIY) and increase as time goes by.

WUIC70-24

WUIC71-24

IWUIC: APPENDIX C, SECTION C101, C101.1, TABLE C101.1, SECTION C101 (New),

C101.1
(New), C101.2 (New), C101.3 (New), C101.4 (New), C101.5 (New), C101.6 (New), C101.7 (New), C101.8 (New), TABLE C101.1 (New)

Proponents: Cary Yballa, Central County Fire Department, Cal FPO (cyballa@ccfd.org); Crystal Sujeski, CAL FIRE/Office of the State Fire Marshal (crystal.sujeski@fire.ca.gov); Darcy Davidson, Carlsbad Fire Department, California Fire Prevention Officers (darcy.davidson@carlsbadca.gov)

2024 International Wildland Urban Interface Code

Revise as follows:

APPENDIX C ~~FIRE HAZARD SEVERITY FORM~~ COMMUNITY WILDLAND-URBAN INTERFACE (WUI) FIRE HAZARD EVALUATION FRAMEWORK

SECTION ~~C101~~
~~FIRE HAZARD SEVERITY FORM~~

~~**C101.1 Fire hazard severity form.**~~
~~Where adopted, Table C101.1 is permitted to be used as an alternative to Table 502.1 for analyzing the fire hazard severity of building sites.~~

~~TABLE C101.1 FIRE HAZARD SEVERITY FORM~~

~~**A. Subdivision Design Points**~~	
~~1. Ingress/Egress~~	
~~Two or more primary roads~~	~~1~~___
~~One road~~	~~3~~___
~~One-way road in, one-way road out~~	~~5~~___
~~2. Width of Primary Road~~	
~~20 feet (6096 mm) or more~~	~~1~~___
~~Less than 20 feet (6096 mm)~~	~~3~~___
~~3. Accessibility~~	
~~Road grade 5% or less~~	~~1~~___
~~Road grade more than 5%~~	~~3~~___
~~4. Secondary Road Terminus~~	
~~Loop roads, cul-de-sacs with an outside turning radius of 45 feet (13 716 mm) or greater~~	~~1~~___
~~Cul-de-sac turnaround~~	~~2~~___
~~Dead-end roads 200 feet (60 960 mm) or less in length~~	~~3~~___
~~Dead-end roads greater than 200 feet (60 960 mm) in length~~	~~5~~___
~~5. Street Signs~~	

~~Present~~	~~1~~___
~~Not present~~	~~3~~___
~~B. Vegetation (IWUIC Definitions)~~	
~~1. Fuel Types~~	
~~Light~~	~~1~~___
~~Medium~~	~~5~~___
~~Heavy~~	~~10~~___
~~2. Defensible Space~~	
~~70% or more of site~~	~~1~~___
~~30% or more, but less than 70% of site~~	~~10~~___
~~Less than 30% of site~~	~~20~~___
~~C. Topography~~	
~~8% or less~~	~~1~~___
~~More than 8%, but less than 20%~~	~~4~~___
~~20% or more, but less than 30%~~	~~7~~___
~~30% or more~~	~~10~~___
~~D. Roofing Material~~	
~~Class A Fire Rated~~	~~1~~___
~~Class B Fire Rated~~	~~5~~___
~~Class C Fire Rated~~	~~10~~___
~~Nonrated~~	~~20~~___
~~E. Fire Protection—Water Source~~	
~~500 GPM (1892.5 L/min) hydrant within 1,000 feet (304.8 m)~~	~~1~~___
~~Hydrant farther than 1,000 feet (304.8 m) or draft site~~	~~2~~___
~~Water source 20 min. or less, round trip~~	~~5~~___
~~Water source farther than 20 min., and 45 min. or less, round trip~~	~~7~~___
~~Water source farther than 45 min., round trip~~	~~10~~___
~~F. Existing Building Construction Materials~~	
~~Noncombustible siding/deck~~	~~1~~___
~~Noncombustible siding/combustible deck~~	~~5~~___
~~Combustible siding and deck~~	~~10~~___
~~G. Utilities (gas and/or electric)~~	
~~All underground utilities~~	~~1~~___
~~One underground, one above ground~~	~~3~~___

~~All above ground~~	~~5~~
~~**Total for Subdivision**~~	
~~Moderate Hazard~~	~~40–59~~
~~High Hazard~~	~~60–74~~
~~Extreme Hazard~~	~~75+~~

Add new text as follows:

SECTION C101
COMMUNITY WUI FIRE HAZARD EVALUATION FRAMEWORK

C101.1
Definitions. The Community WUI Hazard Evaluation Framework presented here is intended for communities as small as a few hundred to tens of thousands of residents. The methodology is not intended for the documentation of single residences or large cities. It is intended to provide a community with an overview of the overall WUI fire-related hazards and to enable the code official to compare the relative hazards and preparedness levels of different communities. The information collected can be used by first responders and community and county officials to prioritize hazard mitigation within and around the community and to develop “tabletop” responses to different WUI fire scenarios. In the event of an actual WUI fire, the information collected could be used by first responders and local officials to safely evacuate civilians, to reduce the risk of first responder injuries and to enhance fire containment. The following are definitions and uses of the different components of Table C101.1 Community WUI Fire Hazard Evaluation Framework. This framework may be expanded to include additional characteristics that are not specifically listed in this preliminary version.

C101.2 Community. In the sense of WUI fire hazard, the community should be viewed in the context of evacuation arteries rather than jurisdictional boundaries. As such, the community may have parts that are incorporated or unincorporated. Community size is reported in acres, and the community boundary selected for this hazard evaluation can be provided for use in a geographic information system (GIS) layer in a number of formats, including but not limited to shapefile, geodatabase or Geo-Package. A topographic overview of the area (community) is used to describe the general conditions using one or more of the following key words: flat terrain, rolling hills, moderate slopes, valleys, steep slopes and/or plateau.

Information about prevailing weather patterns, such as localized winds or significant wind events (strength and direction), should also be included in the community profile.

C101.3 Fuels. The fuels section is intended to provide an overview of the structural, vegetative and other fuels present in the community. This is not a parcel-level assessment; however, if defensible space assessment data is available, it can be aggregated and utilized within this framework to provide higher resolution assessment of community fire hazard. Structure density is a simple metric to capture structure-to-structure spacing and provide insight on the potential structure-to-structure fire spread. For uniform communities, a representative structure separation distance (SSD) may be sufficient, whereas nonuniform communities will be better described using a histogram of SSD. The age of structures may also be a factor in structure vulnerability due to changes in building codes associated with structure hardening. Similarly, a community that was built over a short period of time can be represented by a single value representing the decade of construction, while a community that grew and expanded over long periods will be better represented by a histogram of structure ages.

A database such as LANDFIRE (www.landfire.gov/) can provide the vegetative fuel type and fuel loading throughout the community. This data will be limited by the age of the last LANDFIRE overflight and the 100 feet (30 meters) pixel spatial resolution.

Natural and artificial fuel breaks, including fuel treatments within and around the community, should be represented in a geospatial format and should include the year the vegetative fuel treatment was conducted. Fuel treatments should also include any logging activities in the area surrounding the community. Fire history in and around the community will describe the last time the community experienced direct impacts from fire. Shapefiles of the fuel treatments and fire history will allow for spatial documentation of this data. Fuel treatments and fire history should be documented at least 10 miles (16 km) out from the edge of the community. Local conditions (e.g., fuel, topography, weather, evacuation routes) may require documentation well beyond 10 miles (16 km). The last large fire in the area of the community perimeter, together with the vegetative fuel loading, will provide information on the potential energy content of the vegetative fuels in the event of a short- or long-term drought.

The documentation of other community hazards, such as hazmat or high fuel load facilities (e.g., fixed propane tanks, hazardous material storage and use facilities, ammunition facilities lumber yards, pallet storage, tire storage), is important as they can affect civilians and first responder safety during evacuations, fire containment and mop-up activities. The information should be provided in the form of a GIS layer and may then be used by first responders to develop "tabletop" responses for emergency preparedness, and to direct response actions during a WUI fire event.

C101.4 Population. The population of the selected community will impact, among other factors, the minimum time required for evacuation. Population and population density, expressed as the number of residents per acre, are both important metrics that provide information that can be used for evacuation assessment. The permanent to transient population density ratio is intended to capture the fraction of the community that may be visiting for tourism and may not be aware of community evacuation and other fire related activities.

C101.5 Notification. The notification section of the Community WUI Hazard Evaluation is designed to capture the presence and type of mass-notification tools available to emergency managers. It should be noted that reliance on individual notification methods may result in limited notifications. If a Reverse 911 system is in place, the percentage of the community that will potentially receive the notifications from this system will estimate the number of residents that may require different notifications. Sirens or other fixed notification systems with power backup should also be listed in this section along with the fraction of the population covered by these systems. Additional notification systems that don't require phone or internet are also captured in this section, since WUI events frequently result in power outages or other service interruptions.

C101.6 Evacuation. This section of the Community WUI Hazard Evaluation is not intended to replace a full community evacuation study or act as a community evacuation plan. The primary purpose of this section is to compute, given a number of assumptions, a Minimum Throughput Time (MTT), to provide an initial idealized order of magnitude time to be considered in the early stages of evacuation pre-planning. This information can be of value to first responders and community emergency planning personnel, as it may potentially highlight critical evacuation bottlenecks inside or outside the community.

The MTT concept is a traffic engineering calculation of roadway capacity to provide an initial lower bound for planning community evacuation. The MTT is intended for isolated and partly isolated interface and intermix communities rather than a city setting with large populations and complex evacuation routes. A community should consider a detailed evacuation study to further enhance the community evacuation plan. There is a significant body of work associated with developing dynamic evacuation models. An example of a framework which includes coupled fire and evacuation considerations, as well as background on the individual model components, was published in 2019 in Safety Science, Volume 118, authored by Ronchi et al., titled "An open multi-physics framework for modelling WUI fire evacuations," on pages 868-880.

The MTT considers two significant factors: bottlenecks within and beyond town, and the total number of vehicles that must be accommodated. Bottlenecks slowing traffic throughput may be located within or outside of jurisdictional boundaries. Bottlenecks occurring well beyond the evacuating community may cause ripple effects significantly impacting community evacuation. In identifying the population for computing the MTT, consideration should be given to neighboring settlements/communities that may share the same evacuation route(s). The MTT should consider the minimum number of traffic lanes (i.e., 8 lanes merging into 2 lanes should be treated as 2 lanes) available for evacuation, the community population and the average speed limit of the egress routes. Contraflow, the implementation of reverse direction traffic flow, may be considered here, along with provisions for first responder access to the community. The computed Minimum Throughput Time (MTT) does not account for any of the numerous potential hindrances to evacuation traffic, such as road accidents, reduced speed due to smoke obscuration, merging of traffic in town to feed the primary arteries, large vehicles that occupy more space than cars and have reduced maneuverability, or fire activity impacts, such as burn overs, causing evacuation lane(s) closures and potential slowdowns associated with traffic redirections.

The evacuation section is also used to identify vulnerabilities of egress arteries including vegetative fuel setbacks as well as any hazardous material facilities which might affect evacuation. Fuel setback information, collected in 0.15 miles (0.25 km) increments along egress routes, presented in the form of a histogram and a GIS layer, could help identify vulnerable spots that may potentially impact evacuation and identify candidate locations for fuel treatments.

The presence of a Community Evacuation Plan, the presence and capacity of safety zones and other large crowd assembly areas, and whether evacuation drills are performed will contribute to the community evacuation preparedness overview. The number of hospitals and senior care facilities and their total capacity will provide further information to assess overall community evacuation needs.

C101.7 Infrastructure / COOP / COG. The locations and needs of key facilities for maintaining continuity of operations (COOP) and continuity of government (COG), such as police, fire, EMS, hospitals, government buildings, cell towers, water sources, water provider infrastructure, electrical utility key infrastructure and natural gas key infrastructure should be listed and incorporated in this part of the evaluation framework.

Infrastructure characteristics, particularly related to water supply and electric utilities, can impact response and potential pre-fire hazard reduction. The public water system dependence on power supply, including the availability of backup power sources (i.e., generator backup) will provide insight into the resilience of the water system. The location of power lines (i.e., above or below ground) can impact evacuation, as downed power lines can impact evacuation and mobility throughout the community.

C101.8 Fire Fighting Response. The type of fire department, whether volunteer, career, or combined, may impact the likely availability and response time of first responder resources. The density of firefighting (ff) responders, as a ratio of the number of personnel on shift to the number of structures (number of ffs/number of structures) will provide information on the maximum possible coverage by the local resources.

In this section, mutual aid resources should be counted only if mutual aid agreements are in place and can ensure rapid deployment. Mutual aid response is captured through a histogram in 1-, 2-, 3- and 4-hour travel times. This may also be approximated using a geographic radius of distance from the community. The purpose of this information is to provide insight into the minimum response times by mutual aid.

TABLE C101.1 COMMUNITY WUI FIRE HAZARD EVALUATION FRAMEWORK

COMMUNITY	DATA TYPE	DATA LAYER IN MDS
Community shapefile, geodatabase or Geo-Package including topography and geographic attributes, and prevailing weather patterns (e.g., wind)	GIS layer	X
FUELS		
Structure Density (structure separation distances—SSD)	SSD histogram	
Age of structures	Histogram	
Vegetative fuel loading Fuel type Fuel loading	Fuel type Tons/acre	
Natural and artificial fuel breaks (including fuel treatments withina dn around community and year built)	List, GIS layer	X
Community hazards (e.g., hazmat and high fuel load facilities)	Specify, GIS layer	X
Fire History	Frequency of, and most recent, fires in/around community	X
POPULATION		
Population Density Permanent/transient ratio	Number, age distribution Number/acre P/T ratio	
NOTIFICATION		
Reverse 911 Opt-in or Opt-out Percent of population enrolled in Reverse 911	Opt-in/Opt-out Percentage	
Sirens or other notification with power backup Percent of populatin within siren coverage range	List Percent of population	
Notification dissemination without phone or internet	Y/N	
EVACUATION		
Egress Route Capacity (Minimum Throughput Time)	Time (hours)	
Vulnerability of egress arteries: Fuel setback Hazmat/highfuel load factilities affecting evacuation Other	Fuel setback data, GIS layer, Specify, GIS layer	X X X
Hospitals and senior care facilities	Specify, number of persons	X
Community evacuation plan Safety zones and large crowd assembly areas, capacity Evacuation drills	Y/N, specify, GIS layer Y/N, specify, GIS layer Y/N, specify, GIS layer	X X X
Community in evacuation route of other communities, through-flow number	Y/N, identify, number	

INFRASTRUCTURE / COOP / COG		
Location and needs of key facilities	List	X
Public water	Y/N	
Dependence on power	Y/N	
Generator backup	Y/N	
Community owned water	Y/N	
Power lines around primary arteries (above ground or below)	Above or Below	X
Critical infrastructure that requires fuel to keep operating	Specify, GIS layer	X
FIRE FIGHTING RESPONSE		
Volunteer vs Career (availability of first responder resources at station)	Volunteer / career / combination	
Density of firefighting (FF) responder to number of structures (FF/structure ratio)	FF/structure	
Mutual aid response (engines-hours histogram) and agreements with mutual aid	Engines-hours histogram	

Reason: The proposed appendix in the Wildland Urban Interface Code is meant to be a tool to enable communities to collect, assemble, and represent the associated risks within the Wildland Urban Interface (WUI) fire area.

Community level fire hazard data is not always readily available in a centralized location and not in a standard format. The proposed framework enables communities' leaders to collect their WUI fire hazard data in an immediately accessible format.

This framework allows the community WUI fire hazard area data to be an inclusive picture. Part of the data assembled in the framework layout will help first responders during an incident. This data may enhance situational awareness, facilitate ingress and egress routes, and increase structure survivability through targeted fire responder actions.

The framework allows decision makers the ability to access WUI fire hazard risks across multiple communities when implemented in this standardized method. For example, a comparison can be made between a community of 5,000 residents to a community with 20,000 residents. They will be able to compare their overall fire hazard as well as the relative fire hazard.

The information from the standardized framework may be used to assist with making design and prioritize resources at the community, county, and state level. These resources may include funding for fuel treatment around communities in designated very high fire hazard severity zones.

The proposed framework has the benefit of enabling communities, county and state to use a methodized approach to assess hazards, offer property solutions and inform first responders before and during incidents.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The cost impact will be varied. Much of the data is already available but may be in many different documents. Pulling the data together will range from zero to "X" amount for a new community starting from scratch. The intent is to be a standard approach for any size community.

WUIC71-24

WUIC72-24

IWUIC: APPENDIX G, SECTION G101, G101.1, G101.2, G101.3, G101.3.1, G101.3.2, G101.3.3, G101.3.4, G101.3.5, G101.3.6, G101.4, APPENDIX G (New), SECTION G101 (New), G101.1 (New), G101.2 (New), G101.2.1 (New), G101.3 (New), G101.3.1 (New)

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2024 International Wildland Urban Interface Code

Revise as follows:

~~APPENDIX G SELF-DEFENSE MECHANISM~~

~~SECTION G101~~ ~~GENERAL~~

~~G101.1 Identification of the problem.~~
~~The *International Wildland-Urban Interface Code* establishes a set of minimum standards to reduce the loss of property from wildfire. The purpose of these standards is to prevent wildfire spreading from vegetation to a building. Frequently, proposals are made by property or landowners of buildings located in the wildland-urban interface to consider other options and alternatives instead of meeting these minimum standards. This appendix chapter provides discussion of some elements of the proposed self-defense mechanisms and their role in enhancing the protection of exposed structures.~~

~~G101.2 Structural survivability.~~
~~Various stages of assault occur as a building is exposed to a wildland-urban fire. Ashes are cast in front of a fire out of a smoke or convection column, which can result in secondary ignitions. Heavier embers that have more body weight and may contain more heat to serve as sources of ignition follow. Finally, the actual intrusion of a flame front and the radiant heat flux can expose combustibles outside of a building and the exterior structure of a building to various levels of radiant heat. A study revealed that the actual exposure of a building to the flame front by the perimeter of the fire was usually less than 6 minutes. However, the exposure to the forms of other materials that can result in proliferation of other ignitions can vary, depending on wind, topography and fuel conditions.~~
~~To enhance structural survivability, the self-defense mechanisms must, first, do everything possible to prevent the ignition of materials from objects that are cast in front of the fire and, second, they must withstand the assault of the fire on the structure to prevent flames from penetrating into the building and resulting in an interior fire. There are considerable problems in achieving both of these objectives using some of the proposed alternative forms of protection such as the lack of definitive standards for self-defense mechanisms on the exterior of buildings. Although fire service has done considerable research into the evaluation of technology, such as smoke detectors, fire alarms, and interior sprinkler systems, very limited amount of study has been done on exterior sprinkler systems.~~
~~All forms of fire protection are classified as either active or passive. Active fire protection is taking specific action to control the fire in some manner. Passive fire protection uses resistance to ignition or provides some form of warning that allows other action to be taken. These two classifications of self-defense mechanisms create different problems with regard to being accepted as alternatives for building construction. Furthermore, certain self-defense mechanisms must be built in during new construction, and others may only be capable of being added as a retrofit to existing structures. As a matter of public policy, most *code officials* are reluctant to accept passive fire protection as an equivalent to a construction requirement, but are also reluctant to accept active fire protection systems that require intervention by suppression personnel.~~
~~The unequal distribution of self-defense mechanisms within a specific neighborhood poses another problem. If an individual is granted a waiver or exemption on the basis of putting in a nonmandated self-defense mechanism, and the neighbors to either side choose not to do so, or are not given the same options, there is a potential operational problem.~~

~~G101.3 Alternative concepts.~~
~~Sections G101.3.1 through G101.3.6 provide consideration of several alternative self-defense mechanisms.~~

~~G101.3.1 Exterior sprinkler systems.~~

~~Currently, there is no nationally accepted standard for the design and installation of exterior fire sprinkler systems. Interior sprinkler systems are regulated by nationally recognized standards that have specific requirements. However, exterior sprinkler systems lack such uniformity. What is generally proposed is a type of sprinkler system, placed on the roofs or eaves of a building, whose primary purpose is to wet down the roof. These types of systems can be activated either manually or automatically. However, the contemporary thought on exterior sprinkler systems is that if the roof classification is of sufficient fire resistance, exterior sprinklers are of little or no value. Another option and alternative with exterior sprinklers is to use them to improve the relative humidity and fuel moisture in the *defensible space*. In this case, the exterior sprinkler is not used to protect the structure as much as it attempts to alter the fuel situation. However, studies do not support the idea that merely spraying water into the air in the immediate vicinity of a rapidly advancing wildland-urban fire does much good. Clearly, irrigation systems that keep plants healthy and fire-resistive plants that resist convection and radiated heat can accomplish the same purpose.~~

~~G101.3.2 Alternative water supply systems for exposure protection~~.

~~Pools and spas are often offered as an alternative water source for fire departments. These water sources must be reliable and able to be accessed to be of any use by fire protection forces. Accessibility means that the fire department must be able to withdraw the water without having to go through extraordinary measures such as knocking down fences or having to set up drafting situations. Designs have been created to put liquid- or gas-fueled pumps or gravity valves on pools and spas to allow fire departments to access these water systems. A key vulnerability to the use of these alternative water systems is loss of electrical power. When the reliability of a water system depends on external power sources, it cannot be relied upon by fire fighters to be available in a worst-case scenario.~~

~~G101.3.3 Class A foam systems~~.

~~One technology is Class A foam devices. These are devices that allow a homeowner to literally coat the exterior of their house with a thick layer of foam that prevents the penetration of embers and radiant heat to the structure. Experiments in various wildland fire agencies advocate foaming houses in advance of fire and flame fronts. To be accepted by the *code official*, the Class A foam system should pass rigorous scrutiny with regard to the manner and needs in which it is activated, the ways and means in which it is properly maintained, and a ways and means to test the system for its operational readiness during hiatus between emergencies.~~

~~G101.3.4 Enhanced exterior fire protection~~.

~~This alternative method would increase the degree of fire resistance on the exterior of a building. This is most often an alternative recommended as a retroactive application when individual properties cannot achieve adequate *defensible space* on the exterior of a building. Normally, fire resistance and building scenarios are concerned with containing a fire. Fire-resistance ratings within building design ensures resistance to a fire for the specified time to compartmentalize the building's interior.~~

~~To improve fire resistance on the exterior of the structure, the primary emphasis is on preventing intrusion into the building. This means protection of apertures and openings that may or may not be required to have any degree of fire resistance by accepted building codes. The option that is available here is for individuals to provide coverage in the form of shutters or closures to these areas, which, along with maintenance of combustible-free perimeters, can often prevent intrusion.~~

~~There are obvious limitations to this alternative. First and foremost is the means of adequately evaluating the proposed fire resistance of any given assembly. Testing techniques to determine fire resistance for such objects as drywall and other forms of construction may not be applicable to exterior application. Nonetheless, *code officials* should determine the utility of a specific fire resistance proposal by extrapolating conservatively.~~

~~G101.3.5 Shelter in place~~.

~~Developments in the wildland-urban interface may be designed to allow occupants to "Shelter in place." Use of this design alternative should include ignition-resistant construction, access, water supply, automatic sprinkler systems, provisions for and maintenance of *defensible space*, and a *Fire Protection Plan*.~~

~~A *Fire Protection Plan* describes ways to minimize the fire problems created by a specific project or development. The purpose for the *Fire Protection Plan* is to reduce the burden and impact of the project or development on the community's fire protection delivery system. The plan may utilize components of land use, building construction, vegetation management and other design techniques and technologies. It should include specific mitigation measures consistent with the unique problems resulting from the location, topography, geology, flammable vegetation and climate of the proposed site. The plan shall be consistent with this code, and approved by the fire *code official*. The cost of preparation and review is to be borne by the project or development proponent.~~

~~G101.3.6 Building location~~.

~~The location of a new building within lot lines should be considered as it relates to topography and fire behavior. Buildings located in natural chimneys, such as narrow canyons and saddles, are especially fire prone because winds are funneled into these areas and eddies are created. Buildings located on narrow ridges without setbacks may be subjected to increased flame and convective heat exposure from a fire advancing from below. Stone or masonry walls can act as heat shields and deflect the flames. Swimming pools and rated or noncombustible decks and patios can be used to create a setback, decreasing the exposure to the structure. Attic and under-floor vents, picture windows and sliding glass doors should not face possible corridors due to the increased risk of flame or ember penetration.~~

~~G101.4 Conclusion~~.
~~The purpose of the *International Wildland-Urban Interface Code* is to establish minimum standards that prevent the loss of structures, even if fire department intervention is absent. To accept alternative self-defense mechanisms, the *code official* must carefully examine whether these devices will be in place at the time of an event and whether they will assist or actually complicate the defense of the structure by fire suppression forces if they are available.~~
~~The best alternative to having a building comply with all of the provisions of this code is to remove sources of fuel. This is closely paralleled by excellent housekeeping between the vegetation and the structure. Alternative ways of achieving each of these goals can and should be considered after scrutiny by appropriately credentialed and qualified fire protection personnel.~~

Add new text as follows:

APPENDIX G VOLUNTARY HOME-HARDENING RECOMMENDATIONS

SECTION G101 GENERAL

G101.1 Identification of the problem. The International Wildland-Urban Interface Code establishes a set of minimum standards to reduce the loss of property from wildfire. The purpose of these standards is to prevent wildfire from spreading from vegetation to a building. Many homes were built in the wildland-urban interface areas prior to the implementation of provisions found in this code. As a result, many homes are lacking in their ability to survive an approaching wildfire. Many of the features discussed herein are designed as low-cost features to retrofit existing homes. Additionally, many owners desire to increase the survivability of their home and provide additional protection beyond the minimums prescribed in this code. This appendix chapter provides discussion of some elements of possible features to enhance survivability and harden the structure against an approaching wildfire.

G101.2 Structural survivability. The home hardening features listed in Section G101.21 were developed as a best practices guide to assist homeowners to increase the ignition-resistance of their homes from wildfires. Some of these items are based on upgrading to more stringent building materials when that building component is due for replacement as part of its normal maintenance or lifespan, such as the roof covering.

G101.2.1 Home hardening features. If homes are not already provided with the suggested protection, the following items should be considered in hardening a home against wildfire:

1. When it is time to replace your roof, replace it with a Class A fire rated roof.

2. Block any spaces between your roof covering and sheathing with noncombustible materials (bird stops).

3. Install a noncombustible gutter cover on gutters to precent the accumulation of leaves and debris in the gutter.

4. Cover your chimney and stovepipe outlets with a noncombustible corrosion resistant metal mesh screen (spark arrestor), with 3/8-inch to 1/2-inch openings.

5. Install ember and flame-resistant vents.

6. Caulk and plug gaps greater than 1/8-inch around exposed rafters and blocking to prevent ember intrusion into the attic or other enclosed spaces.

7. Inspect exterior siding for dry rot, gaps, cracks, and warping. Caulk or plug gaps greater than 1/8-inch in siding and replace any damaged boards, including those with dry rot

8. Install weather-stripping to fill gaps greater than 1/8-inch between garage doors and door frames to prevent ember intrusion. The weather-stripping must be compliant with UL Standard 10C.

9. When it's time to replace your windows or skylights, replace them with multilayered glazed panels containing at least one tempered pane or dome.

10. When it's time to replace your siding or deck, use compliant noncombustible or ignition-resistant materials.

11. Cover openings to operable skylights with noncombustible metal mesh screen with openings in the screen not to exceed 1/8-inch.

12. Install a minimum 6-inch metal flashing, applied vertically on the exterior of the wall at the deck-to-wall intersection to protect the building siding material.

G101.3 Defensible space features. The maintenance and defensible space features listed in Section G101.31 were developed as a best practices guide to assist homeowners to increase the effectiveness of their defensible space and improve the effects of the home hardening features to increase the survivability of their homes from wildfires.

G101.3.1 Maintenance and defensible space. The following maintenance and operational procedures assist to limit the impact on a home from an approaching wildfire:

1. Regularly clean your roof, gutters, decks, and the base of walls to avoid the accumulation of fallen leaves, needles, and other flammable materials.

2. Ensure that all combustible materials are removed from underneath, on top of, or within five feet of a deck.

3. Remove vegetation or other combustible materials that are within five feet of windows and glass doors.

4. Replace wood mulch products within five feet of all structures with noncombustible products such as dirt, stone, or gravel.

5. Remove all dead or dying grass, plants, shrubs, trees, branches, leaves, weeds, and pine needles within 30 feet of all structures or to the property line.

6. Ensure exposed firewood is stored at least 30 feet away from structures or completely covered in a fire-resistant material that will not allow embers to penetrate. Additionally, make sure you have 10 feet of clearance around your wood piles.

7. Be sure to store combustible outdoor furnishings away from your home when not in use.

8. Remember to properly store retractable awnings and umbrellas when not in use so they do not collect leaves and embers.

Reason: Home hardening is the term used to describe vegetation management compliance and building materials used to resist the intrusion of flames or embers projected by a wildland fire. It can be applied to new construction or for retrofitting an older home. Home Hardening considers the relationship between your home and its exposure to nearby combustible features such as vegetation, vehicles, accessory buildings, or even miscellaneous structures like a fence.

Your roof is one of the most vulnerable areas of your home! Due to its large surface area, your roof is more susceptible to embers and flame.

How is a roof vulnerable?

- Combustible roof coverings such as a non-fire-retardant treated wood shake or shingle roof. California requires roof coverings and assemblies to be Class A-ratedExternal Link. Common Class A roof coverings include asphalt shingles, tile or cement shingles, or metal panels.
- Gaps or openings in your roof assembly that have degraded exposing unprotected roof components.
- Debris accumulation on your roof, especially when located next to vulnerable areas such as combustible wall intersections.

What to do about a roof

- Keep your roof clear of debris and vegetation.
- Fill in gaps between the roof covering and the sheathing to prevent the intrusion of embers and flame.
- When it is time to replace your roof, install a Class A-rated roof covering such as asphalt fiberglass composition shingles.
- Replace combustible siding at roof-to-wall intersections with noncombustible siding.

How are roof attachments vulnerable?

- Debris accumulation around roof attachments.
- Gaps or penetrations in the roof covering from the installation of a roof attachment like a solar panel.

What to do about roof attachments

- Check periodically and keep areas around roof attachments free of debris.
- Ensure that roof attachments have enough space underneath them so that debris does not accumulate.
- Ensure openable skylights have a noncombustible metal mesh screen not exceeding 1/8 inch and have multipaned glazing with one layer of tempered glass.
- Install metal flashing around exposed wood frame skylights.

Check your gutters! Clean gutters regularly and install noncombustible gutter covers on gutters.

How are gutters vulnerable?

- Gutters without a gutter cover can allow accumulation of debris making it highly susceptible to embers and fire. If the debris catches on fire, it exposes unprotected combustible areas of your roof assembly.
- Gutters made of combustible materials such as vinyl can catch on fire and expose unprotected combustible areas of your roof assembly.

What to do about gutters

- At a minimum, install a noncombustible gutter cover to reduce the buildup of debris. When it is time to replace your gutters, replace them with a non-combustible option such as metal.
- Ensure your roof has a metal drip edge installed that completely covers the space above your gutter system.

Make sure your vents are protected from embers and fire. Upgrade your vents!

How are vents vulnerable?

- Access points such as your attic or crawlspace vents are areas embers or flames can enter and ignite combustible materials inside your home.
- Inlet vent that allows for the entry of wind-blown vegetative debris. Ridge or off-ridge vents located on your roof are more susceptible.
- Vents constructed of flammable materials such as plastic are highly vulnerable to embers and flames.

What to do about vents

- At a minimum, vents should have metal mesh screening that is at least 1/8 inch to protect against embers and flame.
- Upgrade to WUI-rated ember/flame-resistant vents. Be sure to accommodate for proper ventilation. Consult your local building official or licensed contractor for local building requirements for wildland areas.
- Keep debris away from all vents.
- Properly seal all openings including around blocking in vent areas.

Plug gaps or openings in your eaves and remove all vegetation and combustible materials that are directly underneath.

How are eaves vulnerable?

- Open eave construction with gaps or penetrations between the rafter tails and blocking as they are entry points for embers.
- Vents in eaves with gaps or penetrations in the blocking.
- Wide overhangs.
- Combustible fuel sources next to your home that can create a fire pathway for embers or flames to your eaves.

What to do about eaves

- Remove vegetation and combustible materials directly below eaves.
- Create a soffit eave (horizontal) or enclose eave (angled) using noncombustible material. Consult your local building official or licensed contractor for building codes in your area.
- Inspect eaves for gaps around rafter roof tails and blocking. Plug or caulk gaps.

Exterior siding that is combustible, has gaps, holes, or rot is vulnerable to both embers and flame.

How is siding vulnerable?

- If ignited, combustible siding can provide a path for flames to penetrate through other vulnerable areas such as windows, under-eave areas, or vents.
- Siding ignition from nearby combustibles that are too close to the house.
- Roof-to-wall areas where combustible siding is present.
- Gaps or penetrations in the exterior covering that are larger than 1/8 of an inch.

What to do about siding

- Plug or repair all gaps, holes, or rot in your exterior siding.
- Consider replacing combustible siding with a noncombustible or ignition-resistant material option. Consult your local building official or licensed contractor for local building codes in wildland areas.
- If a full replacement of your exterior covering is not possible then consider a partial replacement by using a noncombustible siding material for the bottom 2 feet from the ground and add metal flashing to protect the bottom edge sheathing.

Close the gap! Poorly sealed doors with gaps or penetrations provide a path for embers to enter your home or garage.

How are doors vulnerable?

- Doors that have rot or decay.
- Combustible door framing material as embers tend to accumulate at the bottom thresholds and sides.
- Doors that have gaps or penetrations greater than 1/8 inch.
- Door screens that are not made of metal mesh.
- Fuel sources stored nearby or inside a garage which increases its ignition potential.
- Garage doors that lack gasketing or have gaps that allow for the intrusion of embers.

What to do about doors

- Install or replace non-compliant wood screen or sliding doors with a noncombustible option.
- Install metal mesh screens in sliding or screen doors.
- Relocate combustibles and flammables inside your garage so they are not located next to ignition sources.
- Add metal flashing at garage door jambs and headers.
- Add gasketing (weather-striping) to garage doors to prevent ember intrusion.

Remove combustibles and vegetation around windows and upgrade older vulnerable single-pane windows with ones designed for areas that experience wildland fire.

How are windows vulnerable?

- Windows that are left open unattended.
- Combustible framing material that, when ignited, glass breaks or falls out providing a path for embers or flames to enter your home.
- Radiant heat which can cause windows to break even before fire reaches the house. Single-pane and large windows are particularly vulnerable.
- Windows that face large vegetation areas or have vegetation directly underneath.
- Vinyl windows that do not have an internal reinforcement bar in the horizontal or vertical separator member as they are prone to failure from radiant exposure due to deformation of the frame.

What to do about windows

- Install or upgrade to double-pane tempered glass windows. Tempered glass is about four times more resistant to breaking during a wildfire.
- Noncombustible metal framing material is an optimal choice.
- Confirm if vinyl windows have a vertical or horizontal reinforcement bar.
- Create a 0 to 5 ember-resistant zone by removing vegetation and other combustibles by all windows.
- Install metal mesh window screens to improve the performance of windows subjected to radiant heat exposure.

Protect your deck! Deck ignitions can start from flames underneath or embers on top.

How is a deck vulnerable?

- Combustible damaged or rotting deck boards as they are more easily ignitable.
- Deck boards made of combustible materials that are attached to the residence.
- Deck-to-wall intersections that have combustible siding and no metal flashing.
- Combustibles within the first 0 to 5 feet zone around a combustible deck (patio furniture, planter boxes, door mats, etc.)
- Combustible items stored underneath your deck that could be an ignition source for fire.
- Decks that overhang a slope that can be exposed to flames from trees or other vegetation downslope.
- Lattice or other combustible fencing options are used as a vertical enclosure under a deck, as it is readily ignitable.

What to do about decks

- Create an ember-resistant zone under the deck footprint extending five feet outward to reduce the likelihood of under-deck flame exposure. Use hardscapes like gravel, pavers, or concrete.
- Ensure sufficient defensible space if your deck is overhanging and located on a slope to minimize flame spread.
- Replace deck boards with ignition-resistant, noncombustible, fire-retardant-treated wood, or material that complies with performance testing standards (this includes steps, stairs, and railings).
- Replace any damaged or rotting deck boards as they ignite more easily.
- Install a minimum of a 6-inch metal flashing applied vertically on the exterior wall and at deck-to-wall intersections.
- If a full replacement of your deck is not possible then consider a partial replacement by replacing the walking surface boards with a noncombustible option for the first 1 ft. away from the residence.
- Remove combustible items stored under your deck.
- Regularly clear debris on top of or underneath your deck.

Bibliography: https://www.fire.ca.gov/home-hardening

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The section is voluntary. The cost is determined based on the recommendations to harden an existing structure in the Wildland Urban area.

WUIC73-24

IWUIC: APPENDIX H, SECTION H101, H101.1, FIGURE H101.1(1), FIGURE H101.1(2), FIGURE H101.1(3), FIGURE H101.1(4)

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

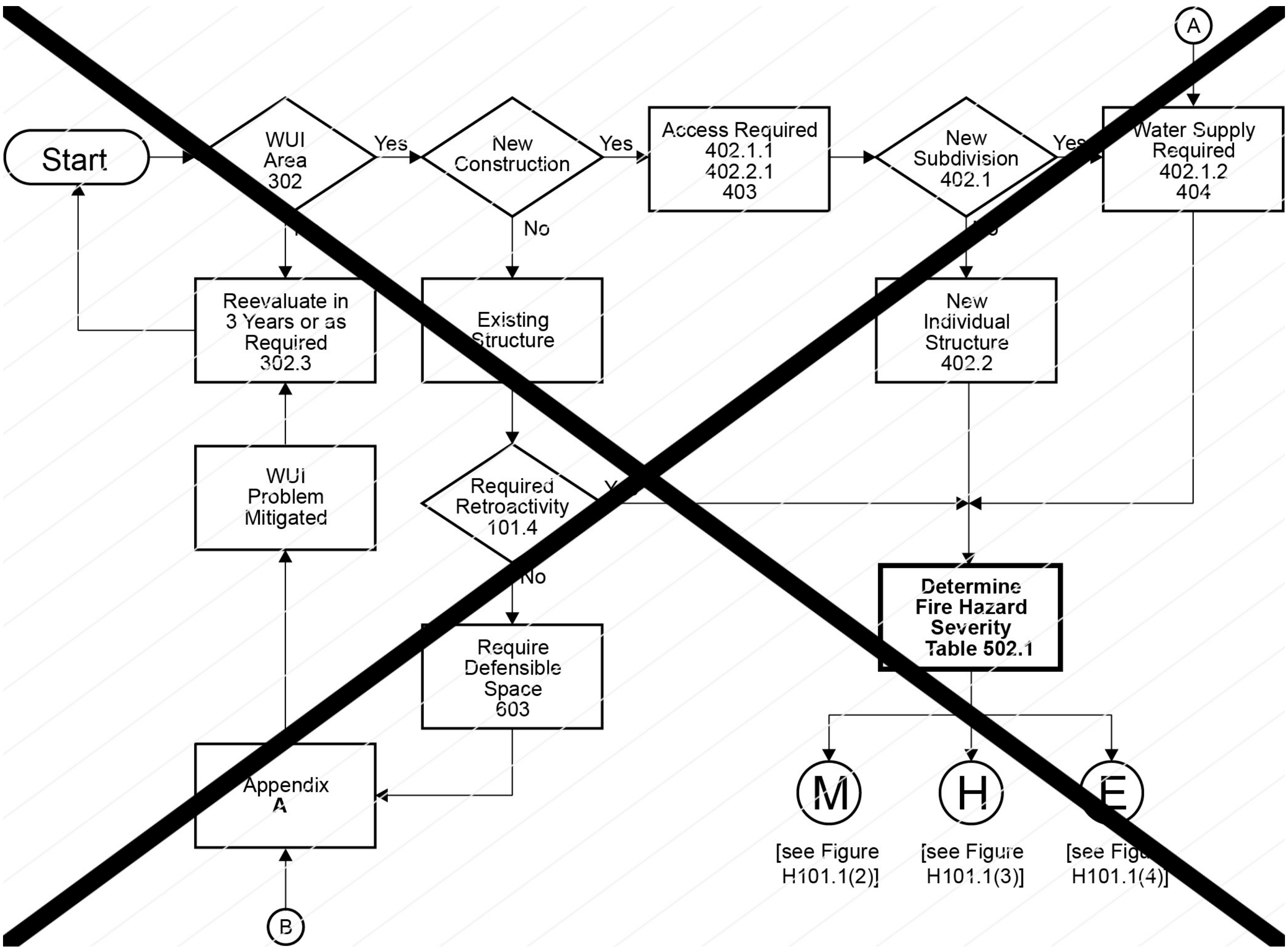
2024 International Wildland Urban Interface Code

Delete without substitution:

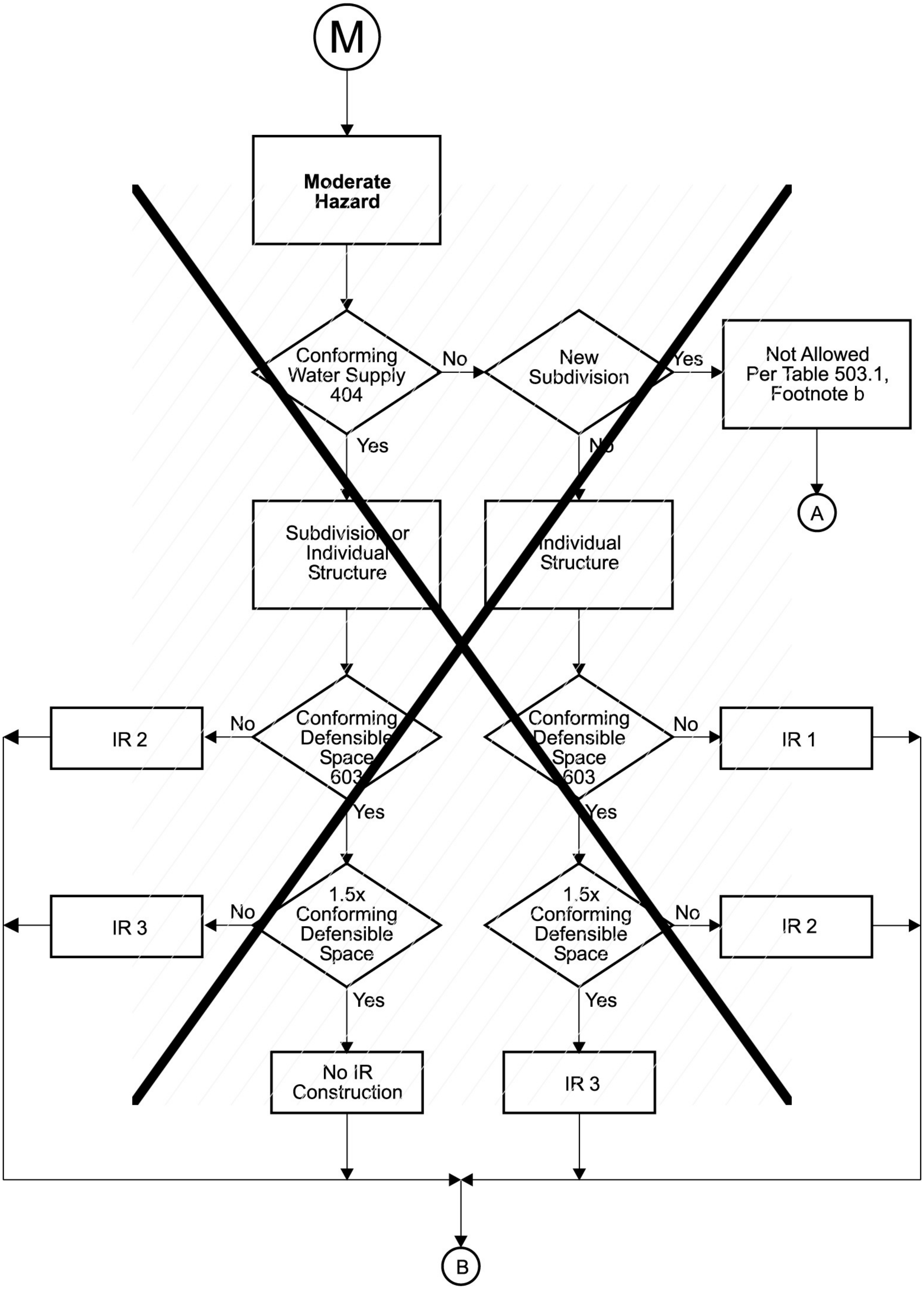
~~APPENDIX H INTERNATIONAL WILDLAND-URBAN INTERFACE CODE FLOWCHART~~

~~SECTION H101~~
~~GENERAL~~

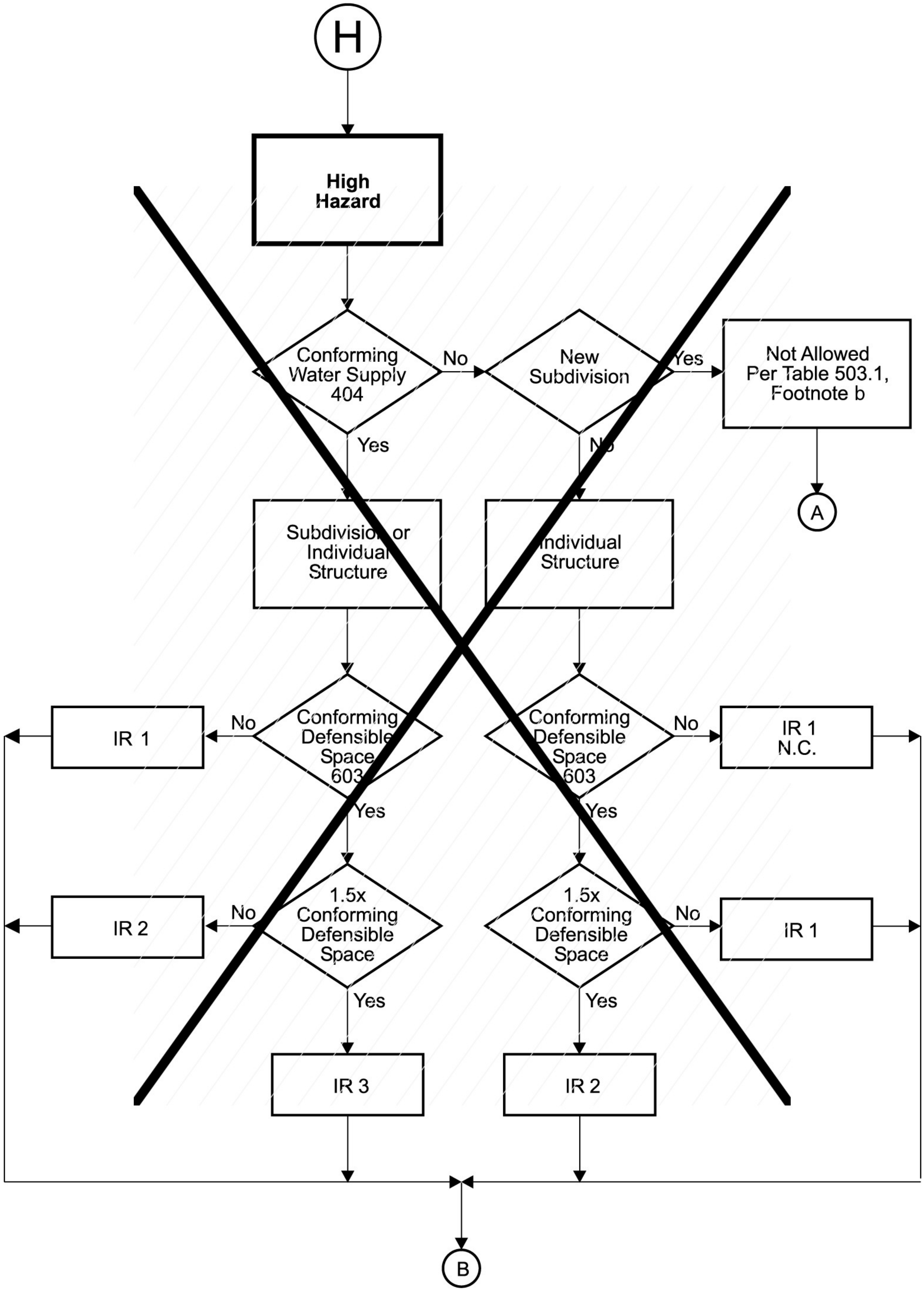
~~H101.1 Flowchart.~~
~~The flowchart shown in Figures H101.1(1) through H101.1(4) is based on the "Decision Tree" concept and is intended to provide the~~ ~~*code official*~~ ~~with a graphical representation of how this code is to be applied.~~



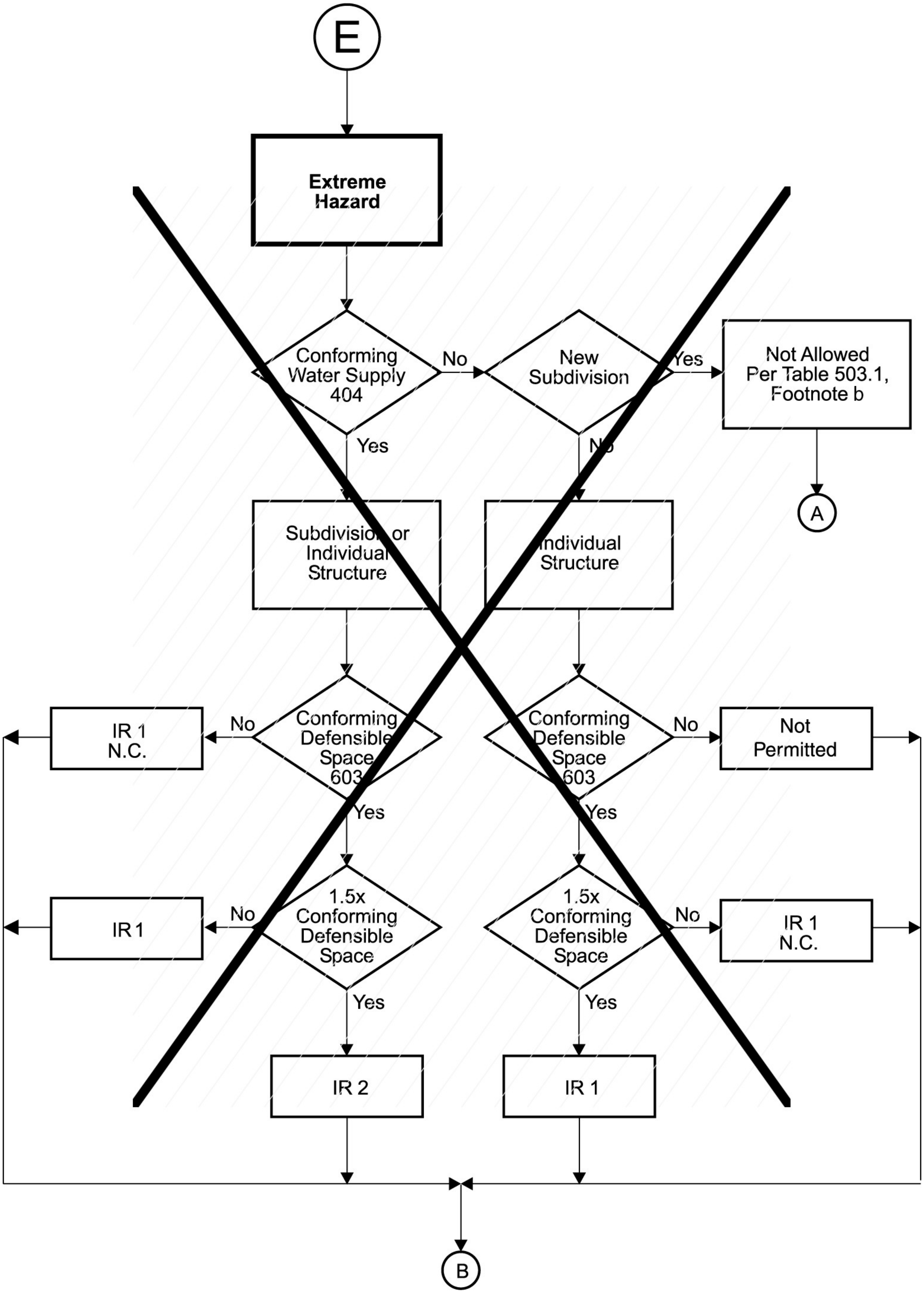
~~FIGURE H101.1(1) DETERMINATION OF REQUIREMENTS~~



~~FIGURE H101.1(2) MODERATE HAZARD~~



~~FIGURE H101.1(3) HIGH HAZARD~~



~~FIGURE H101.1(4) EXTREME HAZARD~~

Reason: This proposal recommends deleting Appendix H without substitution. This appendix is an informational flowchart based on Table 503.1. It has been in the IWUIC since its first edition, in 2003, just like the Table it is based on.

Several other proposals will recommend changes to that Table 503.1. In particular, the flowchart assumes that the issue of water supply is part of the table and that is proposed to be deleted since the intent is to make the structure capable of withstanding the approaching fire on its own, and not be dependent on the arrival of firefighters or application of water to the structure. The flowchart also contains nomenclature (such as IR 1 and IR 1 N.C.) that is proposed to be revised.

This flowchart is unique in the IWUIC code as a guide for a particular table in the code and is unnecessary.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal simply deletes an optional appendix since proposed changes to Table 503.1 will make it inconsistent with the code requirements.

WUIC73-24

CCCIPC1-24

IPC: APPENDIX E, SECTION E103, TABLE E103.3(1)

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Plumbing Code

APPENDIX E SIZING OF WATER PIPING SYSTEM

SECTION E103
SELECTION OF PIPE SIZE

Revise as follows:

TABLE E103.3(1) RECOMMENDED TABULAR ARRANGEMENT FOR USE IN SOLVING PIPE SIZING PROBLEMS

COLUMN	1			2	3	4	5	6	7	8	9	10
Line	Description			Lb per square inch (psi)	Gal. per min through section	Length of section (feet)	Trial pipe size (inches)	Equivalent length of fittings and valves (feet)	Total equivalent length col. 4 and col. 6 (100 feet)	Friction loss per 100 feet of trial size pipe (psi)	Friction loss in equivalent length col. 8 × col. 7 (psi)	Excess pressure over friction losses (psi)
A	Service and cold water distribution piping[a]	Minimum pressure available at main		55.00	—	—	—	—	—	—	—	—
B		Highest pressure required at a fixture (Table 604.3)		15.00	—	—	—	—	—	—	—	—
C		Meter loss 2″ meter		11.00	—	—	—	—	—	—	—	—
D		Tap in main loss 2″ tap [Table E103.3(4)]		1.61	—	—	—	—	—	—	—	—
E		Static head loss 21 ft × 0.43 psi		9.03	—	—	—	—	—	—	—	—
F		Special fixture loss backflow preventer		9.00	—	—	—	—	—	—	—	—
G		Special fixture loss—Filter		0.00	—	—	—	—	—	—	—	—
H		Special fixture loss—Other		0.00	—	—	—	—	—	—	—	—
I		Total overall losses and requirements (Sum of Lines B through H)		45.64	—	—	—	—	—	—	—	—
J		Pressure available to overcome pipe friction (Line A minus Lines B to H)		9.36	—	—	—	—	—	—	—	—
Pipe section (from diagram) Cold water distribution piping	FU		264	—	—	—	—	—	—	—	—	
	AB		288	108.0	54	$2^1/_2$	15.00	0.69	3.2	2.21	—	
	BC		264	104.5	8	$2^1/_2$	0.5	~~0.20~~ 0.085	~~1.9~~ 3.1	0.26	—	
	CD		132	77.0	13	$2^1/_2$	7.00	0.20	1.9	0.38	—	
	CF[b]		132	77.0	150	$2^1/_2$	12.00	1.62	1.9	3.08	—	
	DE[b]		132	77.0	150	$2^1/_2$	12.00	1.62	1.9	3.08	—	
K	Total pipe friction losses (cold)				—	—	—	—	—	—	5.93	—
L	Difference (Line J minus Line K)				—	—	—	—	—	—	—	3.43
Pipe section (from diagram) Hot water distribution piping	A′B′		288	108.0	54	$2^1/_2$	12.00	0.69	3.3	2.21	—	
	B′C′		24	38.0	8	2	7.5	0.16	1.4	0.22	—	
	C′D′		12	28.6	13	$1^1/_2$	4.0	0.17	3.2	0.54	—	
	C′F′[b]		12	28.6	150	$1^1/_2$	7.00	1.57	3.2	5.02	—	
	D′E′[b]		12	28.6	150	$1^1/_2$	7.00	1.57	3.2	5.02	—	
K	Total pipe friction losses (hot)				—	—	—	—	—	—	7.99	—
L	Difference (Line J minus Line K)				—	—	—	—	—	—	—	1.37

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 psi = 6.895 kPa, 1 gpm = 3.785 L/m.

a. To be considered as pressure gain for fixtures below main (to consider separately, omit from "I" and add to "J").

b. To consider separately, in K use C-F only if greater loss than above.

Reason: This is an editorial proposal. The corrections are on intermediate values that do not affect the outcome of the final answer. The corresponding table in the IRC is correct.

This proposal is submitted by the ICC Plumbing Mechanical Gas Code Action Committee (PMGCAC)

PMGCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 PMGCAC has held 26 virtual meetings open to any interested party. In addition, there were several virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the PMGCAC website at PMGCAC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is a simple cleanup of incorrect values in a table.

CCCIPC1-24

CCCIWUIC1-24

IWUIC: 503.2, 503.2.1, 503.2.2, 503.2.3, 503.2.4

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Wildland Urban Interface Code

503.2 Ignition-resistant building material.

Ignition-resistant building materials shall comply with any one of the requirements in Section 503.2.1 through 503.2.4.

503.2.1 Noncombustible material.

Material shall comply with the definition of *noncombustible* materials in Section 202.

503.2.2 Fire-retardant-treated wood.

Fire-retardant-treated wood shall be identified for exterior use and shall meet the requirements of Section 2303.2 of the *International Building Code*.

503.2.3 Fire-retardant-treated wood roof coverings.

Roof assemblies containing fire-retardant-treated wood shingles and shakes shall comply with the requirements of Section 1505.6 of the *International Building Code* and shall be classified as Class A roof assemblies as required in Section 1505.2 of the *International Building Code*.

Revise as follows:

503.2.4 <u>Other</u> Ignition-resistant building material.

Material shall be tested on the front and back faces in accordance with the extended ASTM E84 or UL 723 test, for a total test period of 30 minutes, or with the ASTM E2768 test. The materials shall bear identification showing the fire test results. Panel products shall be tested with a ripped or cut longitudinal gap of $^1/_8$ inch (3.2 mm). The materials, when tested in accordance with the test procedures set forth in ASTM E84 or UL 723 for a test period of 30 minutes, or with ASTM E2768, shall comply with Sections 503.2.4.1 through 503.2.4.3.

> **Exception:** Materials composed of a combustible core and a noncombustible exterior covering made from either aluminum at a minimum 0.019 inch (0.48 mm) thickness or corrosion-resistant steel at a minimum 0.0149 inch (0.38 mm) thickness shall not be required to be tested with a ripped or cut longitudinal gap.

Reason: Editorial cleanup. No change in technical requirements.Section 503.2 has the title of “Ignition-resistant building material” and a subsection has the same title.

This proposal adds the word “Other” in front of “ignition-resistant building material”, to differentiate it from the overall title.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

CCCIWUIC1-24

CCCIFC1-24

IFC: CHAPTER 33, SECTION 3301, 3301.1, 3301.2

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Fire Code

Revise as follows:

CHAPTER 33 FIRE SAFETY DURING CONSTRUCTION<u>, ALTERATION,</u> AND DEMOLITION

SECTION 3301
GENERAL

3301.1 Scope.
This chapter shall apply to structures in the course of construction, *alteration* or demolition, including those in underground locations. Compliance with NFPA 241 is required for items not specifically addressed herein.

3301.2 Purpose. This chapter prescribes minimum safeguards for construction, *alteration* and demolition operations to provide reasonable safety to life and property from fire during such operations.

Reason: The purpose of this code change is to add the term "alteration" to the title of Chapter 33, as the term used throughout the chapter in conjunction with construction and demolition. Some will make the argument that by definition alteration is a form of construction, which is true. However, if the use of the term is necessary in both the scope and purpose sections of this chapter and where the chapter includes different safety provision for buildings undergoing an alteration, it should be specifically included in the title.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Chapter 33 already includes several provisions for alterations to comply with the construction safety requirements. This proposal is purely editorial, as it adds the term Alteration to the title. There are no new technical requirements included in this proposal, therefore there is no change in the cost of construction.

CCCIFC1-24

CCCIMC1-24

IMC®: 1108.5

Proponents: Emily Toto, ASHRAE, ASHRAE (etoto@ashrae.org)

2024 International Mechanical Code

Revise as follows:

1108.5 Copper <u>or copper-alloy</u> pipe. Joints between copper or copper-alloy pipe or fittings shall be brazed, mechanical, press-connect, soldered, threaded or welded joints conforming to Section 1108.3.

Reason: With the change during the last cycle to combine brass pipe and copper pipe, the title was not modified. To avoid confusion, the reference to copper-alloy is added to the title of the section.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The change is editorial in nature.

CCCIMC1-24

CCCIBC1-24

IBC: [F] 907.5.2.3.1, 909.21.1, 2406.4.3; IFC: 907.5.2.3.1, [BF] 909.21.1

Proponents: Stephen Kerr, Josephson Werdowatz Inc, self, Self (skerr@jwa-se.com)

2024 International Building Code

Revise as follows:

[F] 907.5.2.3.1 Public use areas and common use areas.
Visible alarm notification appliances shall be provided in *public use areas* and *common use areas*.

Exception: Where *employee work areas* have audible alarm coverage, the notification appliance circuits serving the *employee work areas* shall be initially designed with not less than 20-percent spare capacity to account for the potential of adding visible notification appliances in the future to accommodate hearing-impaired employee~~(s)~~.

909.21.1 Pressurization requirements.
Elevator hoistways shall be pressurized to maintain a minimum positive pressure of 0.10 inch of water (25 Pa) and a maximum positive pressure of 0.25 inch of water (67 Pa) with respect to adjacent occupied space on all floors. This pressure shall be measured at the midpoint of each hoistway door, with all elevator cars at the floor of recall and all hoistway doors on the floor of recall open and all other hoistway doors closed. The pressure differentials shall be measured between the hoistway and the adjacent elevator landing. The opening and closing of hoistway doors at each level must be demonstrated during this test. The supply air intake shall be from an outside, uncontaminated source located a minimum distance of 20 feet (6096 mm) from any air exhaust system or outlet.

Exceptions:

1. On floors containing only Group R occupancies, the pressure differential is permitted to be measured between the hoistway and a *dwelling unit* or *sleeping unit*.
2. Where an elevator opens into a lobby enclosed in accordance with Section 3007.6 or 3008.6, the pressure differential is permitted to be measured between the hoistway and the space immediately outside the door~~(s)~~ from the floor to the enclosed lobby.
3. The pressure differential is permitted to be measured relative to the outdoor atmosphere on floors other than the following:
   3.1. The fire floor.
   3.2. The two floors immediately below the fire floor.
   3.3. The floor immediately above the fire floor.
4. The minimum positive pressure of 0.10 inch of water (25 Pa) and a maximum positive pressure of 0.25 inch of water (67 Pa) with respect to occupied floors are not required at the floor of recall with the doors open.

2406.4.3 Glazing in windows. Glazing in an individual fixed or operable panel that meets all of the following conditions shall be considered to be a hazardous location:

1. The exposed area of an individual pane is greater than 9 square feet (0.84 m^2).
2. The bottom edge of the glazing is less than 18 inches (457 mm) above the floor or adjacent walking surface.
3. The top edge of the glazing is greater than 36 inches (914 mm) above the floor or adjacent walking surface.
4. One or more walking surface~~(s)~~ are within 36 inches (914 mm), measured horizontally and in a straight line, of the plane of the glazing.

Exceptions:

1. *Decorative glazing*.

2. Where a horizontal rail is installed on the accessible side~~(s)~~ of the glazing 34 to 38 inches (864 to 965 mm) above the walking surface. The rail shall be capable of withstanding a horizontal *load* of 50 pounds per linear foot (730 N/m) without contacting the glass and be not less than $1^1/_2$ inches (38 mm) in cross-sectional height.

3. Outboard panes in insulating glass units or multiple glazing where the bottom exposed edge of the glass is 8 feet (2438 mm) or more above any grade or walking surface adjacent to the glass exterior.

2024 International Fire Code

Revise as follows:

907.5.2.3.1 Public use areas and common use areas. Visible alarm notification appliances shall be provided in *public use areas* and *common use areas*.

Exception: Where employee work areas have audible alarm coverage, the notification appliance circuits serving the employee work areas shall be initially designed with not less than 20-percent spare capacity to account for the potential of adding visible notification appliances in the future to accommodate hearing-impaired employee~~(s)~~.

[BF] 909.21.1 Pressurization requirements.
Elevator hoistways shall be pressurized to maintain a minimum positive pressure of 0.10 inch of water (25 Pa) and a maximum positive pressure of 0.25 inch of water (67 Pa) with respect to adjacent occupied space on all floors. This pressure shall be measured at the midpoint of each hoistway door, with all elevator cars at the floor of recall and all hoistway doors on the floor of recall open and all other hoistway doors closed. The pressure differentials shall be measured between the hoistway and the adjacent elevator landing. The opening and closing of hoistway doors at each level must be demonstrated during this test. The supply air intake shall be from an outside, uncontaminated source located a minimum distance of 20 feet (6096 mm) from any air exhaust system or outlet.

Exceptions:

1. On floors containing only Group R occupancies, the pressure differential is permitted to be measured between the hoistway and a *dwelling unit* or *sleeping unit*.
2. Where an elevator opens into a lobby enclosed in accordance with Section 3007.6 or 3008.6 of the International Building Code, the pressure differential is permitted to be measured between the hoistway and the space immediately outside the door ~~(s)~~ from the floor to the enclosed lobby.
3. The pressure differential is permitted to be measured relative to the outdoor atmosphere on floors other than the following:
   3.1. The fire floor.
   3.2. The two floors immediately below the fire floor.
   3.3. The floor immediately above the fire floor.
4. The minimum positive pressure of 0.10 inch of water (25 Pa) and a maximum positive pressure of 0.25 inch of water (67 Pa) with respect to occupied floors is not required at the floor of recall with the doors open.

Staff Analysis: The ICC Code Correlation Committee (CCC) determined that removing the parentheses and maintaining the "s" (plural form of the word) was appropriate formatting. The CCC approved this item As Modified reflecting this formatting.

Reason: In discussion with ICC staff it was pointed out that in IBC Section 201 (201.2 Interchangeability) words used in the singular number includes the plural and the plural, the singular. To remove redundant language this proposal simply intends to eliminate where both the singular and plural are used together with the "(s)" text.

Bibliography: IBC Section 201.2:

201.2 Interchangeability. Words used in the present tense include the future; words stated in the masculine gender include the feminine and neuter; the singular number includes the plural and the plural, the singular.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposal is purely editorial and does not intend to change any requirements of the building code.

CCCIBC1-24

CCCIPC2-24

IPC: 918.2

Proponents: Ken Smithart Jr, IPS Corporation, Studor (ken.smithart@ipscorp.com); Ronald George, Plumb-Tech Design & Consulting Services LLC, Self (ron@plumb-techllc.com)

2024 International Plumbing Code

Revise as follows:

918.2 Installation.
~~The~~ Air admittance valves shall be installed in accordance with the requirements of this section and the manufacturer's instructions. Air admittance valves shall be installed after the DWV testing required by Section 312.2 or 312.3 has been performed.

Reason: This proposed change is clerical in nature and clarifies that this section is referencing air admittance valves.

Bibliography: Studor Engineered Products Manual - 10th Edition

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

- **Studor Engineered Products Manual - 10th Edition.pdf**
  https://www.cdpaccess.com/proposal/9351/30430/documentation/145736/attachments/download/4295/

Justification for no cost impact:

This is a clerical update to the wording and should not affect the cost.

CCCIPC2-24

CCCIFC2-24

IFC: 3206.7.5

Proponents: Sandie Hastings, Self (sandiehastings@gmail.com)

2024 International Fire Code

Revise as follows:

3206.7.5 Number of doors required. The required fire department access doors shall be distributed such that the ~~lineal~~ linear distance between adjacent fire department access doors does not exceed 125 feet (38 100 mm) measured center to center.

Exception: The linear distance between adjacent access doors shall not exceed 200 feet (60 960 mm) in existing buildings where change in occupancy is not proposed.

Staff Analysis: The ICC Code Correlation Committee (CCC) determined that the appropriate term, by definition, is "linear" rather than "lineal". The CCC approved this item As Modified to replace the term "lineal" with "linear".

Reason: Editorial. The exception should use the same word (lineal) as the body of the code section.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The change proposal is editorial in nature and has no cost impact on the cost of construction.

CCCIFC2-24